DAUGAVPILS UNIVERSITĀTE
DAUGAVPILS UNIVERSITY

DAUGAVPILS UNIVERSITĀTES 65. STARPTAUTISKĀS ZINĀTNISKĀS KONFERENCES

TĒZES

ABSTRACTS OF

THE 65th INTERNATIONAL SCIENTIFIC CONFERENCE OF DAUGAVPILS UNIVERSITY

DAUGAVPILS UNIVERSITĀTES

AKADĒMISKAIS APGĀDS „SAULE"

2023

Daugavpils Universitātes 65. starptautiskās zinātniskās konferences
Programmas komiteja

Dr. psych., prof. **Irēna Kokina** (Daugavpils Universitātes rektore, Latvija) – Programmas komitejas priekšsēdētāja
Dr. biol., prof. **Arvīds Barševskis** (Daugavpils Universitātes zinātņu prorektors, Latvija) – Programmas komitejas priekšsēdētājas vietnieks
Dr. habil. art., prof. **Romualdas Apanavičius** (Vītauta Dižā universitāte, Lietuva)
Dr. habil., prof. **Jakubs Bartoševskis** (Koninas Lietišķo zinātņu Valsts universitāte, Polija)
Dr. philol., prof. **Maija Burima** (Daugavpils Universitāte, Latvija)
PhD, prof. **Yesudas Choondassery** (Bērklijas koledža, ASV)
Dr. paed., asoc. prof. **Sergejs Čapulis** (Daugavpils Universitāte, Latvija)
Dr. art., prof. **Ēvalds Daugulis** (Daugavpils Universitāte, Latvija)
Dr. paed., prof. **Jeļena Davidova** (Daugavpils Universitāte, Latvija)
Dr. habil. philol., prof. **Ina Druviete** (Latvijas Universitāte, Latvija)
PhD, prof. **Ulla Harkonena** (Joensū Universitāte, Somija)
PhD, prof. **Dzintra Iliško** (Daugavpils Universitāte, Latvija)
Dr. hum., prof. **Genovaite Kačiuškiene** (Lietuva)
Dr. biol., prof. **Inese Kokina** (Daugavpils Universitāte, Latvija)
PhD, prof. **Enne Koresaare** (Tartu Universitāte, Igaunija)
Dr., assist. prof. **Detlev Lindau-Bank** (Fehtas Universitāte, Vācija)
Dr. sc. soc., prof. **Vladimirs Meņšikovs** (Daugavpils Universitāte, Latvija)
Dr. chem., asoc. prof. **Sergejs Osipovs** (Daugavpils Universitāte, Latvija)
Dr. habil. sc. ing., prof. **Slavomirs Partickis** (Jāņa Pāvila II Ļublinas Katoliskā universitāte, Polija)
Dr. med., asoc. prof. **Anatolijs Požarskis** (Daugavpils Universitāte, Latvija)
Dr. hist., prof. **Irēna Saleniece** (Daugavpils Universitāte, Latvija)
Dr. habil. biol., prof. **Jaroslavs Sklodovskis** (Varšavas Dzīvības zinātņu universitāte, Polija)
Dr. geol., asoc. prof. **Juris Soms** (Daugavpils Universitāte, Latvija)
Dr. theol., prof. **Anita Stašulāne** (Daugavpils Universitāte, Latvija)
Dr. paed., prof. **Malgoržata Susvillo** (Varnijas un Mazuru Universitāte Olštinā, Polija)
PhD, prof. emeritus **Geoffrey R. Swain** (Glāzgovas Universitāte, Apvienotā Karaliste)
Dr. philol., prof. **Vilma Šaudiņa** (Daugavpils Universitāte, Latvija)
Dr. biol., prof. **Ingrīda Šauliene** (Viļņas Universitāte, Lietuva)
Dr. biol., prof. **Artūrs Škute** (Daugavpils Universitāte, Latvija)
Dr. biol., prof. **Nataļja Škute** (Daugavpils Universitāte, Latvija)
Dr. oec. **Manuela Tvaronavičiene** (Lietuvas ģenerāļa Jona Žemaiša militārā akadēmija, Lietuva)
Dr. habil. paed., Dr. habil. psych., prof. **Aleksejs Vorobjovs** (Daugavpils Universitāte, Latvija)
Dr. iur., prof. **Vitolds Zahars** (Daugavpils Universitāte, Latvija)

Daugavpils Universitātes 65. starptautiskās zinātniskās konferences

Rīcības komiteja

Dr. biol., prof. Arvīds Barševskis (Daugavpils Universitātes zinātņu prorektors, Latvija) – Rīcības komitejas priekšsēdētājs
Ludmila Aleksejeva, Zeltīte Barševska, Maija Burima, Jana Butāne-Zarjuta, Armands Gricāns, Maija Grizāne, Dzintra Iliško, Irēna Kaminska, Jānis Kudiņš, Miervaldis Mendriks, Olita Miglāne, Sergejs Osipovs, Andrejs Radionovs, Matīss Ruskulis, Juris Soms, Uldis Valainis, Anna Vanaga, Elīna Vasiļjeva

Programme Committee of the 65th International Scientific Conference of Daugavpils

Dr. psych., prof. **Irēna Kokina** (Rector of Daugavpils University, Latvia) – Chairman of Scientific Committee
Dr. biol., prof. **Arvīds Barševskis** (Vice Rector for Science of Daugavpils University, Latvia) – Vice Chairman
Dr. habil. art., prof. **Romualdas Apanavičius** (Vytautas Magnus University, Lithuania)
Dr. habil., prof. **Jakub Bartoszewski** (State University of Applied Sciences in Konin, Poland)
Dr. philol., prof. **Maija Burima** (Daugavpils University, Latvia)
PhD, prof. **Yesudas Choondassery** (Berkeley College, USA)
Dr. paed., asoc. prof. **Sergejs Čapulis** (Daugavpils University, Latvia)
Dr. art., prof. **Ēvalds Daugulis** (Daugavpils University, Latvia)
Dr. paed., prof. **Jeļena Davidova** (Daugavpils University, Latvia)
Dr. habil. philol., prof. **Ina Druviete** (University of Latvia, Latvia)
PhD, prof. **Ulla Harkonen** (Joensuu University, Finland)
PhD, prof. **Dzintra Iliško** (Daugavpils University, Latvia)
Dr. hum., prof. **Genovaite Kačiuškiene** (Lithuania)
Dr. biol., prof. **Inese Kokina** (Daugavpils University, Latvia)
PhD, prof. **Enne Koresaare** (University of Tartu, Estonia)
Dr., assist. prof. **Detlev Lindau-Bank** (University of Vechta, Germany)
Dr. sc. soc., prof. **Vladimirs Meņšikovs** (Daugavpils University, Latvia)
Dr. chem., asoc. prof. **Sergejs Osipovs** (Daugavpils University, Latvia)
Dr. habil. sc. ing., prof. **Sławomir Partycki** (The John Paul II Catholic University of Lublin, Poland)
Dr. med., asoc. prof. **Anatolijs Požarskis** (Daugavpils University, Latvia)
Dr. hist., prof. **Irēna Saleniece** (Daugavpils University, Latvia)
Dr. habil. biol., prof. **Yarosław Sklodowski** (Warsaw University of Life Sciences, Poland)
Dr. geol., asoc. prof. **Juris Soms** (Daugavpils University, Latvia)
Dr. theol., prof. **Anita Stašulāne** (Daugavpils University, Latvia)
Dr. paed., prof. **Małgorzata Suswillo** (University of Varmia and Mazuri in Olsztyn, Poland)
PhD, prof. emeritus **Geoffrey R. Swain** (University of Glasgow, United Kingdom)
Dr. philol., prof. **Vilma Šaudiņa** (Daugavpils University, Latvia)
Dr. biol., prof. **Ingrīda Šauliene** (Vilnius University, Lithuania)
Dr. biol., prof. **Artūrs Škute** (Daugavpils University, Latvia)
Dr. biol., prof. **Nataļja Škute** (Daugavpils University, Latvia)
Dr. habil. oec. **Manuela Tvaronavičiene** (The General Jonas Žemaitis Military Academy of Lithuania, Lithuania)
Dr. habil. paed., Dr. habil. psych., prof. **Aleksejs Vorobjovs** (Daugavpils University, Latvia)
Dr. iur., prof. **Vitolds Zahars** (Daugavpils University, Latvia)

Organizing Committee of

the 65th International Scientific Conference of Daugavpils University

Dr. biol., prof. Arvīds Barševskis (Vice Rector for Science of Daugavpils University) – Chairperson of Organizing Committee
Ludmila Aleksejeva, Zeltīte Barševska, Maija Burima, Jana Butāne-Zarjuta, Armands Gricāns, Maija Grizāne, Dzintra Iliško, Irēna Kaminska, Jānis Kudiņš, Miervaldis Mendriks, Olita Miglāne, Sergejs Osipovs, Andrejs Radionovs, Matīss Ruskulis, Juris Soms, Uldis Valainis, Anna Vanaga, Elīna Vasiļjeva

Daugavpils Universitātē docētāju un studējošo zinātniskās konferences notiek kopš 1958. gada. Konferencēm ir starpdisciplinārs raksturs, tajās piedalās gan studējošie, gan arī ievērojami zinātnieki no dažādām pasaules valstīm. Daugavpils Universitātes 65. starptautiskās zinātniskās konferences pētījumu tematika ir ļoti plaša – eksaktajās, humanitārajās, izglītības, mākslas un sociālo zinātņu jomās.

Krājumā Daugavpils Universitātes 65. starptautiskās zinātniskās konferences tēzes = Abstracts of the 65th International Scientific Conference of Daugavpils University apkopoti materiāli, kas tiks prezentēti konferences darba grupās 2023. gada 20.–21. aprīlī un kas atbilst konferences formālajām prasībām.

Krājuma veidotāji saglabā autoru iesniegto tēžu lingvistisko un gramatisko struktūru.

Par norādītajiem faktiem, izteiktajiem viedokļiem un lietoto terminoloģiju atbild tēžu autori.

The annual scientific conferences at Daugavpils University have been organized since 1958. The themes of research presented at the conferences cover all spheres of life. Due to the facts that the conference was of interdisciplinary character and that its participants were students and outstanding scientists from different countries, the subjects of scientific investigations were very varied – in the domains of exact sciences, the humanities, education, art and social sciences.

The Collection of Abstracts of the 65th Scientific Conference of Daugavpils University contains the abstracts on researches, which will be presented in the corresponding work groups organized within the framework of the conference in April, 20–21, 2023. In the abstracts published in ***Daugavpils Universitātes 65. starptautiskās zinātniskās konferences tēzes = Abstracts of the 65th International Scientific Conference of Daugavpils University*** we have preserved the authors' style (linguistic and grammatical structures), and the authors themselves are responsible for the facts and opinions reflected and the terminology used in their abstracts.

MĀKSLA
≈
ART

Elvita Kotāne[1], Aina Strode[2]
[1] *Rezekne Academy of Technologies, Atbrīvošanas aleja 115, Rēzekne, Latvia, LV-4601, elvita.kotane@inbox.lv*
[2] *Rezekne Academy of Technologies, Atbrīvošanas aleja 115, Rēzekne, Latvia, LV-4601, aina.strode@rta.lv*

ASPECTS OF GRAPHIC DESIGN DEVELOPMENT FOR A RURAL TOURISM GUIDE

Keywords: *graphics design, rural tourism, tourist guide*
A tourist guide is an aid to tourists to provide information about a specific geographic location, its historical data, sightseeing spots, and food and accommodation providers. Tourist guides for countries and cities are widely available today, so tourists visiting rural routes have limited access to analyzed and compiled information. The regional and broader tourism guides contain information on only a few locations in rural areas that are not profitable to visit because they are far apart. Nearby and little-known places are not included on the routes as a large proportion of rural tourist sites are unable to provide awareness measures to promote themselves. When analyzing statistics in Latvia, tourists visit state capitals more, unlike Latgale Region. On the other hand, when analyzing a more extended period, the matrix of tourist inflow has a growing dynamic. This indicates that rural tourism has a potential that needs to be developed. Developing a local rural area tourism guide will enable a potential tourist to find information on travel opportunities on this route faster and more conveniently. This will attract tourists and residents, as there will be a systemized tour guide available with developed routes that will be full-fledged for getting to know the local geographical and cultural-historical color for guests, as well as for organizing local studies activities for students. The graphic design of the guide is one of the most critical aspects for the tour guide to be noticed and to interest the consumer to get acquainted with systematically arranged content. Its design must be laconic, easy to understand, and at the same time relevant to the era. Today people want to spend more time in nature, so the tour guide needs to integrate common elements and a color palette that forms associations with the rural environment. During the study, information on the nature of rural tourism was collected and, by conducting an analog analysis, graphic design criteria were developed to create a modern and visible tourism guide.
The aim of the article: to analyze the sources relevant to the topic and define the criteria for evaluating the graphic design of the tourist guide.
Methods of the study: feasibility study for the graphic design development process of a tourism guide-analysis of literature sources and documents on the specifics of rural tourism and the use of graphic design elements in the design of a tourist guide; analog content analysis.

Sarmite Bogdanovica

CONTEMPORARY DESIGN: ASPECTS OF THINKING

1. Contemporary design is not only a visual expression, it is also a matter of thinking and philosophy, which affects society's values, culture and sustainable development.
2. The impact of contemporary design on society includes social, cultural and environmental aspects, as well as technological developments and design ethics.
3. Contemporary design raises new challenges, such as developments in innovative technologies, sustainable and environmental protection requirements, as well as global dimensions and responsibility.
4. Future challenges and opportunities for contemporary design open up the opportunity to use technology to create innovative solutions, promote public welfare and sustainable development, as well as develop design ethics and responsibility.

***Anna Pakere*[1]*, Zeltīte Barševska*[2]**
[1]*Daugavpils University, Vienības street 13, Daugavpils, anna.pakere@lcb.lv*
[2]*Daugavpils University, Vienības street 13, Daugavpils, zeltite.barsevska@du.lv*

IDENTIFYING AND PRESERVING INTANGIBLE CULTURAL HERITAGE IN THE CONTEXT OF LIFELONG LEARNING: TRADITIONS AND INNOVATIONS OF LATVIAN PUBLIC LIBRARIES

Key words: *intangible cultural heritage, lifelong learning, public libraries, culture policy, traditions, innovations.*
Public libraries are an integral part of Latvia's cultural space, which nowadays are often the only cultural and educational institution in a parish/village/city area. Libraries, as unique cultural memory institutions, keep intangible cultural heritage values and ensure their sustainability, stimulate the cultural life of the local community, and give the lifelong learning opportunities, and realize contemporary cultural/artistic events and projects.
The research analyses the experience of Latvian public libraries in intangible cultural heritage cognition, popularization and persistent promotion in the lifelong learning process, ensuring everybody a possibility to get knowledge and skills during the lifetime and improving experience accordingly to interests, wishes, and necessities. The aim of lifelong learning is to connect informal learning with formal education, gaining new competence for participants that is provided by research, practice, and transfer of intangible cultural heritage aspects. For the tradition to become continuous, it must be able to develop in the context of time, and therefore the elements of innovation and interpretation are essential. How Latvian public libraries solve this problem is actualized in the research by summarizing the most successful experience stories and bringing forward the conclusions.
The aim of the research is to find out the opportunities for the conservation of intangible cultural heritage in the context of lifelong learning, based on the experience and initiatives of Latvian public libraries as well as based on "Cultural Policy guidelines "Cultural State"" (2022 – 2027), to develop guidance of organizing thematic cultural/artistic events in the cultural environment of Latvian libraries.

Iveta Feldmane

ĶERMENIS KĀ TRIBĪNE LEONARDA LAGANOVSKA KONCEPTUĀLO DARBU SĒRIJĀS

Atslēgvārdi: *ķermenis, konceptuālā māksla, Leonards Laganovskis, postpadomju perioda māksla*
Indivīda un varas attiecības ir viena no centrālajām tēmām, uz ko dažādos griezumos un izliekot atšķirīgus akcentus fokusējas redzamākais konceptuālās mākslas pārstāvis Latvijā Leonards Laganovskis (1955). Ķermenis, kas pauž vai reprezentē varas ietekmi un nospiedumus, kā arī indivīda ķermeniskās pieredzes aspekti Latvijas mākslā ienāk pakāpeniski un ir konstatējami laika periodā kopš pagājušā gadsimta 60.-80. gadiem. Autore piedāvā kritisku ieskatu divās Leonarda Laganovska darbu kopās, kuru tapšanas laiks sakrīt ar vēlīno padomju un agro postpadomju periodu un reprezentē ķermeni kā noteiktas ideoloģijas nesēju. Pirmajā gadījumā, kur pētījuma objekts ir Laganovska vairāku gadu garumā tapusī akvareļu sērija "Tribīnes", tā ir autoritāras varas ideoloģijas kritika. Otrkārt, tiek apskatīta mākslinieka veidotā foto sērija "Sāga"(1996), kas reprezentē seksualizētu biznesa sievietes tēlu un atražo virkni stereotipu attiecībā uz sievietes ķermeni un dzimumu lomu sabiedrībā. Tēmas izpēti autore balsta feminisma pozīcijās, izvirzot jautājumu, kā mākslinieks traktē sievietes tēlu, viņas ķermeni un sociālo lomu. Autore secina, ka Leonards Laganovskis minētajās darbu sērijās izmanto sievietes tēlu, viņas ārējo izskatu, ķermeni un atsevišķas tā daļas kā instrumentu savas māksliniecisķās stratēģijas īstenošanai. Ņemot vērā to, ka nozīmīgu vietu Laganovska mākslā ieņem teksts, vārdu nozīmju un dzimtes vizualizācijas, kā arī dažādas vārdspēles, autore pievērš uzmanību arī "Sāgas" attēlu parakstiem, kas kalpo nevien kā ironisks komentārs, bet arī paplašina mākslas darba kopējo vēstījumu.

Nellija Muižniece, Žanna Vērdiņa
Daugavpils Universitāte, Vienības street 13, Daugavpils, Latvia, LV5401
nellijamoiseja@inbox.lv, zhanna.verdinja@gmail.com

MEANS OF PORTRAIT EXPRESSION IN THE CONTEMPORARY PAINTING

Key words: *portrait, contemporary painting, painting techniques, mixed media.*
Contemporary art includes the pulse of an era in all its manifestations, including the means of portrait expression. The portrait, directly or indirectly, represents the formation of history, society, social and collective memory, expression of national identity and political contexts. The portrait itself, in the contemporary painting, includes wide range of amplitude - from the individual representation to generalization, from state order to free interpretation, from representation to privacy and intimacy. It is possible to see the development of contemporary art in the portrait, proving the depth of the person and the mastery and novelty of the artist. The aim of this study is to become aware of the portraitists of contemporary paintings, their works, means of expression, techniques, peculiarities and the diversity of possible expressions and materials.

Jeļena Tamane
Daugavpils University, Vienības street 13, Daugavpils, jelena.tamane@du.lv

MODERN TENDENCIES OF TEXTILE DESIGN

Key words: *design, textile, modern tendencies, trends, interior*
Textile and textile products are an integral part of our everyday life. They surround us in the most significant and memorable life moments, make our houses cosy but usual processes - more comfortable. Home textile items are frequently used by interior designers in order to make the space more attractive and eye-catching. During the last years the tendencies of textile production have changed their direction quite noticeably. Textile design development forecasts face global crisis and tend to solve definite human problems. The pandemic had emphasized the importance of home textile design and quality, but limited ecological resources of the planet caused the essence of sustainable usage and green thinking. The era of textile responsible production and dealing with overproduction as one of the most serious Planet's threats has started. Clean and nature positive ideas are reflected also in the textile design that had been represented in the latest world textile exhibitions. Fresh and unordinary views of textiles, circular production, reusing materials, lifelong products and greener production circumstances are the main goals of modern textile industry. Aim of the research is to describe and analyse some of the future-oriented trends of modern textile.

Jeļena Šapkova[1], Zeltīte Barševska[2]
[1]Daugavpils University, Vienības street 13, Daugavpils, jelena.sapkova@inbox.lv
[2]Daugavpils University, Vienības street 13, Daugavpils, zeltite.barsevska@du.lv

REALIZATION OF CULTURAL PROJECTS IN THE CONTEXT OF THE PUBLIC LIBRARIES NETWORK: THE EXPERIENCE OF LATGALE CENTRAL LIBRARY

Key words: *creative cultural project, public library network, Latgale Central library, contemporary cultural space, intangible cultural heritage.*
The Latvian public libraries network is an important resource that ensures the conservation, accessibility, popularization, and sustainability of Latvian intangible cultural heritage, at the same time, supporting and promoting contemporary cultural, educational, and scientific development processes.

Libraries, as contemporary public cultural space, provide free access cultural environment to a wide range of society. They actively implement creative cultural projects, looking for opportunities for extra funding at regional, national, and international levels.
The quality of projects' realization is furthered by several elements including the knowledge of state cultural process, the creativity, and competence of staff, the engagement of reliable and professional partners, and the ability to work in crisis and to think long-term. The realization of cultural projects facilitates the number of visitors in libraries and libraries' recognition, especially in local society, as well as allows creative people (writers, artists, etc.) to communicate with their target audience.
In the process of initiating, planning, and organizing short-term projects it is necessary to be prepared for assessing its feasibility and for analyzing objective risk factors (for example, the capacity of libraries' space and personnel, limited funding, etc.) whereas the risks of long-term projects mainly are connected with the project's idea and solution, moral and technological aging. The time of the pandemic Covid-19 for cultural projects' implementers – libraries – was full of restrictions and challenges but it furthered the rise of new forms, methods, and concepts for the fulfilment of projects' aim and tasks and reaching the target audience.
The aim of the research is to identify, in the context of the public libraries network, the experience of Latgale Central library, as a contemporary cultural space, in the realization of cultural projects over ten years period (2013-2023), to analyze tendencies, opportunities and achieved results, as well as to evaluate the mechanisms of funding engagement in projects' realization.

Gita Palma
Daugavpils Unversity, Vienības 13, Daugavpils, gita.palma@gmail.com

THE EXHIBITION AS A FORM OF COMMUNICATION WITH THE PUBLIC

Before creating an exhibition, whether short-term or long-term, it is necessary to think both about whether the exhibition will reach the visitor, to create a communication that will bring the content-thought of the exhibition to the visitor, and about how the accessibility of the exhibition may change at times when museum attendance is limited. Thus, two studies, which have been produced here in Latvia and published on Culturelab.lv, were examined.
The first of the studies is "Access to culture in Latvia: factors and possible solutions" (2020)
The study analyses whether people easily recall their cultural consumption, how persistent an individual's interests in culture are, whether interest in culture can increase through special events, and how reliable participants' assumptions are about what kinds of cultural events will and will not interest them. It also explores whether and how important barriers to attending a cultural event are cost, distance, the image of culture as an elitist activity, lack of company. The study also examines whether interest in culture is related to the interests of relatives and friends, whether it is explained by habit or by the individual's involvement in creative activities. Finally, it also analyses whether there is sufficient information about cultural events.
The second study is "Cultural offer in conditions of limited contact" (2022)
The study was based on twenty-five testimonies from various museums, visual arts, music, performing arts, cinema, libraries, cultural centers, and festivals on how the working process has been going during the pandemic Covid-19. Since March 2020, it has been a time of great uncertainty for the cultural and creative sector. It has also been a time of gaining new skills and self-learning - of trying, perhaps making mistakes, and trying again.
The key question "how not to lose our audience" has led us to look for new ways of communicating in two important directions: building our cultural offer in the digital environment and bringing cultural content into the urban or outdoor world in more unusual and new formats. The author of this article, Gita Palma thought the pandemic Covid-19 worked at the Popular Front Museum of the Latvian National History Museum (LNVM), including the time when the museum was behind closed doors. Thus, the analysis of the study is also interesting in that one of the experiences comes from the Latvian National History Museum. This was also my experience, says the author of the paper.

Silvija Ozola

THE INFLUENCE OF CHURCHES FOR CITIZENSHIP CATHOLIC PARISHES ON THE LAYOUT AND URBAN SPACE OF HANSEATIC CITIES OF THE ARCHBISHOPRIC OF RIGA IN THE 13TH AND 14TH CENTURIES

On lands of the Baltic Seacoast, the construction of cult buildings in the 12th and 13th centuries expanded with the spread of the Catholic Faith, influencing the spatial organization of the urban environment. Bishoprics and centres of spiritual life were founded for the subjugation of lands, in which fortified residences were provided for the bishop and council. The main architectural dominant of the building complex was the cathedral. The development of two different fortified building units contributed to settlement and the creation of cities. The Riga Archbishopric (1255–1562) subjected to Pope and the Holy Roman Emperor was founded. Churches for citizenship Catholic parishes became architectural dominates in cities that were included in the Hanseatic League.

Research object: urban space of the 13th and 14th centuries in cities of the Hanseatic League.

Research problem: sacral buildings changed urban aesthetics and the original image of cities. The layout and urban space of Hanseatic League cities had been sufficiently studied to preserve their identity during the development of the contemporary urban environment.

Research goal: analysis of the impact of churches for the citizenship Catholic parishes on the planning, visual image and architecturally spatial development of Hanseatic League cities, as well as Riga. **Research novelty**: analysis of common and local features of medieval urban space and the structural evolution of Hanseatic League cities during the 13th and 14th centuries.

Research methods: analysis of archive documents, projects, cartographic materials, studies of published literature, an inspection of churchesin nature, and photo fixation.

Sigija Šķēle-Tomiņa[1], Jeļena Koževnikova[2]

[1] Daugavpils University, Vienības street 13, Daugavpils, Latvia, LV-5401, sigija.skeletomina@gmail.com

[2]Daugavpils University, Vienības street 13, Daugavpils, Latvia, LV-5401, kozevnikova.jelena@gmail.com

VITREOGRAPHY TECHNIQUES AND ARTISTS

Key words: *vitreography, graphic artist, graphic techniques, glass art, printmaking, glass engraver.*

The aim of the research is to show, maintain and popularize a sustainable and internationally recognized graphic environment with the graphics technique - vitreography, outlining trends in graphics as a whole. Thus, it will be possible to get acquainted not only with the non-traditional technique and to synthesize it in the modern space, but also to learn about artists who are able to combine graphics, glass art and vitreography technique in their creative activity. As well as getting an idea of the current innovative approaches and possibilities of use of world art graphics.

The tendency to explain the concept of graphics is quite broad. The method of creative work, technology and innovations in graphics are equally used in the well-known spectrum of graphic techniques - linocut, lithography, dry needle and others. Vitreography is a method of combining glass art and graphics, it is open to novelty: simultaneously experimenting with different materials, technically creating graphic combinations or creating something completely new, surprising with a variety of colors, simple lines, or 3D graphics collections that bring stained glass to life essence and diversity. The vitreography technique also includes the interpretation of 3D effect lights and depth work to create optical illusions. Color, glass and light control are important elements of abstract design. Achieving glass works, layering them, gaining depth, making the painting more hidden, the effect of light and shadow movement in general is really sensational.

Research methods: theoretical - analysis of literature and Internet resources, empirical - case analysis research and method, analogical studies. As part of the research, the author will introduce the vitreography technique, the possibilities of glass materials, graphic artists and artists. The research article is informative, drawing attention to non-traditional graphic techniques, which are practiced more and more often nowadays, as artists experiment and emphasize graphic elements, as well as paying more attention to the vitreography technique. For the research of the topic, the following were used and identified: social sites, as well as the Department of

Glass Arts / Glass department / Art Academy of Latvia. New Britain Museum of American Art and other available literature sources.

BIOLOOĢIJA
≈
BIOLOGY

Inese Kokina[1], Ilona Plaksenkova[2], Lauris Jankovskis[3], Marija Jermalonoka[4], Renata Galek[5]

[1]Daugavpils University, Parādes street 1A, Daugavpils, inese.kokina@du.lv
[2]Daugavpils University, Parādes street 1A, Daugavpils, ilona.plaksenkova@du.lv
[3]Daugavpils University, Parādes street 1A, Daugavpils, laurisjankovskis@gmail.com
[4]Daugavpils University, Parādes street 1A, Daugavpils, marija.jermalonoka@du.lv
[5]Wroclaw University of Environmental and Life Sciences, Grunwaldzki Sq. 24A, Wroclaw, Poland, renata.galek@upwr.edu.pl

A SYSTEMATIC REVIEW ON NEW INSIGHTS ON BIOSYNTHESIS OF NANOPARTICLES USING PLANTS EMPHASIZING THE USE OF ALFALFA (MEDICAGO SATIVA L.)

This systematic review presents knowledge of methods for the biological synthesis of nanoparticles (NPs) using medical plants, mainly alfalfa (*Medicago sativa* L.) plants, their extracts and callus cultures is being studied. The aim of this study is to highlight the least complex and cheapest biosynthesis approaches of metal NPs. Our study offers insights into advantages and disadvantages of the biological NPs synthesis with plants and recommendations to increase efficiency and availability of the plant-induced synthesis of NPs.
Small concentrations of metal NPs stimulates plant growth, but high cause toxicity and decrease the growth. Physical and chemical methods use toxic chemicals as a solvent, which increase NPs toxicity. Biological synthesis of NPs using alfalfa (*Medicago sativa* L.) and other medical plants *in vivo*, their extracts or extracts from callus cultures are non-toxic approaches. Production of NPs using alfalfa plants has several advantages as lower costs, reduction of pollution, improvement of the environment and human health. Alfalfa plants contain synthesis-promoting natural solvents, such biomolecules as phenols, flavonoids, proteins, glycolates which give them anti-inflammatory, antioxidant effects and ability to break down various materials without free radicals making NPs environmentally benign.
This review reveals that often biosynthesis is used to synthesize Ag, Au and ZnO NPs. Synthesis with plant extracts is widely used method, since extracts contain the largest number of biomolecules. Synthesis with living plants (*in vivo*) provides NPs with improved properties for better interactions with plants, but are used less often due to long realization time, need for control of plants growth conditions and difficulty to control size and shape of the synthesized NPs. Future studies are needed to clarify which molecules can provide the most efficient biosynthesis and how plant molecular mechanisms account for the properties of the synthesized NPs.

Sergejs Popovs[1], Tatjana Krama[1,2], Diana Bahhir[3], Liina Ots[3], Vadims Bartkevičs[4], Iveta Pugajeva[4], Tatjana Grigorjeva[1], Māris Munkevics[1,6], Krists Zants[6], Ronalds Krams[1,2], Enno Merivee[2], Anne Must[2], Markus J. Rantala[5], Indriķis Krams[1,3,6], Priit Jõers[3], Giedrius Trakimas[7]

[1]Daugavpils University, Parādes street 1A, Daugavpils, sergey.p@email.com, tatjana.krama@du.lv, tatjana.grigorjeva@du.lv, marismunkevics@gmail.com, ronalds.krams@du.lv, indrikis.krams@du.lv
[2]Estonian University of Life Sciences, Friedrich Reinhold Kreutzwaldi street 5, Tartu, Estonia, tatjana.krama@emu.ee, enno.merivee@emu.ee, anne.must@emu.ee
[3]University of Tartu, Ülikooli street 18, Tartu, Estonia, diana.bahhir@ut.ee, liina.ots@ut.ee, indrikis.krams@ut.ee, priit.joers@ut.ee
[4]Institute of Food Safety, Animal Health and Environment "BIOR", Lejupes street 3, Rīga, vadims.bartkevics@bior.lv, iveta.pugajeva@bior.lv
[5]University of Turku, FI-20014 Turun Yliopisto, Turku, Finland, mjranta@utu.fi

[6]*University of Latvia, Jelgavas street 1, Rīga, marismunkevics@gmail.com, krists.42@inbox.lv, indrikis.krams@lu.lv*
[7]*Vilnius University, Saulėtekio street 7, Vilnius, Lithuania, giedrius.trakimas@gf.vu.lt*

BIOCHEMICAL AND BEHAVIOURAL PHENOTYPE OF FRUIT FLIES (DROSOPHILA MELANOGASTER MEIGEN, 1830) INDUCED BY PREDATOR STRESS

Besides having direct effects on prey populations and communities, predation incurs substantial nonlethal effects on prey, favouring changes in life-history, behaviour, morphology, physiology, and causing adaptive evolution. The chronic stress caused by sustained predation on prey is comparable to chronic stress conditions in humans. Conditions such as anxiety, depression, and post-traumatic stress syndrome have also been implicated in developing metabolic disorders such as obesity and diabetes.
In this study, we found that predator stress induced during larval development in fruit flies (*Drosophila melanogaster* Meigen, 1830) impairs carbohydrate metabolism by systemic inhibition of Akt protein kinase, which is a central regulator of glucose uptake. However, *Drosophila* grown with predators survived better under direct spider predation in the adult phase. Administration of metformin and 5-hydroxytryptophane (5-HTP), a precursor of the neurotransmitter serotonin, reversed these effects.
Our results demonstrate a direct link between predator stress and metabolic impairment, and also that a diabetes-like biochemical phenotype may be adaptive in terms of survival and reproductive success. We provide a novel animal model to explore the mechanisms responsible for the onset of these metabolic disorders that are highly prevalent in human populations.

Evita Oļehoviča[1], Anna Pastare - Skutele[2], Ligita Liepiņa[3], Anna Mežaka[4]
[1] *Department of Biosystematics, Institute of Life Sciences and Technology, Daugavpils University, Parādes street 1, Daugavpils, evita.olehnovica@gmail.com*
[2]*Department of Biosystematics, Institute of Life Sciences and Technology, Daugavpils University, Parādes street 1, Daugavpils, anna.pastare91@inbox.lv*
[3]*Department of Biosystematics, Institute of Life Sciences and Technology, Daugavpils University, Parādes street 1, Daugavpils, ligita.liepina@du.lv*
[4]*Department of Biosystematics, Institute of Life Sciences and Technology, Daugavpils University, Parādes street 1, Daugavpils, anna.mezaka@biology.lv*

BRYOPHYTE SPECIES DIVERSITY IN BLACK ALDER SWAMP FORESTS IN RELATION TO SUBSTRATE CHARACTERISTICS

Black alder swamp forests are characterized by a variety of different microhabitats, which are important for bryophytes. Forestry activities are among the main threats to black alder swamp forests. Therefore, it is important to evaluate bryophyte affinity to various substrates in different forest age classes. The aim of the study was to explore bryophyte diversity in relation to substrate characteristics along black alder swamp forest age chronosequence. Bryophytes were studied on three substrate groups – ground, living trees, and logs. On each substrate class bryophyte cover was evaluated. For the living trees diameter at the breast height and tree species were recorded. Decay stage, presence of bark, diameter and tree species were recorded for logs. Study provides detailed analysis of the role of different substrates and their characteristics on the bryophyte diversity in the black alders swamp forests.

Ligita Mežaraupe, Sanita Kecko, Veronika Pavlova, Jeļena Kirilova, Ilze Rubeniņa, [1]Muza Kirjušina
[1]*Daugavpils University, Parādes street 1, Daugavpils, ligita.mezaraupe@du.lv*

DEVELOPMENT OF STAINING PROTOCOL USING A-ARYL-A-AMINOPHOSPHONATES LUMINOPHORES FOR OPISTHIOGLYPHE RANAE TREMATODE RESEARCH

α-Aminophosphonates are promising organophosphorus compounds in synthesis, farmacy, medicine and other fields. α-Aminophosphonates as natural amino acid analogues, can inhibit different enzymes, typically involved in the metabolism of amino acids, acting as antagonists. α-aminophosphonates have potential antibacterial, anticancer, antimicrobial and antithrombotic effects and therefore are exhaustively studied compounds. At the moment there is not enough information about using α-aminophosphonates as dyes for bioimaging.

With all the above mentioned in mind, two α-aminophosphonate dyes V1 (diisopropyl ((4-chlorophenyl)((9,10-dioxo-9,10-dihydroanthracen-1-yl)amino)methyl)phosphonate) and V2 (diisopropyl ((4-bromphenyl)((9,10-dioxo-9,10-dihydroanthracen-1-yl)amino)methyl) phosphonate) were used for development of staining protocols for confocal laser scanning microscopy (CLSM) of *Opisthioglyphe ranae* trematodes. *O. ranae* is a common parasitic trematode of amphibians and reptiles. In case of this study amphibian parasites were used.

The anthraquinone dyes are applicable for the parasite's internal and external structure detailed imaging using CLSM. Most important systems of *O. ranae* parasite such as the reproductive, digestive, excretory system were clearly visible. Unfortunately dyes did not perform well with the muscular tissue, it was difficult to detect layers and structure of muscles. In the future studies we will continue to test fluorescence properties of α-aminophosphonate derivatives, to find the most appropriate dye for bioimaging with CLSM.

Aleksandra Mošenoka[1], Ilona Plaksenkova[1], Inese Kokina[1], Marija Jermaļonoka[1]

[1]Daugavpils University, Institute of Life Sciences and Technology, Department of Biotechnology, Parades street 1A, Daugavpils, Latvia, LV-5401

EFFECT OF IRON OXIDE NANOPARTICLES ON VARIOUS SIGNIFICANT AGRICULTURAL CROPS

Over the past decade, the use of nanotechnology in various fields of science has increased significantly. Developments in the field of nanobiotechnology have enabled researchers to find new solutions to multitude problems, including those in the agricultural sector. Important topics in this area are the accumulation of nanoparticles in the environment and associated consequences, as well as the search for environmentally friendly solutions for fertilizers. Iron oxide nanoparticles (Fe_3O_4 NPs) are considered low toxic and can easily decompose in the environment. Iron is an essential micronutrient for plants, since the photosynthesis depends on iron. Thus, the availability of iron regulates the growth of the plant. For the past six years, Department of Biotechnology of the Daugavpils University has been studying the effect of Fe_3O_4 NPs on various significant crops. The purpose of this review is to summarize and compare the obtained results in order to better understand of the future goals in nanobiotechnological research. In total, seven independent studies were conducted, where were investigated the effect of Fe_3O_4 NPs on the morphological parameters, chlorophyll content, genome stability and miRNA expression of such plants as arugula (*Eruca sativa* Mill.), yellow medick (*Medicago falcata* L.), barley (*Hordeum vulgare* L.) and common wheat (*Triticium aestivum* L.) growth in hydroponic medium and common flax (*Linum usitatissimum* L.) callus cultures. All these plant species are crops of a worldwide importance. Wheat, barley and arugula are significant sources of food resources. Medick is an important forage plant. In turn, flax has many significant economic values. The data obtained showed both positive and negative results. This proves that in future such studies are necessary for better understanding the potential of Fe_3O_4 NPs in fertilizers and their toxicological effects.

This study was supported by Daugavpils University student research project grant No. 14-89/2023/4.

Giedrius Trakimas[1,2], Tatjana Krama[2,3], Māris Munkevics[2,4], Ronalds Krams[2,3], Tatjana Grigorjeva[2], Priit Jõers[5], Sergejs Popovs[2], Krists Zants[4], Ēriks Sļedevskis[2], Benjamin L. de Bivort[6], Indriķis Krams[2,4,5,7]

[1]Vilnius University, Saulėtekio street 7, Vilnius, Lithuania, giedrius.trakimas@gf.vu.lt

[2]Daugavpils University, Parādes street 1A, Daugavpils, giedrius.trakimas@du.lv, tatjana.krama@du.lv, marismunkevics@gmail.com, ronalds.krams@du.lv, tatjana.grigorjeva@du.lv, sergey.p@email.com, eriks.sledevskis@du.lv, indrikis.krams@du.lv

[3]Estonian University of Life Sciences, Friedrich Reinhold Kreutzwaldi street 5, Tartu, Estonia, tatjana.krama@emu.ee
[4]University of Latvia, Jelgavas street 1, Rīga, marismunkevics@gmail.com, krists.42@inbox.lv, indrikis.krams@lu.lv
[5]University of Tartu, Ülikooli street 18, Tartu, Estonia, priit.joers@ut.ee, indrikis.krams@ut.ee
[6]Harvard University, Oxford street 26, Cambridge, Massachusetts, United States of America, debivort@oeb.harvard.edu
[7]University of Tennessee, TN 37916, Knoxville, Tennessee, United States of America, indrikis.krams@gmail.com

EFFECTS OF PREDATOR PRESENCE AND 5-HT SIGNALLING ON BEHAVIOURAL LATERALIZATION AND SURVIVAL IN DROSOPHILA MELANOGASTER

The presence of predators is known to create changes in a prey's morphology, which affects selection in a prey's phenotype on factors facilitating escape ability. Previous research showed that isogenic *Drosophila melanogaster* flies exhibit individual non-heritable locomotor handedness. The variability of this trait varies across genotypes and is influenced by neural activity in specific circuits. We tested whether *D. melanogaster* flies grown with predators exhibit higher unpredictability in their turning behaviour and altered survival than those grown with no predators in their environment. We found that the unpredictability of turning behaviour increased in fruit flies reared with spiders. This effect was blocked when flies were fed an inhibitor (αMW) of serotonin (5-HT) synthesis. The survival of fruit flies exposed to spider predation as adults was higher in flies that developed with spiders than in control flies. This survival effect was also blocked when flies reared with predators were fed αMW. The results of this study show a negative association between the unpredictability of the turning behaviour of fruit flies and the hunting success of their predators.

Lenonya Francis[1], Tsepo Mokuku[2]
[1]Daugavipls University, Department of Biology, [2]National University of Lesotho, Science education Department.

EXPLORING MINISASS IN THE TEACHING OF SCIENCE. A CASE STUDY IN LESOTHO

Environmental education and sustainability address the survival of learners in their own environment. Water is a critical part of the environment in the context of the study. This exploratory study investigates the effects of a version of Stream Assessment Scoring System (miniSASS), in the teaching and learning of science in the formal classroom teaching, in one secondary school. The study responded to the research question: What water literacy competences are developed among grade 11 science students, with the use of miniSASS? Water literacy theory was used to guide the study. Qualitative approach was employed in the form of Action Research (AR) methodology.
Fifty-two students participated in the study. Participatory observation and semi-structured interview instruments were employed to collect data. The findings show that numerous water literacy competences were developed among grade 11 science students, with the use of miniSASS. These include: Connectedness and familiarity with water, knowledge of safety and quality of water, ability to identify water-related problems and willingness to solve water-related problems. It is, therefore recommended that curriculum developers, education policymakers, Ministry of education and training, Ministry of water and Ministry of Tourism, Environment and Culture and other government ministries should integrate miniSASS in their programmes, in order to improve water literacy among the youth on sustainability of the streams.

Anastasija Čerkesa, Jeļena Oreha, Nataļja Škute
Daugavpils University, Parades street 1A, Daugavpils

GENETIC STRUCTURE OF PERCH (PERCA FLUVIATILIS (L.)) POPULATION IN DAUGAVA RIVER NEAR PLAVINAS CITY AS PART OF PERCH POPULATIONS OF DAUGAVA RIVER THAT ARE FRAGMENTED BY DAMS

Fish resources are one of the most valuable biological resources in Latvia. Anthropogenic activity is diverse, but it can be reduced to a few main effects, like the development of barriers in fish migration paths. The dams may fragment and diminish natural habitats in rivers and create environmental disparities that can result in the loss of genetic diversity, reduced population sizes and inbreeding.
The Eurasian perch *Perca fluviatilis (L.)* is a freshwater, predatory fish. Perch is an anadromous species that is adapted to various habitats and is a quite common fish species in Europe. This fish is often chosen as a model species in many fish population investigations due to its abundance and wide distribution, extended genetic research, diploidy and no stocking effects. The aim of this study was to investigate the genetic structure of Eurasian perch *Perca fluviatilis* (L.).
Daugava River near a Plavinas city and compare it with the genetic structure of Eurasian perch populations in others places of Daugava River — above and below the Ķegums dams.
DNA was extracted from perch muscles by the salt extraction method. DNA was quantified and qualified spectrophotometrically on a BioSpec-nano spectrophotometer (Shimadzu). DNA quality was estimated electrophoretically using 2% agarose gel. The genetic structure of the perch populations was investigated using seven DNA microsatellite loci: Pfla L4, Pfla L10, Pfla L2, and Pfla L6, YP111, YP78, and YP60. The obtained data were processed and analysed using computer softwares POPGENE 1.32 and GenAlEx 6.41. Allele number per locus, frequency, private alleles in each population, observed and expected level of heterozygosity in polymorphic loci were measured, and their differences and significance with 2 criteria were calculated. The genetic differentiation among the populations was estimated by principal component analysis (PCA) and pairwise FST values. The genetic relatedness of the populations was estimated with the help of Nei's (Nei et al., 1983) index of genetic distance (D) using the computer software Populations 1.2.32
Keywords: *fish population genetics, perch, dams, fragmentation, anthropogenic factors.*

Evita Grāvele[1], Mihails Pupiņš[1], Ligita Mežaraupe[1] and Muza Kirjušina[1]
[1]Daugavpils University, Institute of Life Sciences and Technologies, Parādes street 1, Daugavpils, evita_22@inbox.lv

HELMINTH PARASITES OF TAILED AMPHIBIANS WARTY NEWT, LISSOTRITON VULGARIS (LINNAEUS, 1758) AND CRESTED NEWT, TRITURUS CRISTATUS (LAURENTI, 1768) IN LATVIA

The amphibian helminth fauna was formed depending on their biological characteristics, lifestyle, food spectrum, developmental stage, age and sex in their habitat for a certain period of time.
The investigation was carried out at the Laboratory Parasitology and Histology, Daugavpils University from 2017 to 2022. The larvae of tailed amphibians: warty newt (n=227) and smooth newt (n=18) were collected and examined for helminth parasites.
Totally nine parasite species were found in tailed amphibians. The parasites were dominated by the class Trematoda. This class was represented by three adult and four larval species. The most frequent Nematoda was *Hedruris androphora*. Three trematode species *Astiotrema monticelli, Echinoparyhium recurvatum*, *Opisthioglyphe ranae* in metacercaria stage and one nematode species *Hedruris androphora* were found in both investigated newts species. *Opisthioglyphe ranae* in adult stage were found in *L. vulgaris*, but in larval stage in *T. cristatus* newts.
In comparison with the research carried out in Latvia on species of helminth parasites of tailless amphibians (*Bufo bufo*, *Pelophylax esculentus* complex, *Rana temporaria*, *R. arvalis*) were registred 24 species of helminths: Monogenea – 1, Treamtoda – 17, Nematoda – 5, Acanthocephala – 1. Seven common helminth species were observed between tailless and tailed amphibians.
Pathogenic for humans parasites were detected. In frogs and newts were found *Echinoparyhium recurvatum*, but tailless amphibians are involved in the *Alaria alaria* transmission as intermediate host.

V. Vibornijs[1], M. Zubkins[1], E. Strods[1], I. Aulika[1], J. Purans[1], A. Zajakina[2], K. Korotkaja[2], Z. Rudevica[2]
[1]*Institute of Solid State Physics (ISSP), University of Latvia, Kengaraga 8, LV-1063 Riga, Latvia*
[2]*Latvian Biomedical Research and Study Centre (LBMC), Ratsupites 1, LV-1067, Riga, Latvia*

MAGNETRON SPUTTERING OF THIN FILM ANTI-MICROBIAL COATINGS AND ANTI-MICROBIAL EFFICIENCY EVALUATION METHODOLOGIES COMPARISON

Thin-film tungsten oxide, zinc oxide and copper containing coatings were prepared with magnetron sputtering technology. Various parameters like thickness, material layers composition, sputtering pressure, working gases composition and other sputtering process effecting conditions were varied between different samples. Combined thin films with structure $WO_3/Cu/WO_3$, $ZnO_2/Cu/ZnO_2$ and poor copper samples were prepared and tested with gram-positive *Staphylococcus aureus* and gram-negative *Escherichia coli* bacteria cultures and on MS2 bacteriophage virus. Existing anti-microbial property evaluation methodologies like JIS Z 2801 "Antimicrobial products -Test for antimicrobial activity and efficacy" (Association JS 2001) and ES ISO 22196 "Measurement of antibacterial activity on plastic surfaces" (ES ISO 22196) were adapted to perform testing effectively on large amount of samples. Also testing methodologies selectivity was optimized to detect differences of anti-microbial efficiency between samples with slightly different physico-chemical properties.
Bacteria regrowth after 2h contact with samples was measured in liquid broth media and on plate count agar. In case of incubation on LB plate count agar poor copper (copper sample) and effective $WO_3/Cu/WO_3$ samples with layer thickness 45/20/75nm (sample 1); 100/20/100nm (sample 2) sputtered in 5mTorr pressure and Ar to O_2 ration 30/20 sccm, copletely inactivated both bacteria species, log reduction <5. As for least effective $WO_3/Cu/WO_3$ 100/20/100nm thickens samples sputtered in 10mTorr, and Ar to O_2 ratio in range from 15 to 25 sccm *S.aureus* was more vulnerable with log reduction in range from 3 to 3.66 in compare with *E.coli* log reduction 1 to 1.66. When bacteria incubation after contact with sample coatings was performed in liquid LB broth, overly higher level of bacteria inactivation was detected in compare with plate count agar tests. MS2 bacteriophage infection units count reduction 106 was detected on Cu and 5mTorr pressure prepared $WO_3/Cu/WO_3$.
$ZnO_2/Cu/ZnO_2$ (zinc composite) coating was not effective against both bacteria species with log reduction less the 0.1 during incubation on plate count agar, although when preincubated suspension was regrown in liquid broth optical density difference between zinc composite and sample substrate was detected. $ZnO_2/Cu/ZnO_2$ was not effective against MS2. Zinc containing non effective coating was used to determine possible anti-microbial action mechanisms. Reactive oxygen species formation was measured. In case of copper sample testing less reactive oxygen species formation was detected then with zinc composite in contact with PBS broth, RFU 485/535 $1.5x10^5$ and $2.5x10^5$ respectively. But in case of TSB suspended bacteria incubation on zinc composite less ROS detected in compare with copper application. That could be explained with bacteria ability to degrade ROS in case of zinc composite application due to insufficient cell inactivation. Despite insufficient anti-microbial efficiency of $ZnO_2/Cu/ZnO_2$, in case of cell viability testing with MTT (3-(4,5-Dimethylthiazol-2-yl)-2,5-Diphenyltetrazolium Bromide) formazan crystals formation rate decrease was detected in contact with coating, what could be explained with coatings ability to decrease bacteria metabolitic activity without complete cells incactivation or killing effect.

Laura Taube, Uldis Valainis, Maksims Balalaikins
[1]*Department of Biosystematics, Institute of Life Sciences and Technology, Daugavpils University, Parades Street 1a, Daugavpils, Latvia, LV-5401*

MONITORING OF THE HERMIT BEETLE OSMODERMA BARNABITA IN LATVIA, REALITY AND FUTURE PERSPECTIVES

The hermit beetle Osmoderma barnabita is one of the saproxylic species of high conservation value both in Latvia and throughout its distribution range. The species is protected by local and European Union legislation. Inclusion in Annex II of Council Directive 92/43/EEC of 21 May 1992 on the conservation of natural habitats and wild fauna and flora (hereafter the Habitats Directive) provides for regular monitoring and evaluation of

the species' population in accordance with the requirements of Article 17 of the Habitats Directive. The species is monitored since 2000 by revisiting localities and observing species presence/absence. Decisions concerning the presence of the species are based on the assessment of traces of the species, mainly larval faeces in tree hollows. This method has several negative aspects, e.g. only part of the tree cavities are available for research, larval faeces may persist over time and may not indicate the presence of the species in the hollow at a particular time, and furthermore, it is impossible to estimate the population based on this method. A more confident method of discovering O. barnabita is the use of pheromone traps, which are applied in various monitoring activities and studies. However, so far the use of pheromone traps in monitoring has been hampered by significant obstacles, such as the uneven activity of the species during the field survey season, which makes the detection of individuals unlikely during the short exposure period of the trap. Our aim is to update the monitoring methodology and include e-traps in the monitoring scheme, thus obtaining objective data, saving human and material resources. The monitoring proposes using the trap model developed as part of the LIFE "Life Osmoderma" project, with significant improvements. The most significant improvement is the increase in trap operating time without recharging, which ensures continuous trap operation throughout the period of O. barnabita activity. The use of these traps allows the application of a capture-mark-recapture method to estimate population size. The main outcome of the new monitoring approach is the collection of high-quality data and the providing of objective information for reporting under Article 17 of the Habitats Directive.

Tatjana Grigorjeva[1], Annija Kotova[2], Vita Viktorija Maļutina[2], Tatjana Krama[1,3], Sergejs Popovs[1], Māris Munkevics[1,2], Krists Zants[2], Ronalds Krams[1,3], Priit Jõers[4], Indriķis Krams[1,2,4], Giedrius Trakimas[5]

[1]Daugavpils University, Parādes street 1A, Daugavpils, tatjana.grigorjeva@du.lv, tatjana.krama@du.lv, sergey.p@email.com, marismunkevics@gmail.com, ronalds.krams@du.lv, indrikis.krams@du.lv

[2]University of Latvia, Jelgavas street 1, Rīga, ananija32@gmail.com, vm14035@students.lu.lv, marismunkevics@gmail.com, krists.42@inbox.lv, indrikis.krams@lu.lv

[3]Estonian University of Life Sciences, Friedrich Reinhold Kreutzwaldi street 5, Tartu, Estonia, tatjana.krama@emu.ee

[4]University of Tartu, Ülikooli street 18, Tartu, Estonia, priit.joers@ut.ee, indrikis.krams@ut.ee

[5]Vilnius University, Saulėtekio street 7, Vilnius, Lithuania, giedrius.trakimas@gf.vu.lt

THE EFFECT OF SEROTONIN CONCENTRATION CHANGES ON THE LATERAL MOVEMENTS OF FRUIT FLIES (DROSOPHILA MELANOGASTER MEIGEN, 1830)

The basic chemical reactions in the fruit flies (*Drosophila melanogaster* Meigen, 1830) brain are similar to those occurring in the human brain. In the flies' brain serotonin is responsible for the regulation of locomotion, sleep, general activity, light or shadow selection, as well as the regulation of intestinal tract activity and aggressiveness.

During the study we reared the wild type (Oregon-R) *Drosophila* flies, which were divided in 1 control group and 2 experimental groups, exposed to escitalopram and tryptophan added to their food. Escitalopram is an antidepressant and a specific serotonin reuptake inhibitor. This is a type of drug used to treat depression. In a long-term escitalopram reduces the release of serotonin in the brain. Tryptophan is an essential amino acid and a precursor of the neurotransmitter serotonin. Higher amounts of tryptophan in the body stimulate the increase of serotonin concentration. The aim of the study was to analyse effect of escitalopram and tryptophan on the lateral movement variability in fruit flies. We used the Y-maze labyrinth method, which is commonly used to determine the effects of age, hormones, medicine, nutritional supplements and stress factors on the spatial short-term memory of the study object. During the trial, HD video camera with infrared sensor was placed above the Y-maze labyrinth plate and recorded all the fruit fly motions and turns made to the specific directions. The camera was connected with computer, which has the Noldus "EthoVision XT" video tracking software that registers all the turn coordinates.

The results showed that fruit fly lateral movement variability significantly increased in the flies from escitalopram exposure group. There was no significant difference in lateral movement variability between tryptophan exposure group and the control group flies. Y-maze is another effective method to study depressive behaviour of fruit flies and to understand the basic elements of depressive behaviour overall.

Ilona Jukonienė[1], Zofija Sinkevičienė[1], Agnė Bagušinskaitė[1]
Nature Research Centre, Žaliųjų Ežerų Str. 47, Vilnius, Lithuania

THE HISTORICAL AND CURRENT DIVERSITY OF HABITATS AND PLANT SPECIES IN THREE DIFFERENTLY MANAGED MIRES (LITHUANIA)

Historical research on the vegetation of Lithuanian mires Auštumala (Weber 1902), Kamanos (Brundza 1937) and Šepeta (Brundza 1940) provides a basis for assessing long-term changes in vegetation under anthropogenic influence. The three bogs have been subjected to different anthropogenic impacts, and their status has changed. Kamanos mire, since the middle of the 20th century, has been affected by the network of the drainage system. However, in 1979 it was declared a strict nature reserve. Currently, two-thirds of Aukštumala is used for peat extraction; the other half is a telmological reserve and a Natura 2000 network site. Most of Šepeta mire recently has been used for peat extraction.

Different management practices have affected wetland vegetation and habitats in various ways. Fens and transitional mires with characteristic and rare species were lost in Aukštumala (*Dactylorhiza majalis*, *Gentianella uliginosa*, *Hammarbya paludosa*, *Hydrocotile vulgaris*, *Meesia triquetra, Pinguicula vulgaris*) and Šepeta (*Drepanocladus lycopodioides, Hamatocaulis vernicosus*, *Pedicularis sceptrum carolinum*). In Aukštumala and Kamanos mires, large areas are still occupied by active raised bogs, though changes in vegetation structure, especially in *Sphagnum* cover of hollows, are observed. In addition, Kamanos mire is experiencing a spread of pine trees and an increase in the areas of bog woodlands. The active raised bog habitats of Šepeta have been destroyed, and just bog woodlands occur at its edges.

The research was funded by the Research Council of Lithuania (LMTLT), agreement No S-LIP-22-63.

References

Brundza, K. (ed.). 1937. Kamanos, Žemės ūkio akademijos metraštis 10(3–4): 1–411.
Brundza, K. (ed.). 1940. Šepeta, Žemės ūkio akademijos metraštis 13(4): 1–208.
Weber, C. A. 1902. Über die Vegetation und Enstehnung des Hochmoors von Augstumal im Memeldelta mit vergleichenden Ausblicken auf andere Hochmoore der Erde. Berlin.

Ronalds Krams[1,2], Tatjana Krama[1,2], Didzis Elferts[3], Guntis Brūmelis[3], Iluta Dauškane[3], Dina Cīrule[4], Janīna Daukšte[4], Patrīcija Raibarte[4], Linda Strode[5], Agnis Šmits[6], Indriķis Krams[1,3,7]
[1]*Daugavpils University, Parādes street 1A, Daugavpils, ronalds.krams@du.lv, tatjana.krama@du.lv, indrikis.krams@du.lv*
[2]*Estonian University of Life Sciences, Friedrich Reinhold Kreutzwaldi street 5, Tartu, Estonia, tatjana.krama@emu.ee*
[3]*University of Latvia, Jelgavas street 1, Rīga, didzis.elferts@lu.lv, guntis.brumelis@lu.lv, iluta.dauskane@lu.lv, patricijar9@gmail.com, indrikis.krams@lu.lv*
[4]*Institute of Food Safety, Animal Health and Environment "BIOR", Lejupes street 3, Rīga, dina.cirule@bior.lv, janina.daukste@bior.lv*
[5]*National Botanic Garden of Latvia, Miera street 1, Salaspils, linda.strode@nbd.gov.lv*
[6]*Latvian State Forest Research Institute "Silava", Rīgas street 111, Salaspils, agnis.smits@silava.lv*
[7]*University of Tartu, Juhan Liivi street 2, Tartu, Estonia, indrikis.krams@ut.ee*

THE ROLE OF ECOLOGICAL TRAPS IN THE PASSERINE (PASSERIFORMES LINNAEUS, 1758) BIRD SURVIVAL AND REPRODUCTION

Habitats that reduce animal survival, reproduction and fitness can also be populated. Such habitats are defined as ecological traps. The aim of the research was to find whether human nature conservation activities can lead to ecological traps for bird populations and whether areas around forest water bodies with high levels of biodiversity can cause reduced survival of the bird offspring.

First, we assayed whether breeding great tits (*Parus major*) in Scots pine (*Pinus sylvestris*) forests severely damaged by an outbreak of the great web-spinning sawfly (*Acantholyda posticalis*) suffer fitness costs. We

discovered that great tits inhabiting sawfly outbreak territories had a similar clutch size compared to birds that reproduced in intact forest areas. In the affected parts of the forest the number of newborns was significantly lower and the condition of them was worse.
Second, we investigated whether there is a positive relationship between distance to the nearest forest water bodies and the prevalence of blood parasites in nesting European Pied Flycatcher (*Ficedula hypoleuca*), and are the tree stands further away from wetlands considered as areas free from avian parasites. Parasite prevalence and their transmitter profusion decreased overall with distance increase from the water sites. Newborns were less numerous and in poorer condition near water bodies compared to those in areas 1 km from lakes, streams, and bogs.
Third, we studied whether the prevalence of bird blood parasite infection is associated with the proximity to hydrological objects where the parasites breed, from the wintering sites of the willow tit (*Poecile montanus*) and the crested tit (*Lophophanes cristatus*) flocks. We found that outside the bird reproductive season the avian blood infection prevalence reduced with the distance increase from forest water objects. Infectious parasite distribution was connected with low survival of willow tits compared to crested tits near the forest water sites.

Indriķis Krams[1,2,3,4], Sergejs Popovs[1], Ronalds Krams[1,5], Krists Zants[2], Māris Munkevics[1,2], Giedrius Trakimas[1,6], Tatjana Grigorjeva[1], Ēriks Sļedevskis[1], Tatjana Krama[1,5]

[1]Daugavpils University, Parādes street 1A, Daugavpils, indrikis.krams@du.lv, sergey.p@email.com, ronalds.krams@du.lv, marismunkevics@gmail.com, giedrius.trakimas@du.lv, tatjana.grigorjeva@du.lv, eriks.sledevskis@du.lv, tatjana.krama@du.lv
[2]University of Latvia, Jelgavas street 1, Rīga, indrikis.krams@lu.lv, krists.42@inbox.lv, marismunkevics@gmail.com
[3]University of Tartu, Ülikooli street 18, Tartu, Estonia, indrikis.krams@ut.ee
[4]University of Tennessee, TN 37916, Knoxville, Tennessee, United States of America, indrikis.krams@gmail.com
[5]Estonian University of Life Sciences, Friedrich Reinhold Kreutzwaldi street 5, Tartu, Estonia, tatjana.krama@emu.ee
[6]Vilnius University, Saulėtekio street 7, Vilnius, Lithuania, giedrius.trakimas@gf.vu.lt

WHAT IS PERSONALITY?

Personality is a complex of interrelated individual physiological, cognitive and emotional behavioural patterns influenced by genetic, epigenetic, and environmental factors that are relatively stable over time and contexts. The origins of the personality are still not well understood. In a series of experiments, behavioural handedness and phototactic behaviour have been studied using fruit flies (*Drosophila melanogaster* Meigen, 1830) that developed being genetically and environmentally almost identical. We tested whether these organisms behave idiosyncratically, expressing different personalities. We stick to a model where developmental noise changes critical properties of the neural circuitry underlying phototactic polarity and handedness preferences. We show that the neurotransmitter serotonin counteracts this noise in the phototactic personality of adult fruit flies while it increases the developmental noise in the turning behaviour of *Drosophila*.

ĶĪMIJA
≈
CHEMISTRY

Jelizaveta Širokova[1], Nataļja Škute[1], Jeļena Kirilova[1], Turs Selga[2], Aleksandrs Petjukevičs[1]
[1]Institute of Life Sciences and Technology, Daugavpils University, Parades 1A. Daugavpils, Latvia
[2]Faculty of Biology, University of Latvia, Jelgavas 1, Rīga, Latvia

APPLICATION OF NEW DISUBSTITUTED BENZANTHRONE DYES FOR PLANT MOLECULAR AND CELL BIOLOGY

Protein and nucleic acids visualization and quantitation has become now an important tool in molecular biology. In cell molecular biology there are many new and effective fluorescent dyes with pronounced luminescent and specific characteristics, having different properties and performing different functions in cell biology research. There are several different stains that can be used to visualize DNA. Among the many choices, these five stains are the most common, beginning with ethidium bromide, which is the most widely used. Suitable fluorescent dyes may be benzanthrone derivatives, but this issue has not yet been studied. Disubstituted benzanthrone derivatives can be useful as fluorescent probes for DNA investigation in molecular biology, as well as in staining the cellular structure of eukaryotes and prokaryotes to understand the principles of functioning of living cells. The present research is aimed to the application of new fluorescent disubstituted benzanthrone dyes, as in molecular and cell biology. DNA samples from different plants were obtained by salt-out method and were examined for contamination and concentration were examined by spectrophotometric analysis. New fluorescent disubstituted benzanthrone dyes with piperidine and pyrrolidine substituent were synthesized by nucleophilic reaction of 3-bromo-9-nitrobenzanthrone. The peculiar properties compound was analyzed by UV-Vis and fluorescence spectroscopy in various organic solvents. The different spectrums of absorption DNA with new fluorescent disubstituted benzanthrone dyes was obtained and analyzed. The intracellular analysis was performed using benzanthrone dyes by confocal microscopy. It was shown, that previously synthesized fluorescent disubstituted benzanthrone dyes medium stains nucleus, possible chromatin, endoplasmic reticulum, chloroplasts, and good stains plant cell walks. New benzanthrone dyes medium good stains plant cell walks, nucleus, endoplasmic reticulum.

Nadina Tina Vanaga[1,2], Liga Avotina[1], Arturs Zarins[1,2], Gunta Kizane[1]
[1]University of Latvia, Institute of Chemical Physics, Jelgavas street 1, Riga, Latvia
[2]Daugavpils University, Faculty of Natural Sciences and Mathematics, Parades street 1A, Daugavpils, Latvia

APPLICATION POSSIBILITIES OF FTIR SPECTROMETRY FOR ANALYSIS OF VOLATILE ORGANIC COMPOUND SORPTION PROPERTIES IN SHEEP WOOL FILTERS

Latvian Darkhead (LD) is a local origin sheep breed and a genetic resource [1,2] in Latvia. Preservation and development of sheep population in the local region is important due several reasons, as for are used for the recultivation of fields, it serves as source for export and local use as well as waste wool can be applied for developing new products such as sorbents of volatile organic compound pollutants. Therefore, investigation of the sorption properties of the LD sheep wool fibers are under the interest.
Fourier transform infrared (FTIR) spectrometry is widely used for analysis of the various organic compounds and therefore its application in investigation of wool sorption properties is viewed. An analytical system consisting of volatile organic compound source, sheep wool filter and FTIR spectrometry cell is combined and tested with benzene and toluene. The registration of the FTIR spectra was performed within the range of 600-

4000 cm^{-1}, in the nitrogen gas flow, 5 L/h. For each analysis a reference (empty profile) was measured and compared with a filter profile.
FTIR analysis shows, that in the sheep wool sorbs polar molecules, while for sorption of non-polar volatile compounds modification and/or additions to the filter material are required.
The obtained results will be used for developing recommendations for filter producers to fabricate filters from LD sheep wool fibers.
ACKNOWLEDGEMENT. Research performed within the European Regional Development Fund (ERDF) 1.1.1.1 Practical Orientation Research 4th round project No. 1.1.1.1/20/A/155 "Development of novel and innovative composite materials with enhanced sorption properties from renewable biological natural resources available in the Republic of Latvia for commercial air purification filtration systems".

Jelizaveta Sirokova, Armands Maleckis, Jelena Kirilova
[1]Daugavpils University, Parādes street 1, Daugavpils, jelena.kirilova@du.lv

EFFECT OF THE NITRO GROUP ON NUCLEOPHILIC SUBSTITUTION IN BENZANTHRONE

The development of new fluorescent compounds is of constant interest for many modern applications. Among a wide variety of fluorescent dyes currently used in research and industry, benzanthrone derivatives attract particular interest due to their favorable spectral properties. Many benzanthrone derivatives with various functional groups are widely used as fluorescent dyes and probes.
Various organic synthesis methods are applied for design of new benzanthrone dyes. Nucleophilic substitution of the halogen atom in the benzanthrone core is often used to synthesize benzanthrone derivatives.
In the present study, new fluorophores based on benzanthrone were synthesized from 9-nitro-3-bromobenzanthrone by nucleophilic substitution of the bromine atom with some secondary cyclic amines. It has been found that this reaction is positively affected by the presence of a nitro group. The substitution of the bromine atom for morpholine, piperidine, and pyrrolidine residues proceeds faster and in higher yields than with 3-bromobenzanthrone.
The synthesized compounds have been characterized by spectroscopic and chromatographic methods. The developed dyes exhibit pronounced luminescent properties in various organic solvents. In this regard, their photophysical properties were evaluated by experimental study of the solvatochromic behavior of the obtained compounds in non-polar, polar aprotic and protic solvents. The developed fluorescent molecules have a potential prospect in extensive application of biochemical detection and analysis.

Sergejs Osipovs, Aleksandrs Pučkins
Daugavpils University, Parādes street 1A, Daugavpils, sergejs.osipovs@du.lv

IMPROVING THE QUALITY AND QUANTITY OF BIOGAS PRODUCED FROM FISH PROCESSING WASTE

Aquaculture waste, in both solid and water form, is one of the main challenges for any aquaculture production system (such as fish and shrimp crops) and often enters the ecosystem, causing environmental pollution. Feed wastage has been identified as a major cause of high pollution loads in aquaculture effluents. In semi-intensive and intensive aquaculture systems, moderate to high fish population densities depend mainly or exclusively on the supplemented feed. Despite their higher costs, from 8.6% to 52.2% of fish feed is consumed, and the remain is discharged into farming waters. It is estimated that more than half of the nitrogen and phosphorus elements in culture ponds are derived from fish feed, for example, 57–71% N and 44– 58% P are found in water in the common carp farm of Cyprinus carp.
The research looks into the potential of generating biogas from waste generated by aquaculture. The EDF-5.4_2 bioreactor, produced by "Biotehniskais centrs" (Latvia), was utilized for the experimental study. Samples of sludge from a fish farm located in Nagļu parish, Rēzekne district were collected and analysed for their

moisture and organic matter content before being mixed with crushed reeds to increase the organic matter available for fermentation and biogas extraction.
In this study, biogas was produced by mixing different ratios of sludge and reed residue. The yield of biogas varied based on the temperature, with the best results being achieved at 40°C. During the experiment, 2.75 L of biogas containing 37.3% methane was produced from the mixture of 1,200 g of fish farming sludge and 100 g of crushed reeds. Although the highest methane content of 40.16% was recorded at 43°C, the total amount of biogas produced was lower by 15% at this temperature. The least favourable results were recorded at 37°C, in terms of both the amount of biogas produced and the methane content. The experimental studies demonstrate that residues from aquaculture can be used for biogas production.

Pāvels Osipovs, Sergejs Osipovs, Aleksandrs Pučkins
Daugavpils University, Parādes street 1A, Daugavpils, osipovs.pavels@inbox.lv

IMPROVING THE QUANTITY AND QUALITY OF THE PRODUCTS OBTAINED IN THE PROCESS OF SOLID WASTE PYROLYSIS

The main issue associated with the disposal of solid waste is that they contain harmful chemicals and heavy metals that can contaminate the environment as they break down. One solution to this problem is the use of a process known as pyrolysis, which breaks down the solid waste and produces useful by-products. This process results in the formation of gas, liquid, and solid phases, with the gas containing tar and other components. Tar is a complex mixture of acids, aldehydes, ketones, alcohols, phenols, and aromatic hydrocarbons. Its composition depends on the conditions of gasification. Tar is an undesirable by-product of pyrolysis due to a number of problems associated with its condensation and formation of tar aerosols, for example. Therefore, the tar concentration should be reduced and the temperature maintained above the dew point of the tar components. Typically, a water scrubbing technology is used in pyrolytic gas scrubbing processes. Water is commonly used as the heat carrier because it is relatively easy to obtain. The main disadvantage of this technology is that the tar components gradually accumulate in the water used in the pyrolytic gas cleaning process. The study was conducted using a double-layered pyrolysis reactor in Latvia. The amount of tar was measured by drawing varying volumes of pyrolytic gas through the adsorbents and comparing it to the amounts of individual component compounds. A method known as solid-phase adsorption (SPA) is here being studied as a way of determining the concentration of tar compounds. A specific sampling device using an amino-phase sorbent and activated coconut charcoal was found to be effective for collecting the tar and its volatile organic compounds from the gas produced during solid waste pyrolysis. When testing the device varying the volumes of co-produced gas that were passed through the adsorbents, similar results were obtained in terms of the total amounts of both tar and its individual component compounds.

Maksims Stašāns, Aleksandrs Pučkins, Sergejs Osipovs, Artūrs Zariņš, Valdis Mizers
Daugavpils University, Parādes street 1A, Daugavpils, maksims.stasans@inbox.lv

OPTIMIZATION OF THE METHOD FOR REDUCING TAR CONCENTRATIONS IN THE GENERATOR GASES OBTAINED DURING THE BIOMASS GASIFICATION PROCESS

Biomass is a significant source of renewable energy, making up about 12% of the world's primary energy consumption. As reported, bioenergy and renewable energy were the leading sources of renewable energy globally in 2017, accounting for 9.5% of all energy sources. When biomass is gasified, it produces a raw gas mixture containing hydrogen, carbon monoxide, carbon dioxide, water, methane, and light hydrocarbons. This gas, known as generator gas, also includes several undesirable substances like dust, ammonia, alkali, sulfur, chlorine, and tar. Tar is a complex mixture of aromatic compounds including polycyclic aromatic hydrocarbons. It can cause problems in the gasification process by condensing and blocking equipment such as fuel lines, filters, engines, and turbines if the temperature is lower than its dew point.

The purpose of this study is to examine the effectiveness of a solid-phase adsorption method for measuring the concentration of tar compounds in generator gas. Because biomass tar has a high concentration of volatile organic compounds, not all of them can be collected with just one column. Therefore, the researchers decided to add a second column with a different adsorbent to improve the accuracy of the measurement. They also chose to test three different sorbents (Carbopack B, Carbotrap, and activated coconut charcoal) in order to determine which, one is the most effective at determining the concentration of volatile organic compounds. Desorption efficiency from various sorbents, adsorption efficiency of the studied compounds on each sorbent depending on the sampled gas temperature, and maximal amounts of compounds adsorbed on the activated coconut charcoal were studied. The best results were obtained while using activated coconut charcoal. A modified sampling device consisting of 500 mg of the amino phase adsorbent and 100 mg of the activated coconut charcoal was chosen as optimal for sampling tar in the generator gas produced in biomass gasification.

Armands Maļeckis[1], Evans Griškjāns[1], Marija Cvetinska[1], Elena Kirilova[2]

[1]Institute of Technology of Organic Chemistry, Faculty of Materials Science and Applied Chemistry, Riga Technical University, P. Valdena Str. 3, Riga, Latvia

[2]Department of Applied Chemistry, Institute of Life Sciences and Technology, Daugavpils University, Daugavpils, Latvia

SYNTHESIS AND EXAMINATION OF PHOTOPHYSICAL PROPERTIES OF BENZANTHRONE ETHYNYL DERIVATIVES

In recent years, fluorescent organic compounds have gained significance due to their distinctive optical characteristics and their potential usage in a wide range of fields. For a fluorescent molecule to be well-designed, it is crucial that it possesses certain properties that allow for efficient and reliable fluorescence emission. These include high fluorescence quantum yield, which measures the efficiency of fluorescence emission relative to other competing pathways; Stokes shift, which reflects the degree of relaxation that occurs in the excited state before fluorescence emission, is another important property; photostability is also an important consideration.

Benzanthrone derivatives, which belong to the anthraquinone dye group, are receiving increased interest due to their impressive above-mentioned luminescent characteristics, as well as noticeable solvatochromism – capacity for fluorescence emission that can be adjusted from green to red depending on the solvent and substituents of the molecule. These features make benzanthrone derivatives useful in a range of technological applications.

The field of π-conjugated luminescent molecules has garnered a surging curiosity. Research suggests that attaching phenylacetylene groups to luminescent molecules can enhance their photophysical properties, allowing for the modulation of fluorescence yields, Stokes shifts, absorption, and emission maxima by introducing electron-donating or electron-withdrawing groups onto the phenyl rings and adjusting the length of the π-conjugation. Additionally, phenylacetylene derivatives can serve as useful precursors for a broad range of other compounds and materials.

Taking into consideration the factors previously mentioned, it has been determined that synthesizing new benzanthrone ethynyl derivatives and investigating their properties is a worthwhile pursuit.

Romans Fridmans, Elena Kirilova

SYNTHESIS OF NEW BENZANTHRONE DYES WITH STRONGLY ELECTRON-WITHDRAWING SUBSTITUENTS

A group of benzanthrone dyes are compounds based on four condensed, six-membered rings with carbonyl group and various side substituents. Various researches were devoted to elaboration of synthesis methodologies for compounds containing dinitrile moiety. J. Huang et. al. proposed to synthesize dinitrile derivative of fluorene using malonodinitrile in the presence of dimethylsulfoxide. J.W. Taylor et al.

successfully synthesized derivatives that contain fluorenylidene groups by reaction with malonodinitrile in the presence of benzene.

Alise Kirilova, Marina Savicka
Daugavpils University, Parādes street 1, Daugavpils, alise.kir@inbox.lv

USE OF THE YEAST SACCHAROMYCES CEREVISIAE FOR TOXICITY EVALUATION OF SOME LUMINESCENT DYES

Since the amount of chemicals (including dyes) present in our daily lives is enormous and continues to increase, a sensitive, fast, reliable, and low-cost toxicity assay is needed to evaluate toxicity for eukaryotic cells. Microbial and biochemical assays to assess chemical toxicity include insect, fish, Daphnia magna, and tumor cell lines to assess molecular toxicity to eukaryotic cells and tissues. For detection of toxicity of compounds, it is necessary to use different methods of bioassay, which complement each other in spectrum of detected substances. Previously, we evaluated the toxicological effect of new benzanthrone amino phosphonates using wheat germ (*Triticum aestivum*) as a test organism and found that the studied compounds exhibit toxic effects on wheat seedling growth to varying degrees depending on the concentration and substituent in the molecule. In this study, we continued our study of biotoxicity using a new test object. As the test organism, we selected yeast *Saccharomyces cerevisiae*, which big advantage is the possibility of long-term storage in a dry state (18 months under normal storage conditions). When water is added, the yeast immediately comes alive and it is ready for use in toxicity test. Baker's yeast, *Saccharomyces cerevisiae*, is the simplest and most well-known representative of eukaryotic cells and thus a convenient model organism for evaluating toxic effects in human cells and tissues. The used biological toxicity test – *S. cerevisiae* lethal test is based on detection of yeast viability changes. To distinguish living cells from dead cells, they were examined under a microscope using methylene blue: dead cells stained blue, while living cells did not stain. The studied dyes at various concentrations were exposed to yeast cells for various durations. After the selected exposure time the number of live (colourless) and dead (coloured) cells were calculated and analyzed for evaluation of toxicity of investigated luminescent dyes.

DOKTORANTU SEKCIJA „LITERATŪRZINĀTNE”
≈
DOCTORAL STUDENT SECTION "LITERARY STUDIES"

Aļona Dolinda
Daugavpils University, Parādes street 1, Daugavpils, alona.dolinda@gmail.com

«БУБЕН ВЕРХНЕГО МИРА» ЭКРАНИЗАЦИИ И ТЕКСТ: РАЗЛИЧИЯ И СХОДСТВА

Целью данного исследования является сопоставительный анализ рассказа Виктора Пелевина «Бубен Верхнего мира» и его четырех экранизаций, в ходе которого выявляются различия и сходства, прослеживается оригинальность каждой интерпретации. «Бубен Верхнего мира» это небольшой рассказ Пелевина, состоящий из 16 страниц, поэтому его можно прочесть на одном дыхании. Рассказ обрёл огромную популярность среди режиссёров русского кино – его экранизировали четырежды в 2011 («Бубен Верхнего мира», режиссёр - Сергей Гоникберг), 2014 («Никого внизу, ничего вверху», режиссёр - Анастасия Власова), 2017 («Бубен Верхнего Мира», режиссёр - Татьяна Перцева), 2020 («Бубен Верхнего Мира» (2020), режиссёр - Сергей Годин) годах.
Мистическая составляющая, вплетающаяся в привычную реальность могла быть тем самым толчком для экранизации, тем не менее в каждом короткометражном фильме можно найти сходства и различия – как от друг друга, так и от оригинального текста автора.
Сравнительный анализ предполагается уже в самом выборе темы и на нём будет поставлен главный акцент. Принимая во внимание, что цель доклада найти различия и сходства также будет использован количественный метод, чтобы более точно изложить собранные с помощью сравнительного анализа данные.
Структура сравнения выстраивается по следующей модели: 1. Анализируются персонажи рассказа и экранизаций: как их визуализация, так и поведение. 2. Сопоставляются места и обстоятельства действия – ведь даже то, как герои добираются до места отличается в некоторых экранизированных версиях. 3. Исследуется нарратив и событийная линия.
Детальный анализ позволяет понять насколько далеко экранизированная версия уходит от оригинальной текстовой. Где художественный замысел, а где желание создать что-то совсем не похожее на текст Пелевина.

Līga Struka
Daugavpils University, Vienības street 13, Daugavpils, liga.struka@inbox.lv

MĀTES UN BĒRNA ATTIECĪBU TĒLOJUMS DZINTRAS GEKAS ATMIŅU STĀSTU KRĀJUMĀ "MĀTES SIBĪRIJĀ"

Režisores Dzintras Gekas izdotā grāmata "Mātes Sibīrijā" ir viens no pēdējā laikā aktuālākajiem un apspriestākajiem izdevumiem, kur ir apkopotas intervijas ar 1941.gadā izsūtītajām mātēm un viņu bērniem, kā arī fragmenti no 1941.gadā izsūtīto bērnu stāstiem.
Deportāciju traumatiskā pieredze sabiedrības atmiņā ir saglabājusies jau vairākās paaudzēs.
Runājot par Sibīriju, deportācijām un ar to saistīto pieredzi, svarīgi ir pievērst uzmanību "mātes-bērna" attiecībām, saiknei un lomu sadalījumam. Izsūtījumā mātes un bērna lomas robežas bieži vien ir izplūdušas, ņemot vērā to, ka ierastā ģimenes sistēma, kas ir pastāvējusi pirms izsūtījuma, tiek izjaukta, tāpēc māte pārņem arī tēva lomu un pienākumu izpildi, bet bērns pārņem pieaugušā pienākumus un rūpes. Tiek izjaukts tradicionālais ģimenes modelis, kur ir nodalītas tēva, mātes un bērna lomu robežas.
Mātes figūra izsūtījumā vairs neieņem tādu lomu un nepilda tādas funkcijas, kā tas ir pieņemts tradicionālajā ģimenes modelī. Sibīrijā māte ir kā visu varošais tēls, kas pārņem arī tēva lomu. Maternitātes jēdziens tiek dekonstruēts, sieviete kā māte gan politisko, gan sociālo, gan vides apstākļu dēļ nespēj pilnvērtīgi

pašrealizēties, pildīt savus pienākumus, tāpēc rodas traumatiskā pieredze, kas liedz mātei un bērnam pilnvērtīgi konstruēt attiecības savā starpā.

Kristīne Juškova

RĪGAS REPREZENTĀCIJA JEĻENAS KATIŠONOKAS ROMĀNU TRILOĢIJĀ

Jeļena Katišonoka – rakstniece no Rīgas, dzimusi 1950.gadā. Kopš 1991.gada dzīvo ASV, kur sākot ar 2005.gadu izdod dzejas krājumus un prozu krievu valodā. Viņas pirmais romāns "Reiz dzīvoja vecītis ar vecenīti" tika izdots 2006.gadā, un iegūst plašāku ievērību. Tas stāsta par vecticībnieku pāri, kurš pārceļas no Rostovas pie Donas uz Rīgu 19. un 20. gadsimtu mijā. Pirmajam romānam seko vēl divi romāni - "Pretēji pukstenrādītāja virzienam" (2009) un "Gaisma logā" (2014), kuri turpina Ivanovu klana stāstu.
Tā kā par jaunajām mājām pāris izvēlas Rīgu, tā kļūst par centrālo romānu mākslinieciskās pasaules toposu, kas galveno varoņu liktenī spēlē vislielāko lomu. Rīga romānos tiek parādīta laika griezumā no 20. gadsimta sākuma līdz 20. gadsimta otrajai pusei, laikā kad tajā norisinās kari un biežas varas maiņas. Rīgas reprezentācija Katišonokas romānos sniedz daudzpusīgāku priekšstatu par tās atveidojumu mūsdienu rusofonajā literatūrā, kā arī par tās iedzīvotāju likteņu atveidojumu mūsdienu literatūrā vēsturiskajā šķērsgriezumā kopumā.

Tatjana Nikiforova
Daugavpils University, n.tanuusha@gmail.com

THE PERSONAL GOLDEN AGE OF THE AVIATOR IN VODOLAZKIN'S NOVEL "THE AVIATOR"

The paper presents an analysis of the text of the novel by the famous modern writer Evgeny Vodolazkin "The Aviator". The topos of childhood is considered as the personal golden age of Innokenty Platonov, the protagonist of the novel. This period of life as paradise is understood by Innokenty in adulthood; in childhood, the aviator does not think about it. The episodes from the text of the novel are analyzed, where Vodolazkin describes this period as joyful and carefree. The paper characterizes the main loci that are directly related to the topos of childhood.
Key words: *Vodolazkin, aviator, topos, paradise, childhood, Peter, family.*

***Karolīna Hrapāne*[1]**
[1]Daugavpils University, Parādes street 1, Daugavpils, karolina.hrapane@du.lv

ЕВРЕЙСКИЙ ТЕКСТ В РОМАНЕ Г.ФАСТА "ДОЧЬ АГРИППЫ"

Г.Фаст написал этот роман в 1964 году и этот роман входит в условный цикл исторических романов Г.Фаста про историю евреев, историю еврейского народа. Следует отметить, что роман «Дочь Агриппы» был написан в значимый период жизни автора - Г.Фаст был разочарован в идеологии, можно сказать, что у него произошёл идеологический перелом. Роман «Дочь Агриппы» рассказывает о внутренней борьбе между евреями в Иудее, когда происходит антиримское восстание: римляне воспользовались внутренним конфликтом, захватили Иерусалим и уничтожили Храм. В этом докладе будет описано и проанализировано пространство романа «Дочь Агриппы» - по сути еврейский мир. Также будет проанализирована оппозиция еврейский-нееврейский мир. И именно в этом романе эта оппозиция заявлена иначе, чем в других "еврейских" романах Г.Фаста: сюжет романа репрезентует фрагмент (причем значительный) истории еврейского народа, а именно - в романе «Дочь Агриппы»

«другое» вторгается в еврейский мир и территориально и идеологически (римляне, захватывающие Иудею и уничтожающие еврейские святыни).

Andris Kazjukevics
Daugavpils University, Parādes street 1, andris.kazjukevics@gmail.com

СВОЙ И ЧУЖИЕ В ЛИТЕРАТУРЕ ИНФЛЯНТСКИХ ПОЛЯКОВ

Оппозиция свой – чужой является одной из базовых оппозиций культуры. В контексте литературы Инфлянт Польских данная оппозиция приобретает особое значение, так как связана с проблемой идентификации и самоидентификации. Пограничное состояние инфлянтского мира определяет его особый пространственнный статус. Фактически это некая зона, где происходит встреча с Иным, Другим, Чужим (в том, числе с миром иной культуры), распознавание, отталкивание, некое сглаживание углов, способное воспроизводить разного рода гибридные формы (в том числе самоидентификации, жанра, специфических элементов картины мира).
Инфлянтский мир – это мир, в котором постоянно присутствует некий чужой элемент. Данный элемент нуждается в абсорбировании. Результатом становится, во-первых, большое количество ситуаций принятия/неприятия в текстах инфлянтских литераторов, во-вторых, состояние перманентного культурного саспенса, которое вызывает не всегда объяснимое и не всегда выраженное чувство тревоги и переживания. Одним из путей нивелирования данной ситуации становится обращение к идеальному миру прошлого, что представляет собой определенного рода терапию, некое преодоление фантомной боли. В реферате рассмотрены основные варианты реализации оппозиции свой-чужой на примере текстов инфлянтских литераторов XIX века.

Dario Lami
Daugavpils University, Parādes street 1, Daugavpils, dariolami@gmail.com

ТЕМА “ГОМО СОВЕТИКУС" В РОМАНЕ “GENERATION П” В. ПЕЛЕВИНА: ПОТРЕБИТЕЛЬСТВО, АНТИУТОПИЯ И ПОСТМОДЕРНИЗМ

In V. Pelevin’s novel "Generation P", a very important element is the numerous bitter and ironic references to the Soviet mentality.
The purpose of this intervention is a synthetic analysis of Pelevin’s work in the light of the concept of “homo sovieticus”, a concept popularized by the essayist and writer A. Zinov’ev in his homonymous book (Homo sovieticus, 1982).
Starting from what Zinov'ev himself theorized about the concept of "homo sovieticus" and from the reception and use of this expression in the contemporary Russophone language and culture, we analyze through some examples how this concept has repercussions in Pelevin's novel.
At the same time, we highlight how the inextinguishable traces of the Soviet mentality (the so-called "sovok") in the novel can be included in a broader analysis which, as already theorized by other scholars, sees in "Generation P" a possible example of dystopian literature.
In this same perspective, if "homo sovieticus" can be seen as a peculiar incarnation of the well-known Marcusian "one-dimensional man", it is equally possible to relate the pervasive consumerism described in Pelevin's novel with the repressive nature of modern techno-informational society theorized, among others, by M. Foucault (for example in his reflections on “Truth and Power").
Such an analysis only confirms the purely postmodern nature of Pelevin's novel, based on the simultaneous use of contrasting ideological and cultural references (sovietism, consumerism and, at times, nationalism) which, deprived of a univocal value, are usually reduced to slogans partially incomprehensible to their own creators.

Sandra Zariņa
Daugavpils University, Parādes street 1, Daugavpils, sandra.zarina@du.lv

PADOMJU LAIKU SKOLAS TĒLOJUMS MĀRAS ZĀLĪTES ROMĀNĀ "PARADĪZES PUTNI"

Galvenais padomju skolas uzdevums un atbildība bija veidot cilvēku, kura apziņā būtu iesakņojies kolektīvisms, kā arī uzticība komunisma idejām un padomju valstij kā vislabākajai sabiedrības politiskās un sociālās organizācijas formai. Raksturīgākā padomju skolas iezīme - disciplīna, kas nozīmēja ne tikai kārtību un klusumu stundās, bet arī vienādus formas tērpus, skolas iekšējās kārtības noteikumus, skolēnu uzvedību ārpus skolas, rusifikāciju u.c. Rakstā padomju laiku skolas tēlojums tiek analizēts no Māras Zālītes romānā "Paradīzes putni" atklātā bērna skatapunkta. Romāns "Paradīzes putni" ir uztverams galvenokārt kā autobiogrāfisks, bet ne simtprocentīgi. Galvenā varone Laura "atkušņa periodā" mācās sākumskolā, un viņai ir savs viedoklis par mācību saturu, mācību un audzināšanas procesu, ārpusstundu aktivitātēm, skolēnu savstarpējām attiecībām un attiecībām ar skolotājiem. Tas ļauj viņai kļūt par savu laikmeta soģi, atklājot padomju skolas ēnas puses.

Алла Салтикова

УРАЛ МЕЖДУ ТАТАРАМИ И МОСКОВИТАМИ В РОМАНЕ А. ИВАНОВА «СЕРЦЕ ПАРМЫ» URAL BETWEEN TATARS AND MUSCOVITES IN A. IVANOV'S NOVEL "THE HEART OF PARMA"

Роман А. Иванова «Сердце пармы» переносит читателя в XV век, в период, когда Московское княжество расширяло и укрепляло свои границы, продвигаясь на Восток. В докладе рассматривается проблема формирования государства. В XIV веке в результате различных уступок и договорённостей в состав Московии вошла Пермь Вычегодская, примерно в XV веке – Пермь Великая. Учёные полагают, что Угра находились в даннических отношениях с Русью с XII века, именно поэтому в эти земли регулярно наведывались новгородцы, промышлявшие не только торговлей, но и разбоем. Для Руси политические и товарные отношения были актуальными не только с Европой, но и Китаем, торговые пути с которым контролировали татарские шибаны. Их идейное влияние тоже было значительным. Автор на примере жизней князя Ермолая, а затем его сына Михаила, осмысляет исторические судьбы Урала, было ли это присоединением, освоением новых земель, покорением или колонизацией.

Vera Komarova[1], Jānis Balodis[2], Edmunds Čižo[3]
[1]Daugavpils University, Parādes street 1, Daugavpils, veraboronenko@inbox.lv
[2]Daugavpils University, Parādes street 1, Daugavpils, unitec@inbox.lv
[3]Daugavpils University, Parādes street 1, Daugavpils, edmunds.cizo@du.lv

CONCEPTUAL BASIS FOR DEFINING THE DEVELOPED TRANSPORT INFRASTRUCTURE AND DEVELOPED PRODUCTION IN THE TERRITORY

The aim of this study is the creation of conceptual basis for defining the developed transport infrastructure and developed production in the territory. This includes the conceptualization and empirical interpretation of the terms of a developed transport infrastructure and developed production, as well as the development of tools for measuring them in the territory. Research questions to which the authors intend to find answers in the framework of this study are as follows: (1) what does it mean - conceptually and empirically – "developed transport infrastructure" and "developed production" in a particular territory? (2) how to measure the state of development (i.e., the static level of development) of transport infrastructure and production in a particular territory? Within this study, the conceptualization of the above terms and the development of its measurement tools are carried out using the monographic method, logical analysis and synthesis methods, as well as findings of the existing relevant theoretical and methodological studies. During the study, it was found that a developed transport infrastructure can conceptually be considered as part of the overall logistics performance and empirically interpreted as high quality ports, airports, roads, rail, warehousing / transloading and relevant ICT in a particular territory. In its turn, a developed production can conceptually mean high level of industrial production and empirically interpreted as price-adjusted output of industry in a particular territory. As for the measurement tools of a developed transport infrastructure and developed production, the Industrial Production Index (IPI) and the Logistics Performance Index (LPI) are useful for a quantitative research at the global and macro regional level. The results of this study are being pursued further in order to answer the "umbrella" research question of what is the priority for the economic development of the territory: developed transport infrastructure or developed production, i.e. what is the priority for investments? Conceptual basis worked out within this study is necessary for further own empirical study of the direction and nature of the relationship between the state of development of transport infrastructure and the state of development of production in the territory.

Līga Vindele, Mg.oec.
Finance Department of Madona Municipality, Saieta Laukums 1, Madona, liga.vovere@inbox.lv

ECONOMIC EVALUATION METHODS OF NATURAL RESOURCES

During the recent years, questions about environmental sustainability have been brought into sharp focus. Natural resources ensure the development and sustainability of national economy. Serious problem is caused by increasing intensity of extraction and use of natural resources which is not always connected with the resources being fully utilised and gaining maximum economic benefits from the resources.

Economic evaluation methods of natural resources provide information about evaluation techniques of stores of natural resources, effectiveness of extraction and utilising natural resources and deciding on further action.

The aim of the scientific work is to research the main conceptual methods of economic evaluation of natural resources.

Tasks, associated with the aim are:

-To research the role of natural resources in development planning and analysis;

-To research the indices of the most applied economic approach to the economic evaluation of natural resources;
- To evaluate the main economic criteria of the 'future' decision making.
***Key words**: Natural capital; Natural resources asset; Effective use of natural resources.*
Theses:
-Efficient use of natural resources is the basis for economic sustainability and development.
-Economically viable use of natural capital is essential, and it ensures economic sustainability and development.
-There is a correlation between using the outcomes of economic evaluation of natural resources in decision making and maximising the economic gain.
To achieve the objectives, EU regional statistic data, scientific publications, and industry specific literature were used. Methods used in the research: abstract logical, monographic, document analysis, mathematical statistics, deduction, synthesis.

Musa M. Kamara

OPERATIONS OF ENTREPRENEURIAL GOVERNANCE IN THE HUMAN ECONOMY: LIBERIA CAPITAL, MONROVIA AS A CASE STUDY

Liberia is a post-war country with a population of 3,476,608 according to Liberia Institute of Statistics and Geo-Information survey reports in 2008 on population census (Alliance, 2017). Monrovia, the capital of Liberia, accommodates more than 1.1 million (Ligist, 2008), which is made of approximately 35 percent of its population (McAuslan, 2011). Given this fact, the country is faced with multitude of urban planning and urban management challenges, especially in the capital, Monrovia, where citizens from rural areas migrate in bulks to seek better opportunity in the capital. As a result of these volatile conundrum, the city has become congested skyrocketing the existing housing problem, poverty and crime rate, and environment insecurity etc. And the worst of all, the central government is doing less to mitigate these parochial living conditions. The purpose of the article is to investigate the central government projects and contracted public-private entities responsible for the regenerations of the city by utilizing David Harvey's study From Managerialism to Entrepreneurialism: The Transformation in Urban Governance in Late Capitalism (Harvey, 1989), and Chicago school scholars (Park, Burgess, McKenzie, 1925) to analysis the living condition of the community. By doing so, I used government reports and international organization reports to supports my arguments.
***Keywords**: Local government, urban entrepreneurialism, Capitalist, Liberia.*

Jade D. Solaña
University of Mindanao, Davao City, Philippines, jd_solana@umindanao.edu.ph

RESOURCE UTILIZATION EFFICIENCY OF PUBLICLY-LISTED INDUSTRIAL COMPANIES IN THE PHILIPPINES: A DATA ENVELOPMENT ANALYSIS

Stock trading is a high-risk but worthy investment. In order to succeed, an investor needs to have tools and techniques that will be used to provide a favorable outcome. Various strategies are already available but no single tool or technique is superior to the others resulting to stock investment loss. In this regard, a data envelopment analysis is conceptualized to determine the efficiency of a company's resource utilization and eventually be used as a tool in making stock investments. The researcher will gather secondary data from 72 publicly-listed industrial companies in the Philippines thru the Philippine Stock Exchange and company websites from 2017 to 2021. Using Total Asset, Stockholders' Equity, Cost of Goods Sold and Operating Expenses, the researcher will evaluate the efficiency of industrial companies in utilizing these resources into Sales/Turnover, Net Profit, Return on Asset and Return on Equity. Through Data Envelopment Analysis, the researcher aims to develop a model that will help investors make wise and good stock investments.

Keywords: Resource utilization efficiency, stock investment, data envelopment analysis, industrial companies, Philippines

Khatia Imerlishvili[1], Mariam Gelkhauri[2]
[1]Ivane Javakhishvili Tbilisi State University, 1 Ilia Tchavtchavadze Avenue, khatia.imerlishvili111@sps.tsu.edu.ge
[2]Ivane Javakhishvili Tbilisi State University, 1 Ilia Tchavtchavadze Avenue, Mariam.gelkhauri988@sps.tsu.edu.ge

SOCIAL MOVEMENTS IN THE POST-SOVIET COUNTRY ON THE EXAMPLE OF STUDENT MOVEMENTS (THE CASE OF GEORGIA)

Georgia is a state in the process of democratic transition. The time in the Soviet Union has left its negative traces in the social and political development of the country, which in turn has been reflected in the development process of civil society. The desire to improve the social and political situation in the country is clearly reflected in the direction of activating civil activism. Students are no exception in this respect, they are involved as much as possible in the process of democratic development of the country and often demand both social and political changes.

In modern Georgia, student protest movements are constantly active at a given moment. Practice shows us that the aim of the protest wave is always different, whether it is dictated by social, political or economic factors. Depending on the objective, the forms of protest of the aforementioned movements also differ. Accordingly, the results achieved by the protest are also different. As mentioned above, student movements in Georgia represent an important and remarkable wave of protest, as evidenced by the fact that student protests were reactivated in 2022, namely by the "May Student Movement". Therefore, the study of student movements in the modern perspective is a very important perspective.

Accordingly, the aim of this thesis is to investigate the reasons for the emergence of student protest movements in modern Georgia as a post-Soviet state, and at the same time to determine the forms of these protest movements and the results that these protests have brought. In order to achieve the objectives of the study, qualitative research is conducted and documents are analysed.

Based on the research purpose, the following tasks were set: Study of academic literature and applied studies related to student movements in the world; collection of primary data on the topic and its analysis and interpretation in order to develop a conceptual framework tailored to the local context; study of the specific factors determining the emergence of student movements, be they social, economic or political factors; Study of the specific forms and expressions of student protest movements in Georgia; Study of the specific outcomes of student protest movements in Georgia; comparative consideration of the causes, forms and outcomes of protest movements in modern Georgia;

In this sense, researchers pay special attention to civil society, including social movements. The study of student protest movements in modern Georgia will therefore be of great scholarly value not only for Georgian academic literature, but also for all researchers studying these issues from a comparative perspective (e.g. Western and Eastern Europe).

Ilona Polents[1]
[1] University of West Bohemia, Univerzitní 2732/8, 301 00 Pilsen, Czech Republic, polents@fek.zcu.cz

SOCIAL, CULTURAL AND PSYCHOLOGICAL PROBLEMS IN THE EMPLOYMENT OF UKRAINIAN REFUGEES IN THE CZECH REPUBLIC

As of January 2023, according to the European Commissioner for Refugees, 7,977,980 refugees from Ukraine were registered in Europe, and 4,940,057 received temporary protection visas or were registered in similar national protection schemes in European countries. One of the most pressing issues in the integration of Ukrainian refugees is the work aimed at the employment of refugees. To date, the Czech Republic has issued temporary protection visas to more than 400 thousand Ukrainian refugees, which is the largest number in terms of the share of the population (about 3.7%). According to the results of a study conducted by the author, only a little more than 7%, after a year of stay in the Czech Republic, have a permanent job corresponding to their education or qualifications. This is certainly due to the lack of a good knowledge of the Czech language.

In addition, at least 13% of the refugees are in the gray zone of the labor market and have a job that does not guarantee them any rights, and the Czech Republic does not bring any taxes. More than 10% of Ukrainian refugees with higher education had a negative experience of working in the Czech Republic during the war (they were deceived, they were not paid the promised remuneration, they had to work much more than the established time, the work was too hard physically, or there were very poor working conditions). In the process of in-depth interviews, a huge number of social, psychological, and cultural problems were identified in the adaptation and integration of Ukrainian refugees in the Czech Republic. Thus, refugees accepted as a result of hostilities need much more attention, assistance, and support from the state than ordinary migrants. With the loss of social status, migrants are at increased risk of developing deep depression and mental illness.

Zaiga Vītola
Daugavpils University, zaiga.vitola@du.lv

SUSTAINABLE EQUILIBRIUM BALANCE IN EU MEMBER STATES IN THE CONTEXT OF EUROPEAN GREEN DEAL GOALS

The European Green Deal is the first of six priorities of the European Commission for the period 2019-2024. It is a growth strategy that will transform the Union into a modern, resource-efficient and competitive economy, where there are no net emissions of greenhouse gases by 2050, economic growth is decoupled from resource use, and no person and no place is left behind. The European Green Deal boosts the efficient use of resources by moving to a clean, circular economy, restore biodiversity and cut pollution. The European Green Deal is the plan to make the EU's economy sustainable. Overarching goal of economic policy in any developed democratic country should be to maximize the wellbeing of its citizens. The equitable distribution and access to resources is equally, if not more, important than the mere measure of the quantity of said resources. This is the very ideology behind degrowth: adjusting output according to environmental factors and population need and not according to maximized profits. Without reaching a sustainable steady-state equilibrium, global economic activity will likely never reach the necessary point to cease toxic anthropogenic effects on the environment due to the inherent contradicting forces of free-market capitalism that work against environmental progress.

Lika Kvinchia
Ivane Javakhishvili Tbilisi State University, Tbilisi, Georgia, likakvinchia@gmail.com

THE INFLUENCE OF CIVIL SOCIETY ON URBAN POLICY-MAKING IN TBILISI

Tbilisi is a unique example of urban development, which has changed its face over the centuries, often due to overly active and incorrect intervention. There is a modernized version of the famous saying: "Tell me what kind of city you live in and I'll tell you what it represents." If we believe this statement, the people living in Tbilisi represent a series of chaotic construction, traffic, and ecological problems. The city is facing urban challenges, and it makes perfect sense that the topic of urban protest has become particularly active in recent years. Although small-scale, successful protests against the Tbilisi City Hall and the decision of the investors started as early as the 2000s. During this time, the participants in protests faced many objections from the state. However, their protest also showed that the struggle brings results. An example of such a successful protest is the eight-year battle to save Vake's Park, which ended successfully. Green activists consider "Panorama Tbilisi" to be the most disappointing failure. These are some of the many cases that can be connected to Tbilisi's urban protests.

The purpose of this research is to study the challenges that the groups involved in urban movements are facing today; The ways in which they try to make more effective decisions and the means by which they manage to get more citizens interested in urban protest. According to the goals, the research tasks are to study non-governmental organizations, associations, or simple groups related to urban protest; Therefore, the

objects of the research are non-governmental organizations involved in the urban protest, green activists, and urbanists.

The qualitative research method is used to carry out this research. Since the purpose of the research was an in-depth analysis of the issue of "how" and "why" a given phenomenon occurs, it was necessary to use a qualitative research technique such as a semi-structured interview. 5 respondents were purposively selected from different non-governmental, research, or initiative groups and semi-structured interviews of an average of 30 minutes were conducted with them. The next step was the process of processing the already received information: turning the conducted interview into a transcript and analyzing them.

As a result of the interviews and further analysis, the research questions will be answered and it will be possible to understand what is the impact of civil society on the process of the formation of priorities of Tbilisi's urban policy; what resistance urban movements face; in what ways do urban movements try to mobilize citizens and involve them in urban protests.

IZGLĪTĪBAS ZINĀTNES
≈
EDUCATIONAL SCIENCES

Edmunds Jansons Mg.comp.sc.

ADAPTING FORESIGHT EXERCISE APPROACH IN REGIONAL UNIVERSITY SETTINGS

In the present day uncertainty, it is ever more important for the Regional Universities to assess the rising risks caused by external and internal factors impacting their development. This goal can be reached by increasing the use of futures foresight and futures literacy exercises in the academic institutions.
Foresight brings together key agents of change and various sources of knowledge in order to develop strategic visions and anticipatory intelligence.[i] The Regional Foresight is the implementation of the five essential elements of Foresight - anticipation, participation, networking, vision and action[ii].
Futures literacy skill reduces the futures uncertainty caused by an ever changing environment. The futures literacy concept has been defined as the new 21st-century skill with a set of capacities and skills by Pouru & Wilenius (2020[1]) reflecting on such skillsets as creativity, complexity, empathy, and problem-solving proactively. It helps lower the uncertainty and raises the level of knowledge about the possible impacts of any actions (Kaivo-oja, 2001c)
In order to define the futures trends for development of Vidzeme University of Applied Sciences a Futures Exercise aimed at scenario and futures images building was conducted for the leading personnel of the university. The outline of the participatory workshop was based on the "four-step explorative journey into the futures" approach by Laura Pouru and Otto Tähkäpää for the Futures Day [2]
The workshop with the employees of the University indicated that there is a vast difference in the deployed time dimension for the futures anticipation and the practical understanding of the foresight toolset for solving institutional development challenges. The excercise has proven that more efforts should be paid to the introduction of anticipation science in the academic curriculum.

Hu Mingzhi [1], Dzintra ilisko [2]
[1] Daugavpils University ,13-215 Vienības Street,1343481879@qq.com
[2] Daugavpils University,13-215 Vienības Street,dzintra.ilisko@du.lv

APPLICATION OF ICT IN VOCATIONAL EDUCATION IN LATVIA AND EU IN THE POST-PANDEMIC ERA

In the post-epidemic era, ICT integrates online and offline teaching in the development of vocational education, which can not only break through the constraints of time and space, but also create better teaching effects through changes and exert greater effectiveness. During the epidemic period, ICT has been widely used in vocational education by virtue of ICT advantages of breaking through the limitations of time and space distance. In the post-epidemic era, the wide application of ICT in vocational education is not only conducive to guiding the growth of students, improving the effect of educating people, but also creating an all-round educating pattern with the help of various information means, which has gradually become the process of educating people in vocational schools to carry out student training and management. This article starts with the application of ICT in vocational education in the post-epidemic era, thinks about the role and status of the application of ICT in vocational education, and proposes the application strategy of modern educational technology in vocational education.

Mārīte Kravale-Pauliņa[1], Eridiana Oļehnoviča[2], Ilona Fjodorova[3]
[1] Daugavpils University, Parādes street 1, Daugavpils, marite.kravale@du.lv
[2] Daugavpils University, Parādes street 1, Daugavpils, eridiana.olehnovica@du.lv
[3] Daugavpils University, Parādes street 1, Daugavpils, Ilona.fjodorova@du.lv

DEVELOPING DIGITAL LITERACY IN SECONDARY SCHOOL: APPROACHES AND TOOLS

Digital literacy is an important factor in Europe's growth and, in Latvia in particular, improving digital literacy is one of the country's priority objectives. Digital technologies and innovation have become key drivers of European Union (EU) strategies and programmes to promote economic growth and social development. The development of digital literacy is essential to enhance the competitiveness of individuals and their ability to adapt to technological change. Digital skills and knowledge can help to improve the labour market, foster the creation of new businesses and support social inclusion. A team of researchers investigated young people's digital literacy and teachers' willingness to use different information technology tools. The aim of the study was to explore the possibilities for improving digital literacy in secondary school students and, based on the findings, to develop recommendations for improving digital literacy. This presentation will only present the first step of the research - focus group interviews. Four focus group interviews were conducted with 94 secondary school students from two educational institutions.
The findings reveal that digital literacy has become a major challenge for secondary school students, as technology offers a variety of solutions for learning and teaching content. Focus group interviews highlight that the changing and rapid development of technology, data security and ethics, the volume of information flow and the creation of quality content are just some of the challenges of digital literacy.
Keywords: *digital literacy, inclusiveness, holistic approach, student-centred approach.*

Mabasia Motheba Ramanemane

EXPLORING TEACHING AND LEARNING FOR LEARNERS WITH AUTISM

A growing number of children have been given the diagnosis of autistic spectrum disorder to this point in the world. The problems and challenges that typical learners encounter during their teaching and learning process have been extensively studied in the literature. Nonetheless, during their educational journey, learners with autism were not given much attention or recognition. In addition, this essay aims to explore the challenges that learners with autism encounter during the teaching and learning process. Also, teachers should not be overlooked because it is thought that they contribute to the learning process of learners with autism. For this reason, this research also aims to examine the difficulties faced by teachers who are tasked with teaching learners with autism. This research was conducted qualitatively using observation and interviews as the instruments. Ten learners with autism were observed, and five teachers and learners were interviewed. The research has shown that although there are many hurdles and obstacles in the realm of autism spectrum disorder, none of them are insurmountable. This study is anticipated to give a better understanding of how teaching and learning take place for learners with autism. In this study, discussions and suggestions are further explained.

Dzintra Ilisko[1], Muhsinjon Juraev[2], Okhunbobo Rahimov[3]
[1]Daugavpils University, Parades street 1, Daugavpils, dzintra.ilisko@du.lv
[2]Polytechnical Institute of Tajik Technical University, I.Somoni street 226, Khujand, Tajiskitan, juraev.muhsin.1999@gmail.com
[3]Polytechnical Institute of Tajik Technical University, I.Somoni street 226, Khujand, Tajikistan, rahimov-o_1948@mail.ru

FEATURES OF TEACHING ELECTRIC POWER INDUSTRY AND COMMUNICATION IN AN INTER DISCIPLINARY WAY

The purpose of this article it to determine the relationship between natural and general technical disciplines as viewed through the field of electric power industry. The development of science in the field of education, the relationship of disciplines and modern teaching methods are considered relevant today. In this article, a special attention is paid to the main subjects studied in the direction of training engineers in the field of energy. The basicity of the subjects of physics, mathematics and electrical engineering is determined. To do this, tests were taken from the subjects of mathematics and physics among 70 students of the 1st year students, and knowledge was examined in these subjects. Results show that the level of knowledge of 1st year students in basic subjects is satisfactory for studying specialized disciplines. Furthermore, this shows the necessity of mathematics, physics and electrical engineering subjects. Their relevance and the connection between natural and general technical disciplines in the field of energy are substantiated. The residual knowledge of students are tested in the main subjects and their correspondence with the specialty.
Keywords: *technical disciplines, physics, mathematics, electrical engineering, interconnection of disciplines, electric power industry, education.*

Sebolelo Moorosi

TEACHING AND LEARNING QUESTION TAGS IN ENGLISH AS A SECOND LANGUAGE IN LESOTHO SECONDARY SCHOOLS: THE CASE OF SELECTED SCHOOLS IN QUTHING DISTRICT

The study looks into the difficulties teachers and students have using and comprehending question tags during the teaching and learning process. Investigating these difficulties' nature and solutions was the key goal. The goal of the study was to determine how question tags are taught at the secondary school level and the issues that teachers and students run into. This was accomplished using student written assessments, teacher and learner interviews, and teacher observations. The study is based on Kohonen's experience model of second language acquisition. It was determined that the difficulties faced were influenced by the learners' ethnicity and mother tongue. Some of the difficulties that instructors and students encounter include overgeneralization, a lack of knowledge of the guidelines for the use of question tags, and inadequate prescribed textbooks. It has also been proven that teaching strategies do not aid students in understanding and effectively using question tags in communication. The current study demonstrates that various question tag teaching techniques assist teachers in honing their skills and students' performance in question tag communication. The performance of teachers and students would significantly improve if the study's suggestions were followed.

Alisa Miškovska, Dzintra Iliško
burvigas_slidas@inbox.lv; dzintra.ilisko@du.lv

THE COMPETENCES OF THE COACH IN TRAINING ELITE FIGURE SKATERS

The coach plays an important role in preparing today's new generation of athletes. Coaches fulfil different roles: some help their athletes in their job search by helping to make an optimal career choice, others help them to learn new skills, to practice talents. A true coach is much more than an advisor. Therefore, the aim of research is to investigate which competences are essential for figure skating coach in providing quality training process for elite figure skaters. The article focuses on the dimensions related to the challenges and demands of contemporary culture of figure skating and how it influences work of a coach in the process of preparation of elite athletes.

The authors set the following research questions: what is the experience of Latvian and world coaches in training elite figure skaters? What are the competences of a coach in helping to prepare elite skaters? What kind of difficulties a coach needs to overcome at the process of training elite athletes?
The methods of research are questionnaire and semi-structured interviews with coaches of figure skaters.
It was concluded that the professional experience, formal academic education and understanding of the subject matter of coaches involved in the study has differed depending on their individual characteristics, work experience, country in which they work, sport philosophy or their life motto. However, they are united by common characteristics - respect and love for figure skating. Thus, the results of the study are based on a wide research audience and are considered both from the point of view of experienced, educated and even elite coaches, as well as from less experienced coaches and those coaches who are just getting their first academic education.
***Key words**: elite figure skaters, competencies of the coach, training.*

Jelena Davidova[1], Yue Zhang[2]
[1] Daugavpils University, Parādes street 1, Daugavpils, jelena.davidova@du.lv
[2] Daugavpils University, Parādes street 1, Daugavpils, yuezhang0011@outlook.com

THE CONSTRUCT OF BULLYING IN SCHOOL SETTINGS: THEORETICAL

***Keywords:** school bullying, school setting, school bullying construction, school bullying situation, school education.*
School bullying shows a high prevalence globally. According to a study published by UNESCO (2019), school bullying is widespread worldwide, with about one-third of students experiencing bullying at least once. Bullying can cause serious physical, psychological, and emotional harm that can last a lifetime (Allison, Roeger & Kirkman, 2009). A total of 99 countries around the world have conducted bullying research from 1984 to 2020, but the research strength of each country is unevenly distributed, with the main forces concentrated in developed countries such as Europe and the United States, while the research strength of developing countries is relatively weak (Lin. J. C, 2017).
There is a certain imbalance in school bullying research, between developed countries and developing countries, between western countries and eastern countries. Against this background, this paper summarizes the construction of school bullying in school settings and analyses 1) the background and significance of school bullying research, 2) the investigation on school bullying, 3) social and situational factors affecting bullying, 4) dealing with school bullying and as one of the most important anti-bullying elements, 5) the teachers' responsibilities and challenges in school bullying.
The aim of this paper is to help to establish a theoretical framework, lay a theoretical foundation for the comparison of Eastern and Western school setting-based construction of school bullying in the future, promote the collaboration of school bullying research worldwide, and jointly promote the development of anti-bullying work. **The method** employed is theory.
Reference
Allison, Roeger & Kirkman, (2009). Does School Bullying Affect Adult Health? Population Survey of Health-Related Quality of Life and Past Victimization.Retrieved Jan 4, 2023, from https://journals.sagepub.com/doi/abs/10.3109/00048670903270399
Lin, J, C. (2017), Analysis on the types and formation of school bullying behavior and coping strategies. Journal of educational science, 1.
United nations educational scientific and cultural organization. (2019). A report on the state of bullying in schools around the world. Retrieved Jan 4, 2023, from https://unesdoc.unesco.org/ark:/48223/pf0000246970

Jelena Davidova[1], Yue Zhang[2]
[1] Daugavpils University, Parādes street 1, Daugavpils, jelena.davidova@du.lv
[2] Daugavpils University, Parādes street 1, Daugavpils, yuezhang0011@outlook.com

THE CONSTRUCT OF BULLYING IN SCHOOL SETTINGS: THEORETICAL BASIS

***Keywords**: school bullying, school setting, school bullying construction, school bullying situation, school education*
School bullying shows a high prevalence globally. From 1984 to 2020, the number of published articles on bullying in schools worldwide has increased yearly. From the perspective of the disciplines involved in the core journals, research on bullying in schools shows a trend toward diversification and overlap. A total of 99 countries around the world have conducted bullying research, but the research strength of each country is unevenly distributed, with the main forces concentrated in developed countries such as Europe and the United States, while the research strength of developing countries is relatively weak(Lin. J. C, 2017). The top 10 authors on the school bullying field are from the US, Finland, the UK, Sweden, the Netherlands, and Italy. The top three scholars in terms of both publication volume and citation frequency are Dorothy L. Espelage of the University of North Carolina, USA, Christina Salmivalli of the University of Turku, Finland, and Peter K. Smith of the University of London, UK. Esperage attaches great importance to the translation of basic research results into applied practice (Shandong Normal University, 2017). He has led several school bullying intervention programs in the United States. The KiVa program led by Salmivali is one of the most famous, widely used, and effective school bullying intervention programs in the world, which has been learned and applied by many countries. As an early adopter of bullying research, Smith led the Sheffield Bullying Intervention Project, one of the most successful bullying prevention and intervention projects in the world (Shandong Normal University, 2017).
There is a specific imbalance in school bullying research between developed and developing countries, and between western and eastern countries. Against this background, this paper summarizes the construction of school bullying in school settings and analyses 1) the background and significance of school bullying research, 2) the investigation on school bullying, 3) social and situational factors affecting bullying, 4) dealing with school bullying and as one of the most important anti-bullying elements, 5) the teachers' responsibilities and challenges in school bullying. **The aim of this paper** is to help to establish a theoretical framework, lay a theoretical foundation for the comparison of Eastern and Western school setting-based construction of school bullying in the future, promote the collaboration of school bullying research worldwide, and jointly promote the development of anti-bullying work.

***Jekaterina Siļinkina*[1]**
[1]Daugavpils University, Vienības street 13, Daugavpils, silinkina.e@gmail.com

T*HE CRISIS OF EDUCATION AND THE FACTORS PREVENTING ITS SUSTAINABLE DEVELOPMENT*

The value of education is becoming more and more recognized by scientists, governments, and society every year. Education is not just the teaching of students, but rather a huge, complex institution that affects all aspects of life. The 2030 Agenda for Sustainable Development identifies higher education as a key area that contributes to progress on the 17 Sustainable Development Goals (SDGs). The aim of education in the global sense is to train future leaders of sustainable development. Nevertheless, the number of people affected by armed conflicts, forced relocations, and natural disasters is increasing globally. These factors have a negative impact on education, deepening its crisis situation. The paper analyses main works of researchers on sustainable development of education, reports of international organizations, including the World Bank, which confirm the crisis situation, legislation in the field of education, the existing Latvian practice. It provides a definition of sustainable development of education, explains why it is important to foster it, what is the current form of educational crisis, what are the main causes of the crisis and outlines the main directions for overcoming it. The article does not provide an ultimate solution for the crisis; but it analyses the existing concepts and solutions, lists the possible scenarios for further research by scientists. It is stated that the current education needs greater attention, along with such problems as the Ecology. The principles of continuing education, its integration with production and science, inclusion of students in real life developments are identified as priorities.

***Algimantas Bagdonas*[1]*, Nijolė Meškelienė*[2]*, Svetlana Ušča*[3]*, Jana Grava*[4]**
[1]Kauno kolegija Higher Education Institution, Pramonės pr. 20, Kaunas, algimantas.bagdonas@go.kauko.lt
[2]Kauno kolegija Higher Education Institution, Pramonės pr. 20, Kaunas, nijole.meskeliene@go.kauko.lt

[3]*Rezekne Academy of Technologies, Atbrīvošanas aleja 115, Rēzekne, svetlana.usca@rta.lv*
[4]*Liepaja University, Lielā street 14, Liepaja, jana.grava@liepu.lv*

THE INFLUENCE OF VOLUNTARY ACTIVITIES OF FUTURE TEACHERS ON THE EDUCATION OF SOFT SKILLS: THE CASE OF LITHUANIA AND LATVIA HIGH SCHOOLS

In Lithuania in 2022 announced in the Year of Volunteering. This was one of the reasons for conducting this research and delving into the phenomenon of volunteering itself, as well as the abilities that are developed during volunteer activities and the relevance of these abilities in pedagogical activities. Research discusses the concept of volunteering and the impact of volunteering on the expression of soft skills. Complementing professional skills with "soft" skills is important for a successful future professional career. One way to acquire "soft" skills is volunteering in associations and non-governmental organizations. The role of the educator in contributing to the education of the future generation is extremely important, therefore the educator himself must not only have extensive professional knowledge, but also strengthen personal and interpersonal skills, otherwise known as "soft" skills, which would help to become a mature person capable of solving his own problems, to be active in a working environment, able to work both independently and in a group, take initiative, etc. The research field of this topic is the experience of voluntary activities of Lithuanian and Latvian high school students who have chosen to study Preschool and Preschool Education and its influence on the development of "soft" skills. Problematic question - what is the impact of volunteering on the development of students' "soft" skills? The purpose of the research is to reveal the experiences of students' voluntary activities and their influence on the development of "soft" skills. The research applied the methods of scientific literature and document analysis, written survey and statistical analysis of the obtained data. The results of the research showed that the participation of both Lithuanian and Latvian students in voluntary activities is not systematic. Looking at the results of the study, it can be seen that the level of enhanced "soft" skills acquired by Lithuanian students during volunteering is greater compared to Latvian students. Both Lithuanian and Latvian students highly value the importance of volunteering and believe that they gained important experience and developed and strengthened these "soft" skills, which are very important in their future professional activities - the ability to work in a team, the ability to communicate and cooperate, the ability to make decisions, ability to organize and plan.

Lolita Kostjukova
Daugavpils University, Parādes street 1, Daugavpils, Latvia, LV-5401 lolita.kostjukova@gmail.com

UNDERSTANDING OF LATVIA'S COLLEGE STUDENTS ON ACADEMIC HONESTY

Key words: *academic integrity, higher educational institution, Latvian college, students.*
The aim of the study is to explore students of opinion about academic integrity.
Materials and methods. Theoretical method: analysis of the latest scientific literature, research, statistics and regulatory documents, quantitative methods of data collection.
The research data point to the problems of Latvian colleges students understanding of academic honesty.
Increasing challenges of the 21st century create more diverse and complex situations and interdependencies. For example, the reduction of resources and changes introduced by technology contribute to the reevaluation of society's values and paradigms, even a change, changing individuals' understanding and attitude towards society. Ethical standards and moral values are relative, they are created by the individual himself/herself. Individuals, as rational beings, also have common moral values that are formed and developed together with other people These moral values are not accepted by one individual, but they are accepted among the members of group. The founder of the Global Ethics Institute (USA, 1990), professor Rushworth M. Kidder (Rushworth Moulton Kidder) wrote that "global priority is to understand and restore the concept of community and what it means to live in community", as well as our responsibility as a society, to because "we are raising a generation without an innate sense of ethics" (Lloyd & Kidder, 1990).
In recent years in Latvia, the problem of plagiarism has been brought up in universities, mass media and society. Educational institutions are creating a unified computerized plagiarism control system so that

submitted student works can be compared with other works already in the database. The author herself, being a student for the fifth time and having worked in an educational institution for 20 years, based on personal experience, concludes that honesty in the educational space should be given a new meaning by continuing the dialogue, improving documentation and educating those who are involved in the academic environment. In an educational institution, teaching staff must have an enhanced role in clarifying these unclear boundaries between ethical and unethical behavior, actively promoting the reduction of differences in previous experience of students, deepening their understanding, maintaining high quality standards, and strengthening personal responsibility and academic culture.

VIDES ZINĀTNES
≈
ENVIRONMENTAL SCIENCES

Juris Soms[1], Dana Medne[1],
[1]Daugavpils University, Parādes street 1, Daugavpils,
juris.soms@du.lv; danamedne1@gmail.com

CHANGES IN LAND USE AND AGRICULTURAL PRACTICE IN THE RIVER DAUGAVA VALLEY DURING MEDIEVAL TIMES INFERRED FROM GEOMORPHOLOGICAL AND GEOLOGICAL PROXIES

The lack of historical and geoarchaeological evidence on past land use changes and human-induced landscape variations limits the investigation of long-term trends in agricultural practice fluctuations in SE Latvia. It can be attributed to the river Daugava Valley, where we can find many Iron Age and Medieval settlements. To get insight into the changes in land use and agricultural practice in the study area during Medieval times, the data inferred from geomorphological and geological studies were used as proxies allowing to fill the gaps related to the lack of historical documentation. For this purpose, geological field survey of inland dune sediments in the river valley was conducted. In cases where charcoal was identified under the dune deposits, samples were collected for 14C AMS dating at the Vilnius Laboratory of Mass Spectrometry. The results of 14C dating indicate that at different parts of the river valley deposition took place between 1399 and 1450 calAD, and between 1620 and 1675 calAD. Hence dating reveals that during the so-called Little Ice Age (LIA), high-magnitude geomorphic processes took place in the Daugava valley, leading to intensive deposition of aeolian sediments and burring of soils. Discussing the possible factors and forcing mechanisms of aeolian activity at that time, we must note the cold climate of the LIA during Medieval times and related forest clearing. The review of scientific publications reveals, that within Northern Europe, crop cultivation is very temperature sensitive, hence even a relatively small drop in temperature during the LIA had a considerable impact on the grain harvest and crop yields. The response to the climate cold phase that lowered yields was a change in conventional agricultural cultivation and returning to the slash-and-burn practice. However, reducing canopy vegetation cover in the Medieval times triggered aeolian activity, the formation of dunes and sand cover, in turn leading to the abandonment of many fields on the terraces of the river Daugava valley.

Māris Liepiņš[1]
[1]Daugavpils University, Parādes street 1, Daugavpils, marisliepins79@gmail.com

EVALUATION OF FISH COMMUNITIES IN ALŪKSNE RIVER BEFORE DAM REMOVAL

Evaluation of fish communities in Alūksne river before dam removal.
River barriers have profound impacts on aquatic ecosystems by blocking fish and invertebrate species migration and water and sediment movement. Removal of redundant dams have in recent years picked up pace in Europe as this is an eco-efficient and cost-effective measure to reach the objectives of the Water Framework Directive. The river Alūksne is a 24 km long fast-flowing river that flows from lake Alūksne and enters the river Pededze. The removal of the now obsolete Beja watermill dam is planned as it constitutes the main migration obstacle, dividing the river roughly in half. The goal of this study is to evaluate the fish communities and their spatial distribution above and below Beja watermill dam before it's removal.
In this study electrofishing in 5 upstream and 5 downstream stretches were used to assess the species composition and spatial distribution of fish. The fish were caught, counted, and measured and consecutively released. We found that the downstream stretches are more densely populated and fish communities more diverse. Upstream stretches were found to contain less species overall and lower density, even in highly

suitable habitats. Density, biomass, and diversity of the fish assemblage suggests that Beja watermill dam is currently prohibiting fish from utilizing suitable habitats and this would be mitigated by removing this dam.

Uldis Egle[1], Juris Soms[1],
[1]Daugavpils University, Parādes street 1, Daugavpils,uldisegle@gmail.com, juris.soms@du.lv

GIS FOR THE ASSESSMENT AND MAPPING OF ECOSYSTEM SERVICES PROVIDED BY URBAN FORESTED AREAS: A CASE STUDY OF DAUGAVPILS CITY

The EU Biodiversity Strategy for 2020 includes inventory and mapping of ecosystems to better understand the recent state of biodiversity in Europe. The mapping of ecosystems and assessment of their services provides information to policymakers for decision-making to protect and conserve biodiversity, as well as promote sustainable land use practices. At the same time, the successful integration of ecosystem services into policy and decision-making largely depends on the availability of precise geospatial data on these services and the geographic distribution of their biophysical aspects. Hence GIS-based analysis, assessment and mapping of ecosystem services have increased significantly over the last decades in Europe, as evidenced by the scientific publications on the studies that have applied this technique. However, only some similar studies are conducted in Latvia until now. The assessment and mapping of ecosystem services are particularly important in forested areas of large urban territories, where land cover changes and transformation of habitats typically are more accelerated than in natural ecosystems, as cities are open and dynamic environments. Also it is worth to mention that the importance of forests in cities is not sufficiently estimated, although areas covered by canopy vegetation provide a range of ecosystem services, e.g. shelter for biodiversity, carbon sequestration, recreational services, air quality regulation and other benefits for society. Therefore, this study presents preliminary results on the application of GIS methods to obtain and quantify data necessary for ecosystem services mapping and assessment procedures in Daugavpils city as a case study. Subsequently, the next phase of this study is aimed to identify hotspots of forest ecosystem services within the city and develop recommendations for their appropriate conservation and management.

Dana Medne[1], Juris Soms[1],
[1]Daugavpils University, Parādes street 1, Daugavpils,danamedne1@gmail.com; juris.soms@du.lv

GRANULOMETRIC COMPOSITION OF INLAND DUNES IN THE AUGŠDAUGAVA SPILLWAY VALLEY

Inland dunes as local wind-formed or aeolian landforms are identified and mapped in the Augšdaugava spillway valley during recent studies conducted at the Laboratory of Quaternary Research, Daugavpils University. Until now, there is a lack of scientific data on the granulometric composition of dune-forming sediments. But it is worth to mention that grain size distribution and other granulometric properties are very important indicators which can be used for paleogeographic and paleoenvironmental reconstructions in this area. Therefore, the authors performed a research programme including field studies, geomorphological reconnaissance and granulometric analysis of aeolian sand samples. For grain size analysis of aeolian sediments sand samples were collected from dunes pre-selected during GIS mapping. The bulk samples, each with a mass of about 180-200 g, were taken from the dune crests with a hand auger or from shallow dugs at a depth of 0.8 to 1.2 m directly from the C horizon of soil. Given that the dune crest is a specific sub-environment found on all morphological types of dunes and that sand deposited by wind at a crest has not been substantially modified by other exogenic geological processes after the stabilization of dunes, sand samples were only collected from this position. After physical pre-treatment by 2 mm geotechnical sieve, analyses were done at the Laboratory of Quaternary Research (DU) by a laser diffraction particle analyzer Malvern Mastersizer 2000. Data obtained by particle analyzer subsequently were processed by applying GRADISTAT v9.1 software integrated with MS Excel environment. It allows to calculate such Folk and Ward granulometric indicators as mean grain size M_a, sorting s, skewness SK and kurtosis K_G. The results of the study demonstrate

that the mean grain size of aeolian sand ranges from 190 to 396 µm. Hence aeolian landforms in the spillway valley are composed of rather homogenous, fine or medium sand, which is moderately well or well sorted.

Daniela Haļenko[1], Dāvis Gruberts[1],
[1]Daugavpils University , Parādes street 1, Daugavpils, daniela.halenko3@inbox.lv; davis.gruberts@du.lv

HYDROLOGICAL MONITORING OF THE SURFACE AND UNDERGROUND WATERS IN THE NATURE PARK "DVIETES PALIENE" IN 2022

In 2010-2015, the LIFE+ project "Restoration of the Grieze habitats in the Natura 2000 area Dvietes floodplain" was implemented in the nature park "Dvietes floodplain", within the framework of which the natural course of the river was restored. In connection with it regular hydrological monitoring of the surface and groundwaters was started, which lasted until 2017. In 2022, regular measurements of the Dviete river water levels and the groundwater levels within the Dvietes floodplain meadows were started again. Measurements from two bridges on the Dviete river were made once every 14 days starting from May 31, 2022 to May 31, 2023. Groundwater level measurements were made by TD-Diver submersible data loggers and a Baro-Diver atmospheric pressure sensor.
This study, which uses the automatic groundwater level (pressure) meters, could provide much more detailed information about the groundwater regime of the Dvietes floodplain in the area of the restored Dviete riverbed and its connection to rapid weather changes than all previous monitoring type observations at this location.
Correlation analysis shows that there is a positive correlation between the Dviete's river water level measurements from the Dvietes bridge and measurements from the Sloboda bridge. There is also a positive correlation between groundwater levels in the monitoring wells No. 5 and No. 15. A positive correlation has been observed between the Dviete river water levels at the Sloboda bridge and the groundwater levels at the monitoring wells No. 5 and No. 15. There is no correlation between the water levels the Dvietes bridge and the groundwater levels at monitoring wells No. 5 and No. 15. A weak positive correlation has been observed between the amount of precipitation per week and the groundwater level in the well No. 15, while no correlation to the precipitation records has been observed for the monitoring well No. 5.

Ivars Skudra[1], Dainis Lazdāns[1],
[1]Daugavpils University , Parādes street 1, Daugavpils, skudra.ivars@googlemail.com; dainis.lazdans@gmail.com

IMPACT OF POLLUTION ON WATER QUALITY IN THE DZIRNAVU POND GULBENE TOWN

Water quality in bodies of water can be a good indicator to determine if any adverse anthropogenic effects, such as pollution, occur in the ecosystem. It is also particularly useful in various protected natural areas where water bodies are located and where there is a high anthropogenic effect. The study object of the Master's work is the Dzirnavu pond of the River cross Krustalice and its surface area is 2.4 hectares. The area is located in Gulbene town. The said Dzirnavu pond dates back to the construction of the floodgates on the River cross Alicia.
There are relatively few biodiversity-enhancing elements, as the area around the Dzirnavu pond is made up of private house districts, where the principle of impregnation is largely used for the discharge of waste water. That fact is one of the reasons for the extensive eutrophication processes in that body of water.
the 1998 leak of fuel products into the mill pond aquatorium has only contributed to the deterioration and eutrophication of water quality.
Upon commencing the Master's work study and familiarising himself with the available information regarding the situation in the Dzirnavu pond, examining the previous studies, as well as consulting with the Gulbene Municipality environmental Protection Board, it was clarified that the attraction of European funds for cleaning and remediation work of this body of water is currently one of the priorities.

Measurements will be made in that body of water to determine the physico-chemical parameters of the water, such as temperature, ph, chlorophyll-α, dissolved oxygen, etc., and to compare with the results obtained above. Multiparameter probe DS5 and YSI Pro DSS will be used to obtain this data. During the winter period, Zond 12e, a georadar, was used to determine the thickness of the sediment blanket as far as possible.

Rimants Badins[1], Juris Soms[1], Arturs Škute[1], Dāvis Gruberts[1],
[1]Daugavpils University , Parādes street 1, Daugavpils, rimants.badins@inbox.lv, juris.soms@du.lv, arturs.skute@du.lv; davis.gruberts@du.lv

INPUT DATA PREPARATION FOR SWAT+ MODELLING AT SMALL RIVER CATCHMENT: PROBLEMS AND SOLUTIONS

The efforts to reduce land and water resources degradation and associated pollution of streams and lakes are very important parts of environmental policy and practice in Europe. Therefore, modelling of water runoff and nutrient supply and other processes are widely used to get insight into possible future scenarios. In turn, the results obtained during modelling can be used for the elaboration of possible action plans in the context of climate change. For such purposes, among different models, SWAT+ (Bieger et al., 2017) is widely used throughout the world as it brings large advancements in the modelling of the quality and quantity of surface and groundwater at a watershed scale. The SWAT+ model is a command line tool using different input data: digital elevation model (DEM), catchment boundary, soils, land object data and land use as a contiguous representation of the landscape, stream network, and point sources of pollution. The Dviete river catchment was selected as a case study for SWAT+ modelling. However, the authors found that due to the lack of relevant input data in GIS format, there is a problem with SWAT+ model setup. To solve the problem, in the presented study high-resolution DEM was developed from airborne LiDAR data. This DEM further was used for the delineation of catchment boundary during conventional on-screen analysis and digitization, where the watershed line was drawn considering the topography and hydrography of the territory. Manual digitization of soil inventory maps and maps of Quaternary deposits developed in the period from 1970 to 1991 allowed to prepare vector format soil data. For creating vector data on land use and field boundaries, orthorectified aerial RGB and NIR images flown in 2021, as well as forest inventory data were used. The streams and ditches were manually digitised as channel polyline features with topologically correct connections. Finally, pollution source points were digitised following the information provided by the State Environmental Service of the Republic of Latvia.

Raimonds Šulmanis
Daugavpils University, Parādes street 1, Daugavpils, xraimohax@inbox.lv

INTRODUCTION OF ELECTRIC CARS AND THEIR CHARGING INFRASTRUCTURE AT THE NATIONAL ARMED FORCES AVIATION BASE IN LIELVĀRDE

The Latvian National Armed Forces (NAF) Aviation Base is located 7 km north from the Lielvārde town, in Rembate rural territory, Ogre municipality.
The aviation base in Lielvārde is a military object that includes a land area, as well as buildings, objects and equipment designed to organize the arriving and departure of military aircrafts, maintained and used for national protection.
The transport sector creates huge global carbon dioxide (CO2) emissions. In order to establish transport systems with low carbon emissions, the promotion of electric vehicles is an important strategy of countries in the world.
Environmental strategies of the armed forces of other countries were studied to understand their guidelines. It can be concluded that all the strategies studied have common guidelines. The National Armed Forces Environmental Policy promotes the protection of the environment and the prevention and reduction of

environmental pollution. The armed forces with their own environmental impact should prevent its degradation.
The NAF Aviation Base is intended to introduce electric cars and their charging infrastructure. Electric cars are ecologically friendly to the environment with zero CO2 emissions and do not cause noise contamination. Reducing greenhouse gas emissions created by the transport sector is possible by replacing fossil fuels with renewable energy. Electric cars are intended to be used at the aviation base for all seasons. Application: transportation of material tools, staff transportation, dragging of luggage trolley or trailer, snow removal and anti -slip material sprinkling in narrow places, aerodrome maintenance work, both during the summer and winter season.
The research topic is actual because the electric cars are not implemented at any of the National Armed Forces facilities in Latvia.
Data on the technical, social and economic aspects of the charging infrastructure, the electric car units, the purchase and use of electric cars were obtained during the study. The environmental strategies of the armed forces of other countries were also taken into account.
The results obtained can be used to implement electric cars into other objects of the National Armed Forces. It will be a role model for other military objects.
Keywords: electric car, electric car infrastructure, environmental strategy.

Juris Soms[1], Dana Medne[1], Dainis Lazdāns[1]
[1]Daugavpils University, Parādes street 1, Daugavpils,
juris.soms@du.lv; danamedne1@gmail.com; dainis.lazdans@du.lv

RECONSTRUCTION OF ENVIRONMENTAL CONDITIONS RELATED TO AEOLIAN ACTIVITY IN THE AUGŠDAUGAVA SPILLWAY VALLEY DURING THE LITTLE ICE AGE

Although the wind-formed landforms in Latvia have been investigated in terms of their geomorphology and geological composition, studies with an environmental and geochronological perspective on dunes or dune-forming sediments are so far relatively few. At the same time, the published results of studies performed in Europe and other regions, have demonstrated that much climate, environmental, and other information can be extracted from aeolian landforms. It is also necessary to note that morphology and geographic distribution of dunes are important proxies for a better understanding of climate conditions contributed to the aeolian activity. Hence, authors conducted studies including identification and GIS analysis of inland dunes using high-resolution DEM. The dunes were delineated as polygon features in the process of on-screen digitising. The morphology of delineated dunes and their crestlines served further as the geomorphic proxies for inferring the paleowind directions under which the aeolian landforms were likely formed. For this purpose the wind direction was measured using the bisector of the angle between the two trailing arms of the dune, following the procedures described by Sitzia et al. (2017) and Bernhardson et al. (2019). The obtained results show that the linear and parabolic dunes in the Augšdaugava spillway valley in general have an orientation from W-SW to E-NE, with elongated crests sub-parallel to the margins of the spillway valley. The results demonstrate that most of the dunes appear to have been formed by W or SW winds. Presumably such orientation of dune linear axis possible can be explained by the formation of tunnel effect during air mass transfer through the depression of the spillway valley. This wind activity and formation of dunes took place during the decreasing of solar activity and irradiation, and coincide with decreasing on mean temperatures during the Little Ice Age. We can assume that it led to drying out sandy soils and also presumably higher supply of sand on river banks due higher intensity of spring floods.

Dāvis Gruberts[1], Ilmārs Luksts[2], Jānis Gavars[3]
[1]Daugavpils University, Parādes street 1, Daugavpils, davis.gruberts@du.lv
[2]Daugavpils University, Parādes street 1, Daugavpils, ilmarsluksts@inbox.lv
[3]Daugavpils University, Parādes street 1, Daugavpils, janis.medibas@inbox.lv

RESULTS OF THE XVI LAGRANGIAN DRIFT EXPEDITION ON THE MIDDLE DAUGAVA RIVER

On April 28.-29, 2022, the XVI annual drift expedition was conducted on the Middle Daugava River downstream from Daugavpils, South-East Latvia. The drift was conducted at the peak of the spring floods by applying a manned drifting research platform "Aventura 2" made from a maritime life raft and an inflatable boat, that allowed the crew to drift continuously along the Daugava River for about 20 hours and to track and sample selected flood water masses during their downstream transport in situ according to the Lagrangian method. Main physical, chemical and biological parameters of the tracked flood water masses were measured in situ at regular time intervals. The average drift speed, the river's depth, the main channel's width and geographical position of the research platform were recorded each hour. Simultaneously, the water mass transparency, temperature, pH, conductivity, total dissolved solids, dissolved oxygen concentration and saturation as well as the red-ox potential and chlorophyll-a concentration were recorded. In addition, the sub-surface water samples for the nutrients and zooplankton were collected at each site.
The drift was started in Daugavpils near Daugavpils University on April 28 at 11:30 and ended in Līvāni town downstream from the Dubna inlet on April 29 at 8:00. In total, approximately 65 km long distance was covered in about 20 hours by drifting at an average speed 0,9 m s^{-1}. The repeated in situ measurements and water sampling was conducted at 20 sites along the drift route. In result, a well-known diurnal cycle of some physical and biological parameters (i.e. water temperature, chlorophyll-a etc.) was observed. Other parameters changed randomly along the drift route, or increased or decreased gradually, like the pH lever or the red-ox potential. No significant correlation was found between hydrodynamic properties of the Daugava's main channel and selected physical and chemical properties of the flood water masses tracked during the drift.

Ineta Kruļeva[1]
[1]Daugavpils University, Parādes street 1, Daugavpils, ineta.kruleva@gmail.com

THE USE OF LICHENOINDICATION IN THE ASSESSMENT OF AIR QUALITY CHANGES IN DAUGAVPILS CITY

Air pollution is a significant environmental issue in many cities. It has notable impacts on both human health and the ecosystem. To develop effective strategies for controlling pollution, it is crucial to monitor air quality. One of the effective and reliable methods for air quality evaluation is lichenoindication, which uses the sensitivity of lichens to air pollutants as an indicator of the air quality in a specific area. This method has been widely used in environmental monitoring and research. This study focuses on the use of lichenoindication for evaluating air quality changes in Daugavpils city.
The aim of the study was to investigate the diversity of lichen species on pines (*Pinus sylvestris* L.) and lindens (*Tilia cordata* Mill.) in the territory of Daugavpils city, assess air quality, and obtain data to compare with research conducted in 2012 and 2013. The research methodology is based on the *European guidelines for mapping lichen diversity as an indicator of environmental stress* (2002). These guidelines utilize the diversity of lichen species in a specific area. The research covered 22 regular grid squares for pines and 60 regular grid squares for lindens in Daugavpils city. Each square was surveyed for 4-6 trees that met the requirements specified in the methodology.

VESELĪBAS APRŪPES ZINĀTNE
≈
HEALTH CARE SCIENCE

Nataļja Maiboroda[1], Jānis Eglītis[2], Silvestrs Rubins[3], Aleksejs Zavorins[4]
[1]Faculty of Medicine, University of Latvia, Jelgavas street 3 Riga, Latvia, natalja.maiboroda@gmail.com
[2]Riga East University Hospital, Latvian Oncology Center, Hipokāta street 4 Riga, Latvia janis.eglitis@aslimnica.lv
[3] University of Latvia, Department of Dermatology and Venereology, Jelgavas iela 3, Riga, Latvia silvestrs.rubins@gmail.com
[4] Riga Stradins University, Department of Dermatology and Venereology, Baznīcas street 18, Riga, Latvia aleksejs.zavorins@gmail.com

THE ROLE OF THE SENTINEL LYMPH NODE BIOPSY IN MELANOMA PATIENTS: A RETROSPECTIVE SINGLE CENTER ANALYSIS

Key words: *Sentinel lymph node biopsy, melanoma.*
Introduction. Sentinel lymph node biopsy (SLNB) is a sensitive, minimally invasive operative method for lymph node evaluation and staging in patients with melanoma without clinical and radiological lymph node findings. Precise SLNB identification is crucial for accurate diagnosis of micro-metastasis at an early stage of melanoma progression and treatment initiation.
Aim. A retrospective single center study was performed to compare and analyze the patients who had undergone sentinel lymph node biopsy vs observation.
Materials and methods. The retrospective study was conducted at the Latvian Oncology Center. 134 patients with histologically confirmed melanoma in the 2015, were involved in the study. Patient data: diagnosis, age, sex, histological parameters, stage, treatment tactics, disease progression were collected. A Kaplan-Meier analysis was performed to compare patients who have undergone SLNB vs observation. The observation time was 7 years. Progression-free survival curves were created by R-studio program.
Results. Patients who have undergone SLNB had shown improving progression-free survival comparing to an observational group. The significance given by Fisher's test is P=0,05, which is on the edge. There was 22% (N=30) of patients who have undergone SLNB and 78% (N=104) patients who have undergone observation only. In SLNB group there was 7% (N=2) SLNB of metastases positive patients and 93 % (N=28) metastases negative patients. There were 11 % (N=11) of patients who didn't undergo SLNB due to technical reasons.
Conclusions. Data analyses revealed that in necessary cases SLNB was not taken accordingly to NCCN recommendations and there may be several reasons for that. In Latvia Pembrolizumab was included in the list of compensable medications only from 2018 and we suppose that there was no need to perform SLNB, because the treatment was not available. That is why SLNB plays crucial role in cases without clinical and radiological lymph node findings in melanoma patients, therefore we recommend SLNB in this group for making alterations to disease staging and change of treatment strategy. Another possible reason is that Latvian Oncology center's dermato-oncology unit got established in 2019 only.
Acknowledgements. The authors declare no conflict of interest.

Anastasija Ševčenko[1]
[1]Riga Stradiņš University, Dzirzciema street 16 Riga, nastja1188@gmail.com

FREQUENCY AND SEVERITY OF ANXIETY AND DEPRESSION SYMPTOMS AND THEIR ASSOCIATED FACTORS IN PATIENTS IN A LONG-TERM METHADONE MAINTENANCE TREATMENT

Background: Opioid use is still common in European Union countries and is a challenge for both psychiatrists and narcologists in relation to addiction treatment, its outcomes and patient comorbidities.

The methadone maintenance program is one of the options for opioid addiction treatment, but it is closely related to social stigma and various restrictions, as well as a decrease in the quality of life.
Therefore, the participants of the methadone program are a risk group for depression, the development of anxiety, as well as an increase in the risk of suicide.
Aim: The literature review summarizes latest scientific findings on mental state of methadone maintenance treatment participants.
The aim of the study was to investigate the prevalence and severity of anxiety and depression symptoms, their associated factors and suicide risk in patients in a long-term methadone maintenance treatment.
Methods: Open resources from the PubMed database were used in work. Research from the last 20 years, i.e. from 2003 to 2023, was selected. Exclusion criteria - studies with participants diagnosed with organic psychiatric disorders and minor participants. As well as publications that have not been translated into English, and publications whose full text is not freely available for viewing.
Results and conclusions:
Prevalence and severity of both depression and anxiety symptoms for methadone maintenance treatment patients were found more severe compared to the general population. The most important contributing factors were gender, employment status, social stigmatization, family support, and methadone treatment duration. As well as suicide risks for this patient group were at an alarming rate.
Regular monitoring and evaluation of patients with depression and anxiety screening tools during the visit (PHQ-9 and GAD-7) is very important for the successful course of therapy, improvement of the patient's quality of life, and evaluation of the suicide risk, as well as the prevention of the return of the patient to illegal substance use.

Author: Madara Kraukle[1],
Scientific research supervisor: Māra Kaše - Stūrmane[1, 2],
[1]Rīga Stradiņš University, Dzirciema street 16, Riga, Latvia, madaraa.kraukle@gmail.com
[2]Hospital of Traumatology and Orthopaedics, Duntes street 22, Riga, Latvia, maarak2@inbox.lv

"PATIENTS' AWARENESS OF ORTHOPEDIC HIP ARTHROPLASTY POSTOPERATIVE PERIOD AND SOURCES OF KNOWLEDGE"

Objectives
Hip osteoarthritis is one of the most common disease of the hip joint, which is mainly being treated by hip arthroplasty surgery. In developed countries hip replacement average surgery rates are around 300 per 100 000 population. To avoid postoperative complications such as endoprosthesis dislocation, it is particularly important to observe postoperative regime. Usually patients are discharged a few days after surgery so early comprehensive information is required. Research objective is to find out patients' awareness of hip arthroplasty postoperative period.
Methods
51 patients after first-time hip replacement surgery participated in a quantitative cross-sectional study. The study was held in the Hospital of Traumatology and Orthopaedics in Riga, Latvia. To find out patients' awareness of hip arthroplasty postoperative period a researcher created, structured survey was used. Data was analyzed using IBM SPSS Statistics software.
Results
44 (86%) participants had received information about postoperative period. 26 (51%) received this information from their attending surgeon, 18 (35%) from internet sourcess, 11 (22%) from physiotherapist. All patients knows about different aids in postoperative period. 98% knows about crutches, more than a half are aware of pillow and elevated toilet seat. Less than a half knows about walking frame, sock aid and reacher. 18 (35%) thinks they will have use walking aids 6 to 8 weeks after the surgery, 20 (39%) believes that after three months they will be allowed to return to work and 29 (57%) believes to return to daily activities after the same time.
All patients except one knows about various movement restrictions. 46 (90,2%) mention that it is forbidden to cross the legs, 43 (84%) – to sit on a low furniture, 42 (82%) - to lean forwards in sitting position, 39 (77%) – to rotate the operated leg.
27 (53%) knows that it is allowed to stand up on the second day after the surgery, but 19 (37%) thinks it is allowed after two or three days and 3 (6%) - after one week.

28 (55%) knows about possible leg lenght assymetry. The absolute majority 39 (77%) knows that nausea, pain, swelling and hematomas may be after the surgery

Conclusions

Not all patients have received information about postoperative period and in certain aspects patients' awareness is incomplete.

Matīss Šņukuts[1], Prof. Indra Zeltiņa[2, 3]

[1]Riga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, 028265@rsu.edu.lv
[2]Riga East University Hospital, Gastroenterology and Hepatology Centre, Hipokrāta street 2, Riga, Latvia
[3]Riga Stradiņš University, Department of Infectology, Linezera street 3, Riga, Latvia, indra.zeltina@rsu.lv

A PRELIMINARY STUDY ON PREDICTING SPONTANEOUS BACTERIAL PERITONITIS WITH NEUTROPHIL-TO-LYMPHOCYTE RATIO IN PATIENTS WITH LIVER CIRRHOSIS AND CHRONIC VIRAL HEPATITIS B OR C

Keywords. *Liver cirrhosis; Spontaneous bacterial peritonitis; Hepatitis B virus; Hepatitis C virus; Neutrophil-to-lymphocyte ratio*

Background. Spontaneous bacterial peritonitis (SBP) is a life-threatening liver cirrhosis complication. Diagnosis is confirmed by paracentesis, but non-invasive laboratory tests, such as neutrophil-to-lymphocyte ratio (NLR), could aid in early diagnostic process.

Aim. To assess how NLR can predict SBP in patients with liver cirrhosis, and how other laboratory or demographic/clinical factors improve its prognostic performance.

Materials and Methods. A retrospective cross-sectional study analysed hospitalization records from Riga East University Hospital spanning 2016–2021. The sample included patients with liver cirrhosis and chronic hepatitis B or C infection (HBV/HCV). SBP was defined as ascitic fluid neutrophil count >250/mm^3. Patients had no other acute infections and were divided into two groups: with SBP, and without. Alpha value was 0.05, and we used univariate and multivariate binary logistic regression to identify factors associated with SBP. We used ROC analysis to assess the performance of the multivariate model and its variables.

Results. From 155 total patients, 11 (7.1%) had SBP. The median (IQR) for age was 56 (51–65), and for NLR it was 3.46 (2.25–5.42).

In univariate analysis, high NLR, low serum albumin, intravenous drug use (IVDU), and hepatorenal syndrome-acute kidney injury (HRS-AKI) were positively associated with SBP. Only two significant variables remained in the multivariate model: NLR ($p<0.001$), and IVDU ($p<0.001$). The positive association of NLR had an odds ratio (OR) of 1.29 (95% CI [1.12–1.47]), while IVDU had OR of 47.5 (95% CI [5.3–423.4]). The model had AUC (area under curve) of 0.815 (95% CI [0.636–0.997], $p<0.001$), sensitivity 80.0% and specificity 84.4%. The best cut-off value of NLR for predicting SBP was >6.04 with 70.0% sensitivity, 83.7% specificity, and AUC 0.774 (95% CI [0.602–0.946], $p=0.004$).

Conclusions. NLR can be used to non-invasively predict SBP in patients with liver cirrhosis and HBV/HCV, and its prognostic performance is improved by assessing whether the patient uses intravenous drugs.

Sabīne Bebere[1], Jeļena Vrubļevska[1,2]

[1]Riga Stradins University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, LV 1007, sabine.bebere@gmail.com
[2]Riga Centre for Psychiatry and Narcology, Tvaika street 2, Riga, Latvia, LV 1005, jelena.vrublevska@rsu.lv

A STRUCTURED LITERATURE REVIEW OF ADVERSE CHILDHOOD EXPERIENCES IN PATIENTS WITH PSYCHOACTIVE SUBSTANCE ADDICTION

Key words: Adverse childhood experience, alcohol use, substance use, psychoactive drug use, mental health

Introduction. Adverse childhood experiences include psychological, physical and sexual forms of abuse, as well as dysfunction in the household, which includes substance abuse among family members, and mental health problems in the family. Traumatic experiences in childhood can have lifelong consequences, they can interfere with early brain development, and can increase the risk of various physical and mental health problems.
Aim. The aim of the study was to investigate the prevalence and potential impact of adverse childhood experiences in the general population and in inpatients and outpatients with alcohol and other psychoactive substance abuse and addiction.
Materials and methods. An electronic search of the PubMed database was performed. Inclusion criteria were: adult (age 18+), includes people with alcohol and other psychoactive substance misuse and addiction, includes adverse childhood experiences, primary publications, publications in English, publications published from 2017 to 2022, full text available.
Results. The literature review process initially identified 653 articles, of which 11 were included in the review based on the inclusion criteria. Publications used the ACE-IQ (Adverse Childhood Experience International Questionnaire), and ACE 10-question questionnaires. Parental divorce was one of the most common adverse experiences that affected 17-59.5% of respondents. Substance users were more likely to report an adverse childhood experience. The risk of opioid overdose increased with just one ACE point increase. Evaluating adverse experiences can help to promote patient-centred treatment, as understanding some of the causes of a patient's condition can help to think about different therapeutic approaches.
Conclusions. There is an association between adverse childhood experiences and dependence on alcohol and other psychoactive substances in adulthood.

***Dr. E. Misāne*[1,2]**
[1]*University of Latvia, Faculty of Dentistry, Riga, Latvia, elina.misane@gmail.com*
[2]*Riga East Clinical University Hospital, Oncology Centre of Latvia, Department of Head and neck surgery Riga, Latvia*

ANALYSIS OF 57 SURGICALLY TREATED BASAL CELL CARCINOMA PATIENT CASES LOCALISED IN HEAD AND NECK AREA

Introduction: Basal cell carcinoma is one of the most common malignant tumor of the human skin, which is classified as non-melanoma cancer type and develops from non-keratinizing cells in the basal layer of the epidermal tissue. For several years, basal cell carcinoma has been the most common malignant skin tumor diagnosed in the population of Latvia and the therapy of choice is surgery.
Aim of the study: To analyze data of surgically treated basal cell carcinoma patient cases.
Material and methods: Descriptive analysis. The study was to investigate patient's personal medical histories available at the Latvian Oncology Centre. In total, 57 patients aged between 44 and 87 years were diagnosed with basal cell carcinoma and were surgically treated in Riga East Clinical University Hospital, Oncology Centre of Latvia, Department of Head and neck surgery.
Results: Distribution in facial area was: Nose (19,30%), forehead (15,79%), left cheek (14,4%), right cheek (10,53%), left nasolabial fold (7,02%), right temporal area (3,51%), right upper eyelid (1,75%), left ear (1,75%), right preauricular area (1,75%), right ear(1,75%), left preauricular area (1,75%), chin (1,75%), right side of the neck (1,75%), left lower eyelid(1,75%), posterior side of the neck (1,75%), medial angle of the right eye(1,75%), lateral angle of the right eye(1,75%) and scalp (1,75%). Wound closuring techniques were: Rotation flap technique (15,79%), plastic with local tissue (61,4%), primary wound closure (12,28%), microvascular flap technique (7,02%), free skin graft technique (3,51%). Surgeries were performed in: local anesthesia (68,42%) and general anesthesia (31,58%).
Conclusions:
1. Rotation flap technique (15,79%) and plastic with local tissue (61,4%) are the most commonly used wound closuring techniques.
2.The most frequent localizations are nose (19,3%), forehead (15,79%) and left cheek (14,04%).

Marija Pavlukovica[1], Anatolijs Pozarskis[2], Anda Kivite-Urtane[3]
[1] Riga Stradins University, 4th year student, Riga, Latvia.
[2] Daugavpils University, Departament of Anatomy and Physiology, Associate Professor; Riga Stradins University, Head of Residency Program "Sexology, Sexopathology", Daugavpils, Latvia.
[3] Riga Stradins University, Department of Public Health and Epidemiology, Associate Professor; Riga Stradins University, Institute of Public Health, Director, Riga, Latvia.

ASSOCIATION OF DEPRESSION AND ANXIETY WITH SEXUAL ORIENTATION IN A CONVENIENCE SAMPLE OF LATVIAN YOUNG ADULTS

Aim of the study. To investigate Latvian young adult sexual orientation variability and its association with depression and anxiety.
Materials and Methods. Participants aged 18–30-year-old (n=503) were asked to do a self-administered anonymous web-based survey. To describe person`s sexual orientation Kinsey scale was used. Prevalence of depression and anxiety, univariate and multivariate regression analysis was performed to measure relations between investigated factors.
Results. A total of 503 participants were included in the study. Mean (SD) value on the Kinsey scale was 1.4 (1.8) and median (IQR) value was 1.0 (0-2.0) where 0 is defined as 'exclusively heterosexual', 1 is 'mostly heterosexual, only slightly homosexual' person and 2 is 'mostly heterosexual, but more than slightly homosexual'. Prevalence of persons reported violence experience was 20.3%, anxiety 56.3% and depression 37.6%. Logistic regression analysis showed that experience of violence was associated with higher odds of developing anxiety and depression (OR: 2.6 [95% CI: 1.7-4.0] and 2.4 [95% CI: 1.5-3.9]). Being in relationship was associated with higher odds of developing anxiety (OR: 2.8 [95% CI: 1.3-6.3]). Male sex and income 1001-2000 euros a month were associated with lower odds of developing anxiety (OR: 0.4 [95% CI: 0.2-0.5] and aOR: 0.3 [95% CI: 0.1-0.8]). Sexual orientation showed no significant value in association with anxiety and depression (OR: 1.1 [95% CI: 1.0-1.2] and OR: 1.1 [95% CI: 1.02-1.2]).
Conclusions. Our study reported that only significant factor in developing depression and anxiety is experience of violence. Risk of developing anxiety is also increased in females, people in relationships but not married and with lack of income. Sexual orientation has no significance in association with depression and anxiety.

Laura Tauriņa[1], Scientific Research Supervisor Dr. med. Natālija Bērziņa[2]
[1]Rīga Stradiņš University, Faculty of Residency, Dzirciema Street 16, Rīga, Latvia, taurina.laura@gmail.com
[2]Rīga Stradiņš University, Department of Psychiatry and Narcology, Rīga Psychiatry and Addiction Disorders Centre, Tvaika Street 2, Rīga, Latvia, natalija.berzina@rsu.lv

CHANGES IN THE SEVERITY OF DEPRESSIVE AND ANXIETY SYMPTOMS IN HOSPITALISED PATIENTS WITH RECURRENT MAJOR DEPRESSIVE DISORDER AFTER A COURSE OF MUSIC THERAPY

Key words. *Major depressive disorder, Music therapy, Psychiatry, Art therapy*
Objectives. Major depressive disorder (MDD) is a common psychiatric illness that often requires nonpharmacological interventions in addition to standard care. Music therapy is one such intervention that has been shown to be effective in reducing symptoms of depression and anxiety. The aim of this study was to evaluate the efficacy of individual music therapy added to standard psychiatric care in the treatment of recurrent MDD in hospitalised adults.
Materials and Methods. The study was conducted in Strenči Mental Hospital from May 1st to December 31st, 2022. Participants with ICD-10 diagnosis of recurrent MDD, moderate episode were randomised and included in either the intervention or control group. In a period of 4-6 weeks, both groups received either 10 sessions of individual music therapy, or standard care which included medications, occupational and/or physiotherapy. Respondents were followed-up before and after the treatment, using Patient health questionnaire (PHQ-9) for depression, General anxiety disorder scale (GAD-7) for anxiety symptoms, and demographic questionnaire. The results were analysed using IBM SPSS.

Results. The study sample consisted of 46 patients, including 34 women and 12 men, with 23 patients in each of the intervention and control groups. There were no significant differences between the two groups in terms of age (p=0.7) or sex (p=1.0) of the participants. At the baseline assessment, there were no statistically significant differences in mean scores between the two groups for PHQ-9 (p=0.9) or GAD-7 (p=0.6). After the follow-up assessment, there was a statistically significant decrease in the mean scores of PHQ-9 and GAD-7 in both groups (p<0.001). Out of the patients in the intervention group, 34.8% (n=8) showed a clinically significant improvement in depressive symptoms (defined as a 10-point reduction from baseline scores), compared to 21.7% (n=5) in the control group, but the difference between the groups was not statistically significant (p=0.3). There was no statistically significant difference between the intervention and control groups in the percentage of patients who showed a clinically significant improvement in anxiety symptoms (8.7% in both groups), with a p-value of 1.0.
Conclusions. The findings suggest that the addition of a music therapy course to standard treatment did not result in a significantly greater reduction in depression and anxiety scores among patients with MDD compared to the control group. However, music therapy may be more effective in improving depression symptoms than anxiety symptoms. The study is limited by a small sample size and the use of other types of rehabilitation in the control group. Further research with larger sample sizes is needed to obtain more reliable results.

Elina Konstantinova[1], Mihails Žuravlovs[1], Ilva Daugule[1,2]
[1]Faculty of Medicine, University of Latvia, Riga, Latvia, elina.konstantinova20@gmail.com, mtjazelov@gmail.com
[2]Children Clinical University hospital, Riga, Latvia

CLINICAL CHARACTERISTICS OF PRESCHOOL CHILDREN WITH FUNCTIONAL CONSTIPATION

Introduction. Functional constipation is a functional gastrointestinal disorder that is observed in preschool children. Although the most common causes of constipation are dietary mistakes, a variety of emotional aspects are also important factors in the pathogenesis of functional constipation.
Aim. To analyze clinical characteristics of children with functional constipation and to compare the data in relation to the attendance of kindergarten.
Methods. A retrospective cross-sectional study was performed, selecting children (3- 7 years) who were undergoing investigation and treatment at Children Clinical University Hospital in Riga due to constipation during 2017-2018. The following data were analyzed: age, gender, hospitalization history, kindergarten attendance, side diagnoses; clinical tests; prescribed treatment, and recommendations. Statistical analysis: SPSS.
Results. 112 children (51.8 % - girls) with a mean age of 4.46 years (±1 .0729 SD) were included in the study. Out of them, 73.2 % were hospitalized due to constipation for the first time, and in 56.2 % of patients, constipation was the main diagnosis. The majority of children (82.9%) were attending kindergarten. 51.4% of children had some abnormalities in laboratory tests. The prevalence of deviations of clinical investigations did not differ between children attending kindergartens or not. However, children who did not attend kindergarten had more often constipation as a secondary diagnosis compared to children who attended: 73.7% vs 38%; p = 0.005. The treatment prescribed was *Macrogolum* (n= 27), and 12 patients were treated with enema. Dietary changes were recommended for all patients at discharge, while psychological help for treating constipation was advised only in 5% of cases.
Conclusion. Functional constipation is a problem in severely ill children. Although treatment corresponds to the latest guidelines for the treatment of functional constipation, psychological treatment should be recommended.

Jekaterina Manuhina[1], Dr.med. Madara Tirzīte[1, 2], Dr. Rita Smolova[3]
[1]Rīga Stradiņš University, Dzirzciema street 16, Riga, Latvia, manuhina@inbox.lv
[2]Riga East University Hospital, Hipokrata street 2, Riga, Latvia
[3]Jelgava City Hospital, Brīvības boulevard 6, Jelgava, Latvia

CLINICAL FEATURES, TREATMENT OUTCOMES AND PROGNOSTIC FACTORS IN ADULT PATIENTS HOSPITALIZED WITH SARS-COV-2 INFECTION: A RETROSPECTIVE COHORT STUDY

Key words: *SARS-CoV-2, comorbidities, mortality, laboratory parameters*

Introduction: Since the first case of SARS-CoV-2 was reported in 2019, the coronavirus disease has been at the center of human attention. It can be asymptomatic, but in some cases it can cause severe pneumonia and then death.

Objectives: The aim of this study was to investigate the profile of comorbidities as well as clinical and laboratory parameters in Covid-19 patients to determine factors associated with higher mortality and more severe course of the disease.

Methods: The study retrospectively analyzed 410 patients who were hospitalized in Jelgava city hospital in the period from 30.10.2020. until 30.01.2021 with SARS-CoV-2 infection and with/without comorbidities. Statistical data analysis was performed with IBM SPSS program using Kruskoll-Wallis test, Fisher test, ROC curves, Cox proportional hazard regression and Kaplan-Meier method.

Results: 236 women and 174 men were included in the study with a median age of 71 years. It was found that generalized atherosclerosis increases the risk of mortality by 1.9 times, diabetes mellitus by 1.6 times, while chronic cerebral ischemia, encephalopathy and dementia increase the risk of mortality by 3 times. Mortality is also higher in patients with chronic heart failure, atrial fibrillation, a history of cerebral infarction and diseases of the digestive system. Elevated levels of troponin T, D-dimer, C-reactive protein, lactate dehydrogenase, glucose, creatinine, urea, AST, ferritin, INR, erythrocyte sedimentation rate and leukocytes are associated with worse disease outcome in SARS-CoV-2 patients. It was found that the risk of dying increases by 2.6% as patients age by one year.

Conclusions: This study allows to identify the factors that predispose to a more severe course of Covid-19, thus filling the gaps in the literature on the coronavirus disease in the regional hospital of Latvia.

Paula Feldmane[1,2], Jurita Berģe[1,2], Evita Annamarija Klemence [1]

[1]University of Latvia

[2]Emergency Medical Service of Latvia

COMPARATIVE EVALUATION OF ATHEROSCLEROTIC AND DIABETIC GANGRENE PATIENT PROFILES

Diabetes mellitus, peripheral artery disease, is associated with the risk of developing lower limb gangrene and combining with aetiological factors of gangrene, the risk of amputation increases. Aim of the paper: Identify and analyse the risk factors for lower limb gangrene in patients with leg amputation. Material and Methods: A retrospective study analysis of patient histories of diseases undergoing amputation of lower extremities at RAKUS from 2018 to 2020. Respondents were divided into three groups: patients whose amputation was caused by atherosclerosis (hereinafter AS), diabetes mellitus patients whose amputation was caused by atherosclerosis (hereinafter AS_CD) and diabetes mellitus patients whose amputation was caused by diabetes mellitus and no peripheral vascular stenosis or occlusion was detected during additional examination (hereinafter CD). Data analysed: demographics, amputation-related data, laboratory data, history of cardiovascular events (CV), concomitant conditions, late diabetes complications, mortality over a one-year period. MS Exel and SPSS 22 programs were used to collect and analyze data. Results: 373 patients were included in the AS group (56.07%), 257 patients in the CD_AS group (38.80%) and 34 patients in the CD group (5.11%). In the CD group, the lowest age was 57 years compared to 75 years in the AS group and 71 years (P=7.84x10-12) in CD_AS group. A history of KV for a CD group is significantly lower than in the AS and CD_AS groups. In the CD group, cerebral infarction occurs 3 times less than 3 (8.82%) than AS 107 (28.69%) and CD_AS 62 (24,03%) (P =2.80x10-2). In the AS group, atrial fibrillation 136 (36,46%), CD_AS 80 (31,01%) and CD 6 (17,65%), where the difference between groups (P=4.91x10-2). Chronic renal disease in the AS group 81 (21.72%) is 10% less common. Most commonly, osteomyelitis was found in the CD group 25 (73.53%), but most rarely in the AS group 6 (1.61%) (P=8.47x10-41). Reamputation is more common in the CD group 11 (32.35%) compared to AS and CD_AS (P= 2,8 x10-3). The most common pattern of amputation is the AS induced transfemoral right or left leg amputation 468 (70.38%). In the AS and CD_AS groups, amputation

levels more frequently are above the knee joint but for the CD group they are under the knee joint (P =6,07x10-16). Conclusion: Aterosclerotic gangrene is more common in men. In diabetes mellitus patients, gangrene develops at an earlier age. KV events are more common in patients with aterosclerotic gangrene. An infection plays an important role in the development of gangrene in diabetes mellitus patients. In the case of atherosclerotic gangrene, amputation is carried out at a higher level than in diabetic gangreene. Key words: atherosclerosis, diabetes mellitus, peripheral vascular disease, amputation.

Dr.Elīna Polunosika[1,2], Arta Akmene[4], Assist.prof. Daina Pastare[1,2], Prof.Guntis Karelis[1,3]
[1] Riga East University Hospital, Department of Neurology and Neurosurgery, Hipokrata Street 2, LV-1038, Riga, Latvia
[2] Riga Stradinš University, Department of Neurology and Neurosurgery, Dzirciema Street 16, LV-1007, Riga, Latvia
[3] Riga Stradinš University, Department of Infectology, Dzirciema Street 16, LV-1007, Riga, Latvia
[4] Riga Stradinš University, Faculty of Medicine, Dzirciema Street 16, LV-1007, Riga, Latvia

CORRELATION BETWEEN SDMT AND FUNCTIONAL STATUS IN MULTIPLE SCLEROSIS PATIENTS

Objectives. Multiple sclerosis (MS) is a chronic autoimmune inflammatory and neurodegenerative disease of the central nervous system. Around 85 % of people with MS are diagnosed with relapsing - remitting MS (RRMS). Cognitive impairment (CI) affects around 40 - 70% of MS patients. They are recognized as frequent and significant consequences of MS, which significantly affect the quality of their everyday life.
Methods. Patients selection (n = 50) from Riga East Clinical University Hospital including the following criteria: at least 18 years old, diagnosed with RRMS no more than 20 years, having the ability to complete the task as well as agrees to participate in the study. Education level was indicated, EDSS (Expanded Disability Status Scale) and SDMT (Symbol Digit Modalities Test) were performed. Education levels were devided according to the education system of the Republic of Latvia. The control group of corresponding age and education healthy individuals (n = 25) also was tested with SDMT. The analysis of the results was carried out using IBM (International Business Machines Corporation) SPSS (Statistical Package for the Social Sciences).
Results. The medium age of respondents from the study group was 38,5 years [30.0; 46.0]. 23 of them were females (46 %) and 27 were males (54 %). Medium duration of illness 8,5 years [7.00;10.0]. Medium EDSS was 2.5 [2.00; 3.5]. The medium SDMT score - 79.8 [71.1; 87.5]. A statistically significant correlation in the study group was found between an EDSS and SDMT ($p<0,001$). A statistically significant difference between the educational level and SDMT ($p<0,05$) can be clearly seen in this study group. The medium age of control group was 36 years [28.0; 48.0]). There were 13 females (52 %) and 12 males (48 %) which have been tested. The medium of SDMT - 90.3 [82.3; 94.4]. It is 11.4% higher than SDMT in the study group. There was a statistically significant difference between the educational level and SDMT ($p<0,05$) in the control group.
Conclusions. The study shows that in RRMS patients CI increases with functional disability. The participants in the both groups with a higher level of education obtained a higher SDMT. To obtain information about CI of MS patients, SDMT and EDSS should be tested in everyday practice.
Keywords: *Relapsing - Remitting Multiple sclerosis, RRMS, Symbol Digit Modalities Test, SDMT, Expanded Disability Status Scale, EDSS.*

Mihails Žuravļovs[1], Valērija Garaščenko[1], Vitalija Muzika[1], Anna Siņukova[1], Inta Zīle[1], Darja Arīna Miškina[2]
[1]Faculty of Medicine, University of Latvia, Riga, Latvia, mtjazelov@gmail.com
[2]Riga Eastern Clinical University Hospital

DEPRESSIVE AND ANXIETY SYMPTOMS AMONG ISOTRETINOIN USERS IN LATVIA

Background. Isotretinoin is used to treat severe acne. It is used when there was a previous unsuccessful treatment experience. The medication is safe and effective; however, some people report depressive and anxiety symptoms during treatment.

Aim. To obtain information on symptoms of depression and anxiety and their association with the use of isotretinoin; to compare results with the control group.
Methods. A cross-sectional study was conducted with 2 groups: group 1- isotretinoin users and group 2 (control) – 1st line acne medication users. PHQ-9 was used to screen depression, GAD-7 - anxiety.
Results.133 respondents participated in the study, of which 102 were women (76.7%). Group 1 consisted of 53 people (39.8%) who used isotretinoin; group 2- 80 participants (60.2%) who used 1st line acne vulgaris therapy. Most respondents were in the age group from 20 to 30 years (63.9%). We observed higher depressive symptoms in group-1: 47.2% (N = 25) had severe, 26.4% (N = 14)- moderate, and 26.4%- mild or subclinical depressive symptoms ($p < 0.001$) in comparison with group-2: 13.8% (N = 11) had severe, 20% (N = 16) moderate, and 66.2% (N = 53) no depressive symptoms ($p < 0.001$). The mean score of PHQ-9 for group 1 was 13.62, for group 2 - 7.4. The level of anxiety in group 1: 43.4% (23) had severe or generalized anxiety symptoms, 28.3% (15) - moderate, 28.3% - mild or no symptoms ($p < 0.001$). Group-2 had the opposite number distribution: 6.2% had severe anxiety symptoms, 17.5% (N = 114) had moderate, 76.2% (N = 61) - no/mild anxiety symptoms ($p < 0.001$). The mean score of GAD-7 for group 1 was 12.47, and for group 2 - 6.41.
Conclusion. In our study, depressive and anxiety symptoms were more common in isotretinoin users. Due to the limitations of the study, no major conclusions can be made about the connection between isotretinoin and depression and anxiety, but it seems appropriate to regularly screen all patients on isotretinoin for depression and anxiety.

Aija Ozola[1], Kristīne Mārtinsone[2]
[1] Rīga Stradiņš University, Faculty of Rehabilitation, Dzirciema street 16, Riga, Latvia, LV1007, aija.ozola.rsu@inbox.lv
[2] Rīga Stradiņš University, Department of Health Psychology and Pedagogy, J.Asara street 5, Riga, Latvia, LV1009, Kristine.Martinsone@rsu.lv

DEVELOPMENT OF MUSIC- AND WEB-BASED INTERVENTION CONTENT TO PROMOTE SELF-CARE: INTERVENTION MAPPING APPROACH

Keywords: *Intervention Mapping, music-based intervention, self-care, web-based intervention.*
Introduction. In response to the trend towards digital transformation in healthcare, transdisciplinary solutions are promising for the development of behaviour change interventions. Recent research reveals the necessity to encourage changes in self-care behaviour to meet individuals' needs and preferences. Therapeutic use of music indicates positive effects addressing behaviour changes.
Aim. To develop the content of a music- and web-based intervention targeting self-care behaviour changes in general adult population.
Materials and methods. The music- and web-based intervention content addressing 14 self-care strategies was developed according to the conceptualization of self-care proposed in the Self-Care Strategies Questionnaire (Mārtinsone, Perepjolkina & Ruža, 2022). Intervention Mapping was used as a methodological framework. The intervention design team (n=5) and external experts (n=7) were involved in all phases of the development. The experts were selected based on their experience in health psychology or music therapy. The data provided by team members and experts was collected using the content assessment questionnaire. 14 criteria were assessed in a 3-point Likert scale. To process the data the content validity index was calculated.
Results. According to the steps of Intervention Mapping, the behaviour change outcomes, determinants and change objectives were developed. Additionally, therapeutic factors were developed to address the specifics of a music-based intervention. Behaviour change methods were selected and their practical applications designed. The experts' evaluation of the content demonstrated acceptable validity for most of criteria (CVI ≥ .70).
Conclusions. A systematic process based on Intervention Mapping methodology resulted in development of a theory-informed intervention content. Engagement of external experts contributed to reliability of the results.

Lita Saulīte[1], Supervisor: Asoc. prof. Dr. med. Andris Skride[2]
[1] *Riga Stradins University, Dzirciema street 16, Riga, Latvia lita.sauliite@gmail.com*
[2] *Pauls Stradiņš Clinical University Hospital, Riga, Latvia andris.skride@gmail.com*

DOSES OF ENOXAPARIN DEPENDING ON GLOMERULAR FILTRATION RATE IN ACUTE PULMONARY THROMBOEMBOLISM

Introduction. Anticoagulants are one of the main therapeutic agents for acute pulmonary thromboembolism. Enoxaparin is one of LMWH used in the treatment of pulmonary thromboembolism. In order to avoid complications, the dose of enoxaparin for patients with GFR 15-30mmol/l should be adjusted to 1mg/kg. Enoxaparin is not recommended for patients with GFR <15mmol/l. No dose adjustment is required for mild to moderate renal impairment.
Aim. To investigate whether enoxaparin doses are adjusted according to glomerular filtration rate in acute pulmonary thromboembolism.
Methodology. The study included patients from the Paula Stradins Clinical University Hospital who were diagnosed with acute pulmonary thromboembolism after computed tomography with contrast from 2020. to 2022. year. Data from the patient's medical history card were analyzed: gender, age, weight, height, race, blood creatinine level, glomerular filtration rate (GFR), enoxaparin dose. Data has been analyzed using MS Excel and SPSS 20.
Results. 143 patients – 46.9% (n=67) male and 53.1% (n=76) female. The age range of was from 29 to 95 years. GFR range was from 2.7mmol/l to 224.6 mmol/l, which were divided into groups <15mmol/l - 5.6% (n=8); 15-30mmol/l - 5.6% (n=8); 30-60 mmol/l - 32.9%(n=47); 60-90mmol/l -34.3%(n=49); >90mmol/l - 19.6%(n=28) and 3(2%) patients for whom GFR was not determined. Enoxaparin doses ranged from 10mg to 280mg. Group GFR <15mmol/l, the doses from 40mg to 120mg (Mean-67.50; SD-28.15). Group GFA 15-30mmol/l, the doses from 10mg to 240mg (Mean-119.50; SD-80.01). Group 30-60mmol/l, the doses from 10mg to 240mg (112.6; SD-54.62). Group 60-90mmol/l, the doses from 14mg to 280mg (Mean-145.95; SD-57.50). Group >90mmol/l, the doses from 16mg to 240mg (Mean-113.43; SD-53.88)
Summary. Despite the fact that enoxaparin is not recommended for patients with GFR <15mmol/l, enoxaparin was prescribed in this group and in relatively high doses. Patients with GFR 15-30mmol/l, enoxaparin doses were adjusted according to renal function.

Anna Regīna Knoka[1], Megija Zunde[1], Linda Jakuboviča[1], Jeļena Reste[2]
[1] *Rīga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, annareginak@gmail.com, linda.jakubovica00@gmail.com, megija13@gmail.com*
[2] *Institute of Occupational Safety and Environmental Health, Ratsupites street 5, Riga, Latvia, jelena.reste@rsu.lv*

EFFECT OF STANDING SUPPORT CHAIR AND ANTI-FATIGUE MAT ON MUSCLE ELECTRIC ACTIVITY IN LEGS AND GLUTEAL REGION

Keywords: *muscle tension, standing-support chair, standing on the floor, prolonged standing, ergonomics*
Objectives: This study focuses on investigating lower leg and gluteal muscle tension while standing on an office and industrial anti-fatigue mat and leaning against a standing support chair compared to standing on a hard floor.
Methods and materials: The study involved 13 healthy volunteers. Participants stood for 20 minutes in multiple scenarios – on a hard floor, an office anti-fatigue mat, an industrial anti-fatigue mat, and leaning against a standing support chair. Muscle electric activity was measured bilaterally on *M. tibialis anterior, M. peroneus longus, and M. gluteus medius* by surface electromyography with wireless electrodes (BTS FREEMG 1000, BTS Bioengineering). Signal was processed in a specialized computer program provided by the manufacturer. After 14 minutes, a 1-minute long sEMG recording was captured. Then a 20-second sEMG fragment without artifacts was excised, from which the data were analyzed in programs MS Excel and SPSS 26.
Results: The lowest muscle activity was determined while standing on the floor. The median frequency of electric activity in *M. peroneus longus dx. et sin.* was 115.Hz(Q1-Q3; 108.26-135.52), 110.14 Hz(104.82-128.66) on the right and left side respectively while standing on the floor; 125.58 Hz(117.05-146.93) and 116.63 Hz(112.04-132.15) – standing on the industrial anti-fatigue mat (p=0.001); for standing on the office anti-fatigue mat –

141.67 Hz(121.29-152.56) and 134.82 Hz(117.12-145.68) (p=0.001), but while leaning against a standing support chair 120.44 Hz(104.32-126.19) and 123.99 Hz(104.57-131.01) (p=0.001). *M. tibialis anterior dx. et sin.* was 115.91 Hz (109.23-126.03) and 110.94 Hz (104.37-134.52) while standing on the floor, but on the office mat – 131.04 Hz(122.88-140.70), 141.82 Hz(117.29-157.33) (p=0.001). *M. gluteus medius dx. et sin.* while standing on the floor was 112.91 Hz (105.15-120.05) and 107.71 Hz (102.47-145.23) respectively, but while leaning against a standing support chair – 111.67 Hz(106.48-134.09) and 105.95 Hz(102.99-152.96) (p=0.382 and p=0.807).
Conclusions: The study has shown that gluteal and leg muscle electric activity is higher when standing on softer surfaces, especially in legs while standing on an office anti-fatigue mat. When leaning against a standing support chair, gluteal muscle activity is lower compared to standing on the floor or anti-fatigue mats.

Patrīcija Sproģe[1], Katrīna Kupča[1]
Scientific research supervisor: Asoc. Prof. Kārlis Kupčs [1,2]
[1]Riga Stradiņš University, Dzirciema iela 16, Riga, Latvia
[2]Department of Radiology, Pauls Stradins Clinical University Hospital, Pilsoņu street 13, Riga, Latvia

ENDOVASCULAR TREATMENT OF ACUTE ISCHAEMIC STROKE WITH A DYNAMIC THROMBECTOMY SYSTEM

Keywords: acute ischemic stroke, endovascular treatment, mechanical thrombectomy, dynamic thrombectomy system.
Introduction: Acute ischemic stroke is one of the leading causes of deaths both in Latvia and worldwide. Treatment options for it have significantly developed and improved in the last decade, however for many patients this cardiovascular event still leads to disability and reduced functional abilities. Treatment mainly consists of intravenous thrombolysis and/or mechanical thrombectomy. Recently mechanical thrombectomy systems have significantly developed, however new ways are being researched to improve their efficiency. One of the newest is dynamic thrombectomy system, which allows physicians to have full device control and provides with very good visibility to make real-time adjustments during a thrombectomy procedure.
Goals: Evaluate endovascular treatment effectiveness using dynamic thrombectomy system.
Materials and methods: This research was done as a retrospective study by evaluating 46 patients' data, which met inclusion and exclusion criteria of the research. Obtained data were analysed using statistical analysis methods.
Results: For 36 (78%) patients recanalization was achieved with this system, of which for 15 (33%) it was achieved on first attempt. Complications did not develop for majority of patients 39 (85%). Insignificant subarachnoidal haemorrhage developed for three (7%) patients and intracerebral haemorrhage for two (4%). Median for manipulation duration was 45 (P25 39 - P75 90) minutes. Neurological deficit significantly decreased after mechanical thrombectomy. There was statistically significant difference between onset, 24h and discharge NIHSS values (p=0,000). Good functional outcome (90d mRS 0 – 2) was achieved for seven (18%) patients while mortality for 18 (47%) patients.
Conclusions: Dynamic thrombectomy system is safe and effective treatment method for acute ischemic stroke patients. Successful vascular recanalization with this system is achieved in almost eight out of ten patients, while good functional outcomes are seen in about two out of ten patients. Studies with larger number of patients would be needed to better and more accurately evaluate the results of this system.

Mihails Žuravļovs[1], Elīna Konstantinova[1], Laura Karkovska[1], Alise Mirdza Jēgere[1], Laura Ķevere[1]
[1]Faculty of Medicine, University of Latvia, Riga, Latvia, mtjazelov@gmail.com

FACTORS ASSOCIATED WITH BURNOUT IN AMBULANCE WORKERS IN LATVIA

Introduction. Burnout is a frequent psychological problem among medical workers, and its prevalence among emergency medical personnel seems to be especially high.

Aim. The aim was to obtain information on the prevalence of burnout and associated factors among ambulance staff in Latvia.
Methods. Maslach Burnout Inventory was used to obtain research data anonymously online. Data were processed using SPSS v27.0.
Results. 260 participants were enrolled in this study, of which 72.7% were females (N=189) and 27.3% were males (N=71). In total, 190 participants reported some burnout (p<0,001). The most burnout-prone group was trainee doctors (75%), then the dispatchers (66,7%), and doctors (63.3%) (p=0,012). The most burnout-prone age groups were 31-40 (51,2%), 21-30 (46,8%), and 41-50 years (44,1%) (p=0.023). Between variables sex and burnout, there was no correlation (p=0.711). Burnout was found in 31.1% of respondents with 0-2 years of work experience, 44.2% with 2-5 years, 55.7% with 5-8 years, 66.7% with 8-10 years, above 10 years – 37.2% (p=0.012). Among those with the additional job, burnout was found in 53% of cases (p=0.003). Among those who frequently experience anxiety in the workplace burnout was found in 60.1% of cases (p=0,01). In those whose work affects their sleeping patterns, burnout was found in 50% of cases (p=0.001). There was no relationship between burnout and workload (p=0.573). Among professionals who reported a significant risk of burnout, 20.3% reported having thoughts about changing a career path after each work shift constantly, 57.5% reported having such thoughts regularly but constantly and 22.2% of workers with burnout did not report such thoughts (p<0,001).
Conclusion. Burnout symptoms were found in 190 ambulance workers. Factors such as position, age, work experience, the existence of another job, level of anxiety, and the quality of sleep, correlate with burnout. Burnout is a serious problem, that can lead professionals to quit their job.

Egija Junusova[1], Ruslana Tarabasa[2]
Supervisor – Dr. med. Iveta Golubovska
[1]Riga Stradiņš University, Faculty of Medicine, 6th year, Dzirciema street 16, Riga, egijajunusova@inbox.lv
[2]Riga Stradiņš University, Faculty of Medicine, 2nd year, Dzirciema street 16, Riga, ruslana.tarabasa@gmail.com

FACTORS INFLUENCING SINGLE USE MATERIAL DISPOSAL AND USE OF PERSONAL PROTECTIVE EQUIPMENT AMONG ANESTHESIOLOGISTS

Introduction. The adverse health effects of climate change proceed to increase. Healthcare itself contaminates land, waterways and atmosphere. Analysis of literature sources showed that significant concern is plastics getting in landfill.
Aim. The aim of the research was to study influencing factors of personal protective equipment usage. We surveyed 75 Latvian anesthetists, residents with online platform Survey Monkey.
Materials and methods. For data analysis was used Microsoft Excel, IMB SPSS 28.0 (Descriptive statistics, Fisher's tests). Different data bases NCBI, PubMed.
Results Out of 75 respondents 53% are in age group 25-30 years, 31% 30-40 years, 16% from 41-82 years of age. 55% of the respondents work experience is up to 5 years, 31% from 6-10 years, 19% from 11-21 years, 11% above 21 years. 58% with work experience from 11-20 years and 50% with work experience above 21 years, have tendency not to dispose face masks in biological waste. Fisher's exact test,(N=75)=15.564,p= 0.001. 92% with work experience from 11-20 years have tendency to not dispose medication leftovers in biological waste, but it is not statistically significant. 93% in age group from 25-30 tend to dispose face masks in biological waste. 42% in age group 41-82 years tend not to dispose face masks in biological waste. Fisher's exact test, (N=75)=7.569, p=0.016. 90% in age group from 25-30 years tend to dispose respirators in biological waste. 42% in age group from 41-82 years tend not to dispose them in biological waste. Fisher's exact test, (N=75)=5.980, p=0.037. 7% of respondents do not dispose gloves in biological waste, 17% do not dispose face masks, 19% respirators, 19% syringes, 57% medication leftovers, 4% endotracheal tubes.
Conclusions. Half of respondents with work experience above 21 years do not dispose face masks in biological waste. 42% of age group from 41-82 years do not dispose respirators in biological waste. 19% of respondants do not dispose syringes in biological waste.

Egija Junusova[1], Ruslana Tarabasa[2]
Supervisor – Dr. med. Iveta Golubovska
[1]Riga Stradiņš University, Faculty of Medicine, 6th year, Dzirciema street 16, Riga, egijajunusova@inbox.lv
[2]Riga Stradiņš University, Faculty of Medicine, 2nd year, Dzirciema street 16, Riga, ruslana.tarabasa@gmail.com

HABITS OF MEDICAL WASTE DISPOSAL AMONG ANESTHESIOLOGISTS

Introduction
The adverse health effects of climate change proceed to increase. Even though health systems are responsive to diseases, healthcare itself contaminates environment. CO2 absorbent can be used safely to minimize anesthetic waste by reducing fresh gas flow to approach closed-circuit conditions. (Feldman, 2021). Analysis of literature sources showed that incorrect drug disposal can contribute to water contamination and toxicity. (Mcgain et al, 2021). Also significant concern is plastics getting in landfill. Anaesthesiologists - reanimatologists and critical care physicians are responsible and in authority to make healthcare sustainable.
Aim: The aim of the study was to study habits of medical waste disposal in anestesia and critical care using a literature review and a survey for health care providers.
Materials and methods
Different data bases *NCBI, PubMed,* were used to understand the importance of sustinabilty in anestesia and critical care. Web-based survey was performed. 75 anaesthesiologists - reanimatologists, residents were surveyed in the age from 25-82 years. Excel, SPSS used to process data.
Results: Out of 75 respondents 81% work at clinical university hospital, 16% at specialized clinic, 22% at regional hospital, 16% at private clinic, 4% at others. 53% of the respondents work experiance is up to 5 years, 20% 6-10 years, 16% 11-20 years, 6% 21-30 years, above 30 years – 4%.
Next questions were focused on medical waste disposal. 93% answered that used gloves should be sorted in biological waste, 81% face masks and respirators, 80% answered syringes, 90% ETI, 42% drug leftovers, 8% injection needles, 5% gloves and syringes package.
Further questions focused on CO2 absorbents changing criteria and its disposal. 62% of respondants dispose CO2 absorbents in biological waste, 34% in special containers, 6% dispose CO2 absorbents in domestic waste. 74% consider replacement of CO2 absorbents when 1/3 – 2/3 of the colour has changed, 24% when all the colour of absorbents has changed, 4% when hypercapnia persists, 33% when EtCO2 increases, 20% thinks it should be changed once a day, only 8% consider it to be changed after every pacient.
Next questions were focused on drug disposal. 74% dispose prepared, but not administered drugs in biological waste, 26% in specialized sink, 17% in usual sink. 81% dispose the drug after administration in biological waste, 21% in specialized sink, however 18% in usual sink.
Conclusions: Almost a tenth of all respondants dispose single-use materials and linen in domestic waste. The survey shows that only 93% dispose used gloves in biological waste, 7% dispose them elsewhere. A significant amount, almost a fifth of all respondants dispose prepared, but not administred drugs, or drugs after administration in usual sink. There is no consensus on the criteria when should the CO2 absorbents be changed. 6% dispose CO2 absorbents in domestic waste.

Anna Stašulāne
Riga Stradins University, Dzirciema street 16, Riga, anstas@inbox.lv

HYPERHIDROSIS: LATEST DIAGNOSTIC AND THERAPY PRINCIPLES

Keywords: *hyperhidrosis, sweating, antiperspirants, iontophoresis, botulinum toxin*
Relevance. Hyperhidrosis is excessive sweating – more than necessary for normal thermoregulation. This condition affects about 3% of the USA population, most commonly between the ages of 20 and 60. While there are many treatment options available, some of them are not commonly used or approved for use in Latvia. **Objectives.** The aim of this study was to identify, evaluate sources and analyse the results of the latest research and guidelines on the latest diagnostic tools and treatment options for hyperhidrosis. **Materials and methods.** This literature review aims to examine the latest research and guidelines on the latest diagnostic tools and treatment options for hyperhidrosis. This includes selective and critical literature selection, credibility assessment of the sources and identification of themes, debates and gaps in the latest research and

guidelines on latest diagnostic tools and treatment options for hyperhidrosis. **Results.** There are several ways to diagnose hyperhidrosis, including diagnostic criteria, assessment of the sweating rate and area involved in excessive sweating, as well as further measurement of quality-of-life and impairment of daily activities. As it is important to distinguish between primary and secondary hyperhidrosis, there are several laboratory tests available. Concerning treatment of hyperhidrosis while there are many treatment options available, including local therapy, for example, antiperspirants, iontophoresis and botulinum toxin, as well as systemic medications and surgery options, some of them are not commonly used or approved for use in Latvia. **Conclusion**. The results of recent studies and guidelines prove to be useful in increasing doctor and patient awareness, as well as could function as a tool in developing educational materials on hyperhidrosis meant for general public.

Sauļus Kristīne[1], Lobanovs Sergejs[1], Belusa Anastasija[1], Katrīna Neilande[1], Margarita Puķīte [1],
[1]University of Latvia, Raiņa bulvāris 19, Riga, Latvia, lu@lu.lv

IMPACT OF MENOPAUSE HORMONE THERAPY ON THE BODY MASS INDEX OF MENOPAUSAL WOMEN

Background:
After the onset of menopause, more than half the women gain weight, accompanied by the development of menopausal metabolic syndrome. Its main manifestations include abdominal obesity, dyslipidaemia, arterial hypertension and impaired carbohydrate metabolism. It is currently unclear whether hormone therapy helps reduce not only vasomotor symptoms but also obesity due to impaired lipid metabolism.
Aim: Evaluate changes in weight during the menopausal period and compare the body mass index of women using hormone replacement therapy with women not using the therapy.
Methods: This is a cross-sectional study in which a survey was used as a research instrument. The target group of the study consists of 104 respondents who are women aged between 40-70 years. Two groups of respondents were included in the study: a control group of respondents who not taking HRT and a group of women taking HRT. Data analysis was performed in «IBM SPSS Statistics 20» program using Pearson-Chi-Square correlation.
Results: Among all study participants 52 women took hormone replacement therapy and 52 women did not take it. 85% (n=88) of menopausal women experienced weight gain, while 4% (n=4) reported weight loss and 11% (n=12) reported no weight change. Among women using menopausal hormone replacement therapy, 44% (n=46) had a body mass index ≤25kg/m^2 and 6% (n=6) had a BMI ≥25kg/m^2. Among women who did not take the therapy, 38% (n=40) had a BMI ≥25kg/m^2 and 12% (n=12) a BMI ≤25kg/m^2. Pearson-Chi-Square Test showed a statistically significant association between the increased BMI and the use of therapy in menopausal women (x^2=45,06 ($p<0.001$)).
Conclusions: Women who taking menopausal replacement therapy have mostly normal BMI (≤25kg/m2), compared to women who did not take the therapy. While MHT does not cause any changes in weight by itself, but it does result in favorable distribution of body fat.

Alina Rižankova [1]
[1] University of Latvia, Faculty of Medicine, Jelgavas street 3, Rīga, LV-1004, alina240698@inbox.lv

INCIDENCE OF PATIENS WITH MEDULLARY THYROID CANCER IN LATVIA

Incidence of pacients with medullary thyroid cancer in Latvia
Key words: *thyroid, medullary cancer, incidence in Latvia, 2012-2022.*
Background. Medullary thyroid cancer is a specific type of thyroid cancer that develops in the parafollicular C cells of the thyroid gland. Medullary thyroid cancer is rare, this type of cancer accounts for 5-10% of thyroid carcinomas.

Aim. The aim of the study was to study the incidence of medullary thyroid cancer in Latvia, to determine the cancer incidence between gender, ages of patients, location of cancer, stage of disease and to determine the annual cancer incidence.
Materials and methods. This retrospective study included 92 patients with medullary thyroid cancer for the period from 2012 to 2022. Patient data was collected from ambulatory medical records from the Latvian Oncology Centre archive. Data processing was performed in SPSS statistical program.
Results. Among 92 patients 72.8% (n=67) were women and 27.2% (n=25) were men. The mean age of patients was 58.60 ± 13.65 years. The incidence of cancer was determined in each year, the minimum number of cases was in 2016 (n=4, 4.3%), and the maximum in 2012, 2021 (13, 14.1%). 45.7% (n=42) of patients were diagnosed with stage I, 14.1% (n=13) – with stage II, 22.8% (n=21) – with stage III, 17.4% (n=16) – with stage IV. 92 patients (100%) received total thyreoectomy. Most of the patients were diagnosed with postoperative complications, primary hypothyroidism in 43.5% (n=40) and 21.7% (n=20) of patients were without complications.
Conclusion. The incidence of medullary thyroid cancer in Latvia over the last 10 years was determined to be 92 patients. The highest incidence rates were observed in 2012, 2020-2022, while there is evidence to suggest that the incidence of medullary cancer has been progressing over the last 3 years. The disease affects women more often than men, and is more frequently diagnosed in the 58-60 age group and at stage I of cancer.

[1]Iveta Vitālija Grincevičute, [2]Marija Semjonova
Scientific research supervisor: [2]Dr.Inga Landsmane
[1] Rīga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia
[2] University of Latvia, Faculty of Medicine, Jelgavas street 3, Riga, Latvia

LATVIAN YOUTH OPINION ABOUT E-CIGARETTE USE IN COMPARISON WITH TOBACCO CIGARETTES

Keywords. *E-cigarettes. Latvian youth opinion.*
Introduction. The amount of people smoking e-cigarettes is rising all over the world because there are rumors them being less harmful then regular cigarettes. Some people try to give up smoking with the help of electronic devices often substituting the habit.
Aim. The aim of the study was to find out and summarize Latvian youth opinion on the harm of electronic cigarettes, their ability to cause addiction and their greater preferences compared to traditional cigarettes.
Materials and methods. An anonymous digital survey was distributed among Latvian youth. The study included 251 respondents 59%(n=148) men, 41%(n=103) women in the age of 18-30. The results were collected and statistically analyzed using Microsoft Excel.
Results. According to the survey results, the group that was surveyed belief that e-cigarettes popularity is increasing due to a variety of factors: 26%-enjoyable flavors and fragrances, 21%-convenience, 20%- due to mainstream, 13%-attempt to quit smoking tabaco, 11%- accessibility, 9%- lower risk of health problems. Harmfulness of health in in comparison with tobacco cigarettes: 41%- The same as tobacco cigarettes, 42%-lower, 14%-higher, 3%- no impact on health. E-cigarettes addiction versus tobacco cigarettes: 54%-the same, 29%-stronger addiction than tobacco, 16% weaker addiction, 1%-no addiction.
Conclusions. E-cigarettes are more appealing than cigarettes for a variety of reasons, including convenience, choice of different flavors, ease of accessibility etc. Nevertheless, everyone has to bear in mind that e-cigarettes are not a better alternative for tobacco. They can cause the same harm to health and increase addiction.

Dr. E. Misāne[1,2]
[1]University of Latvia, Faculty of Dentistry, Riga, Latvia, elina.misane@gmail.com
[2]Riga East Clinical University Hospital, Hipokrata street 2, Riga, Latvia

MAXILLOFACIAL INJURY MANAGEMENT IN PATIENT WITH POLYTRAUMA: A FALL FROM THE 4TH FLOOR. CASE REPORT

Introduction: Polytrauma is known as injuries to multiple body parts and organ systems. Management requires multidisciplinary team to provide successful treatment. Maxillofacial surgery could be done as a second stage after life saving procedures.
Case discussion: 23 y.o. Women was hospitalized in emergency room due to suicide attempt- a fall from 4th floor. Patient was found unconscious and was intubated. In the emergency room the patient was examined by a multidisciplinary team: anesthesiologist, surgeon, traumatologist, radiologist. Focused assessment with sonography for trauma showed free fluid in the abdominal cavity. Hemoglobin was 5.3, clinically tachycardia was presented up to 120 rpm and hypotension 70/30mmHg. Immediate surgical intervention was performed. Laparotomy- hemoperitoneum was presented, due to multiple liver lacerations and spleen laceration III-IV grade. Splenectomy and liver tamponade was done. Relaparatomy was performed five days after, tampons were evacuated and holecistectomy was performed due to necrosis of gallbladder. Twelve days after admission: bilateral zygomatgic osteosynthesis, maxillary osteosynthesis, right condylar process ostheosynthesis, closed nasal bone reposition and intermaxillary fixation was done.
Conclusion: In severe polytrauma patient case primary goal is damage control surgery. Maxillofacial injury tratment can be performed later at second stage.

Arta Grosmane[1], dr. Gundega Ķauķe[2], dr. Marija Roddate[2], dr. Violeta Žukova[2], dr. Ieva Glāzere[2], Ieva Roze[2], dr. Viktorija Ķēniņa[2,3]
[1] Riga Stradiņš University, Medical Faculty, Riga, Latvia, a.grosmane@gmail.com
[2] Pauls Stradiņš Clinical University Hospital, Rare Neurological Disease center, Riga, Latvia
[3] Riga Stradiņš University, Department of Biology and Microbiology, Riga, Latvia

MYASTHENIA GRAVIS AND ITS EFFECT ON QUALITY OF LIFE AND DAILY ACTIVITIES: A SINGLE-CENTER, CROSS SECTIONAL STUDY

Objectives. The aim of this study is to characterize myasthenia gravis (MG) patients and to evaluate their quality of life and daily activities.
Methods. MG patients from the Rare Neurological Diseases' center of Pauls Stradiņš Clinical University hospital in period from 11/2022-02/2023. were analysed. Demographics, patient history data were obtained during patients' visit by certified neurologists, who also evaluated MG Foundation of America classification (MGFA). Patients filled 15-item MG Quality of Life questionnaire (MGQoL15) and MG Activities of Daily Living scale (MG-ADL).
Results. 24 patients enrolled the study, mean age – 57.8 (±15.5) years, 16 were females. Mean age at first symptoms - 46.8 (±21.1), mean age at diagnosis – 50.4 (±18.8). The median time from first symptoms to diagnosis was 15 (IQR=33) months. Most patients (n=18) were positive on AChR antibodies (Ab), 4 were seronegative, 1 was positive on MuSK Ab, 1 patient's Ab status was unknown. 7 patients had achieved partial remission, others were classified according to MGFA: I (n=6), IIa (n=5), IIb (n=2) and IIIb (n=2). Patients, who achieved partial remission, showed better quality of life (MGQoL median=17) than patients classified as I (MGQoL median=28), IIa (MGQoL median=36), IIb (MGQoL median=37) and IIIb (MGQoL median=41), but the difference was no significant (Kruskal-Wallis H=7.045, p=0.134). Similarly, analysing MG-ADL, patients in remission showed no impairment (MG-ADL median=0), opposed to patients classified in I (MG-ADL median=3), IIa (MG-ADL median=2), IIb (MG-ADL median=6.5) and IIIb (MG-ADL median=8), and this difference was significant (Kruskal-Wallis H=13.723, p=0.008), especially between patients in remission and patients in IIIb class (p=0.022).
Conclusions. This is the first study that aims to characterize MG patients in Latvia. MG patients quality of life is decreased and patients, who have not achievied at least partial remission, have significant impairment in daily activities.

Anna Stašulāne
Riga Stradins University, Dzirciema street 16, Riga, anstas@inbox.lv

OCCUPATIONAL EXPOSURE TO ELECTROMAGNETIC FIELD IN THE WORKPLACE

Keywords: *electromagnetic field, health hazard, risk assessment, prevention, occupational medicine*
Relevance. Exposure to electromagnetic field in everyday life is inevitable, yet employees in various professions can experience higher exposure levels of electromagnetic field than general public which could be considered an occupational hazard. **Objectives**. The aim of this study was to identify, evaluate sources and analyse the results of the latest research and guidelines on the exposure to electromagnetic field in workplace as a potential occupational hazard. **Materials and methods.** This literature review aims to examine the latest research and guidelines on the exposure to electromagnetic field in workplace as a potential occupational hazard. This includes selective and critical literature selection, credibility assessment of the sources and identification of themes, debates and gaps in the latest research and guidelines on the electromagnetic field as a health hazard in workplace. **Results.** Although exposure to electromagnetic field in everyday life is inevitable due to electrical appliances, there are numerous workers who are exposed to elevated levels of electromagnetic fields. At particular risk are those workers with implanted medical devices. The main steps to mitigate the risks could be workers health inspection before starting work; health examination after return to work as well as individual case by case evaluation. The primary issue with acquiring reliable date about medical device malfunctions due to occupational exposure to electromagnetic fields is that health care providers mostly do not report implanted medical device malfunctions. **Conclusion**. The results of recent studies and guidelines prove to be useful in increasing employer and employee awareness as well as could function as a tool in developing educational materials in certain industries.

Artūrs Kupčs
Riga Stradins University, Dzirciema 16, arturs.kupchs@gmail.com

ORGANISATION OF COOPERATION BETWEEN THE PATIENT AND THE GENERAL PRACTITIONER

Introduction. The location of the GP practice in relation to the patient's place of residence and a mutual understanding of the structure within which this collaboration operates are both important for its success. The patient's trust in their doctor and their involvement in the treatment process are also important. **Aim.** To study the relationship between the Latvian population and general practitioners (GP), how it is organised and how the patient perceives it. **Results.** 174 people aged 18-59 were interviewed as part of the study. 13.8% male, 86.2% female. 97% have a GP contracted by the National Health Service, 2% a fee-paying GP, 1% had no GP. 25.3% note at least one chronic illness, 74.7% have no chronic illness. 66.7% of respondents live in Riga or within 20km of Riga. In 53.8% the most frequent reason for a visit is an acute illness, in 29.6% a preventive check-up, and in 16.6% it is due to a chronic illness. 49.7% of patients are located in the main territory of the GP, 42% are outside of it. 24% of respondents live in a city different from their GP practice. 65% patients with their children in the same practice, 35% parents and children are not in the same GP practice. 72% note that they know the structure of their GP's practice well. Only 66% are able to speak to their own GP by phone, 34% are unable to reach their GP by phone. 25% note that they are not able to get to their GP appointment on time. 93% follow the GP's instructions. 80% say they trust their GP, 20% do not trust their GP. **Conclusions.** Some of the respondents do not live in the same city as their GP. Almost half of the respondents are not located in the GP's main area, ¼ of them are even in another city. Cooperation is also made more difficult by the fact that 20% of respondents indicate that they do not trust their GP. Not only organisational factors influence successful collaboration, but also a lack of mutual trust can cause problems in achieving good results in the primary health care system.

Viktorija Tihonova[1], Ainis Dzalbs[2]
[1]Rīga Stradiņš University, Dzirzciema street 16, Riga, Latvia, viktorija.raka@gmail.com
[2]Private family physician's practice, Staļģene

OUTCOMES OF TYPE 2 DIABETES MELLITUS PHARMACOTHERAPY DUE TO CHANGES IN THE MEDICINE REIMBURSEMENT POLICY IN PRIMARY HEALTH CARE

Key words. *type 2 diabetes, primary health care, SGLT-2 inhibitors, DDP-4 inhibitors, HbA1c*
Introduction. In 2021 due to changes in the medicine reimbursement policy general practitioners (GP) got new treatment options for patients with type 2 diabetes (T2D). To metformin and sulfonylurea medications were added dipeptidyl peptidase 4 (DDP-4) inhibitors and sodium-glucose cotransporter 2 (SGLT-2) inhibitors. Such changes should contribute to the improvement of the management of patients with T2D.
Objectives. The aim of the study was to find out how the treatment approach and glycemic control of T2D were changed in primary health care in 2021-2022 years.
Methods. A retrospective longitudinal study was conducted in two General practitioner's offices using patients' medical records. Out of 163 patients with T2D were selected 33 participants, who fulfilled the following criteria: 1) took only non-insulin medication; 2) had changed therapy approach in 2021-2022 years; 3) had no serious comorbidities. In the selected group was assessed glycated hemoglobin (HbA1c) during the 2020-2022 years and GPs management of T2D.
Results. 14 males and 19 females were included in the study with a mean age of 66 years. Mean HbA1c in 2020 were 7,89 %, in 2021 - 7,58%, and in 2022 - 7,33%. GPs managed T2D by themselves in 60,61 % (n=20) of cases. Target HbA1c was achieved in 65,00% (n=13) of cases. GPs referred patients with T2D to endocrinologist in 39,39% (n=13) of cases. Target HbA1c was achieved in 69,23% (n=9) of cases. For T2D management GP's used medications from SGLT-2 inhibitors and DDP-4 inhibitors groups in 80,00% (n=16) of cases.
Conclusions. After changes in the medicine reimbursement policy in primary health care glycemic control of patients with T2D was improved. GPs widely used medications from SGLT-2 inhibitors and DDP-4 inhibitors groups. The effectiveness of therapy prescribed by GP was similar to the effectiveness of therapy prescribed by endocrinologists. There is a need for more participants for the study to get more accurate results.

Vitalija Muzika[1], Mihails Žuravļovs[1], Darja Arīna Miškina[2]
[1]Faculty of Medicine, University of Latvia, Riga, Latvia, vitalija.muzika@gmail.com
[2]Riga Eastern Clinical University Hospital, Riga, Latvia

PREVALENCE AND ASSOCIATED FACTORS OF DEPRESSIVE SYMPTOMS IN ADULT ACNE VULGARIS PATIENTS IN LATVIA

Background. Acne is a common dermatological disease, that affects people from different age groups. Acne is known for causing not only pain and discomfort in the body but also for affecting mental health. It is often associated with psychological problems such as depression.
Aim. To obtain information on the prevalence of depressive symptoms and contributing factors in patients diagnosed with acne vulgaris.
Methods. This was a cross-sectional study, in which 133 patients with acne vulgaris were enrolled. The questionnaire included PHQ-9, Dermatology Life Quality Index (DLQI) as well as lifestyle-focused questions.
Results. 133 people were enrolled in the study, of which 31 were males (23.3%), 102- females (76.7%). 66 people (50.7%) reported symptoms of depression (from mild to severe). The greater the impact of the dermatological condition on the quality of life, the greater the depressive symptoms ($p < 0.001$). The lower the satisfaction with the mental state, the greater the symptoms of depression ($r=-0.65$; $p < 0.001$). There is no statistically significant relationship between the overall length of experiencing acne and the level of depressive symptoms ($p = 0.54$). The less the satisfaction with the skin condition, the greater the symptoms of depression ($r=-0.44$; $p = 0.001$). On average, those who adhered to a healthy diet had mild to moderate depressive symptoms and those who did not – had severe depressive symptoms ($p = 0.026$). There was no correlation between the severity of symptoms and gender ($p =0.74$). Age was also not associated with depression ($p =0.51$).

Conclusion. The prevalence of depressive symptoms was 50.7%. Factors such as the impact of acne on daily life activities, the quality of diet, satisfaction with skin, and mental condition are the factors that correlate with the symptoms of depression in acne vulgaris patients. It is safe to say, that everyone struggling with acne should be regularly screened for depression by their healthcare provider.

Tsira Tolordava[1], Alinta Hegmane[1,2]
[1]University of Latvia, Jelgavas iela 3, Riga, ts.tolordava@gmail.com
[2]Department of Chemotherapy and Haematology, Riga East Clinical University Hospital, Riga, Latvia

PREVALENCE AND PROGNOSTIC SIGNIFICANCE OF SOMATIC BRCA AND TP53 MUTATIONS IN PATIENTS WITH OVARIAN CANCER

Background. Ovarian cancer (OC) is the leading cause of death among women due to gynecological cancers. It is not clear whether existence of somatic BRCA mutations bring the same prognostic results as germline BRCAm. Somatic *BRCA* mutations are found in approximately 18-30% of OC cases. TP53 is a tumor suppressor gene which is mostly found in high grade serous carcinoma (HGSC) (96%). Mutation in TP53 may be associated with poor prognosis.
Aim. To determine a prevalence of somatic BRCA and TP53 mutations in patients with OC and to explore a prognostic role of these mutations.
Methods. 126 OC patients were included in a retrospective research study. They were treated at Riga East University Hospital, Oncology Centre of Latvia. Archived tumor tissue material was analysed by NGS to detect somatic mutations in BRCA and TP53 genes. Data was collected from ambulatory medical records of the Oncology Centre of Latvia. Data processing was performed in IBM SPSS Statistics 15.0. To analyse survival rates Kaplan-Meier method was used.
Results. A total of 126 patients with OC were included in this study. The mean age of patients was 58.22 ± 10,39 years. 7 patients (5.6%) had stage I OC; 9 patients (7.1%) – II; 73 patients (57.9%) - III; 37 patients (29.4%) - IV. BRCA1 mutation was found in 38 patients (30.2%), BRCA2m - in 15 patients (11.9%) and both BRCA1/2m were found in 7 patients (5.6%). 77 patients (61.1%) had mutations in TP53 gene. 31 patients (24.6%) had mutations in both - BRCA1 and TP53. 14 women (11.1%) had mutations in BRCA2 and TP53 simultaneusly. Grade 1 and 2 were found in 6 patients (4.8%) in each group, but grade 3 – in 114 (90.5%) ($p<0.01$). HGSC was found in 106 patients (84.1%) ($p<0.05$). Study showed that somatic BRCA (HR=1.054; 95% TI: 0.590 – 1.883; p=0.86) and TP53 (HR=1.066; 95% TI: 0.594 – 1.915; p=0.83) carriers did not show any advantage in terms of progression free survival (PFS).
Conclusion. Study showed that in most cases ovarian cancer is diagnosed in advanced stages. The prevalence of somatic BRCA and TP53 is high in Latvian population. In this study somatic BRCA and TP53 carriers did not show any advantage in PFS.

Ieva Jurjāne[1], Vladislavs Osipenko[1], Anna Marija Mališkina[1], Ivanda Franckeviča [1,2]
[1] Riga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, ievajurjane1@gmail.com
[2] Children Clinical University Hospital, Department of Pathology, Vienibas street 45, Riga, Latvia

RADIOLOGICAL FINDINGS AND MORPHOLOGICAL SPECTRUM OF PAEDIATRIC BRAIN LESIONS

Keywords: MRI, CNS, paediatric brain lesions
Introduction: Brain tumors are prevalent solid neoplasms in children, causing significant mortality rates. The detection and diagnosis of intracranial tumors and other lesions heavily rely on MRI, which is also essential for effective treatment planning and disease monitoring.
Aim: Purpose of the study was to access and analyze complications and accidental findings of brain MRI and CT in paediatric patients before performing brain biopsy.
Materials and Methods: Medical records of the 134 patients admitted and treated in the Children's Clinical University Hospital, Latvia (2016-2021) were collected. Local and refined biopsy results were retrospectively accessed using laboratory system "Dialab" and CT and MRI reports using clinical system "Andromeda".

Microsoft Excel 2016 was used for data registry. Statistical analysis was performed using IBM SPSS Statistics 28.0.1.

Results: 134 histological reports were collected, of which 124 (92.5%) brain and 10 (7.5%) spinal cord lesions respectively. 93 CNS tumours were identified of which WHO Grade I represented (53.8%;n=50), II – (17.2%;n=16), III – (3.2%;n=3), IV – (25.8%;n=24). The most common histological entity, according to the 2016 WHO Classification, was pilocytic astrocytoma (n=30;22.4%), followed by medulloblastoma (n=14;10.4%).

In total 118 brain MRI and 4 CT reports were collected. Complications or additional findings were registered in 75 cases (61.5%). The complications were mainly seen in patients with an underlying brain tumour. The main complications were hydrocephalus (n=35;28.7%), cerebral edema (n=31;25.4%), brain herniation (n=13;10.7%), intracranial hemorrhage (n=12;9.8%), midline shift (n=11;9.0%), leptomeningeal dissemination (n=9;7.4%). Optic tract was affected in 8 cases (6.6%). The main additional findings were venous angioma (n=3;2.5%), subdural hygroma (n=2;1.6%), arachnoid cyst (n=2;1.6%). Grade IV tumours are more prone to have complications or additional findings than Grade I ($\chi^2(1;n=66)=12,248$, $p<0.001$) and (Phi=0.431)

Summary: The most common complication of a CNS lesion was hydrocephalus, and the most common additional finding was venous angioma. WHO Grade has strong positive relationship with complication/additional finding rates.

Gritāne Kintija[1], Mikijanskis Raimonds[2]

[1] University of Latvia, Jelgavas street 3, Latvia, kintijagritane@inbox.lv

[2]Pauls Stradins Clinical University Hospital, Pilsoņu street 13, Latvia

RELAPSE RATE OF PRIMARY CNS LYMPHOMA AFTER STANDARD AND HIGH-DOSE METHOTREXATE

Background. Patients previously diagnosed with primary central nervous system lymphoma have relapsed over time, usually with neurological symptoms or diagnosed on follow-up CT scans.

Aim. The aim of the current study was to find out how long it takes for a primary central nervous system relapse when standard-dose methotrexate or high-dose methotrexate was first used.

Methods. This study was retrospective. Primary CNS lymphoma is rare diagnosis. The total number of respondents was N=14, their median age Md=62 [IQR:44-75], with high dose MTX treated patients and Md= 61,0 [IQR: 46-70] years with standard dose Metotrexate treated panients. Patient medical histories were used for statistical data analysis, processed in Excel, and analyzed in PSPP. The Mann-Whitney test was used for analysis and data processing.

Results. A Mann-Whitney test found a statistically significant (p=0.01), the first detected relapse after standard-dose methotrexate therapy was after 5.83 months, and after high-dose methotrexate 13.3 months. The ECOG scale at the time of relapse after high-dose methotrexate patients was most often 1 (42.9%), but after standard-dose therapy it was more often 4 (42.9%). It was also observed that after high-dose MTX relapse was observed clinically in 4 patients (57.1%), and after standard-dose therapy in 5 patients (71.4%), this means that after high-dose methotrexate use, lymphoma is rarely manifested clinically, but it is detected in the control CT-scan.

Conclusion. Analyzing the statistical data, patients relapse faster and with a more severe ECOG scale assessment when standard doses of methotrexate are used as primary therapy, and neurological symptoms are more often observed when compared to patients initially treated with high-dose methotrexate.

Acknowledgements. The authors declare absence of conflict of interest.

Dēna Skadiņa[1], Assist. Alise Balcere[2], Lect. Ināra Nokalna[3]
[1] Riga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, dena.skadina@gmail.com
[2] Riga Stradiņš University, Department of Dermatology and Venerology, Dzirciema street 16, Riga, Latvia, Alise.Balcere@rsu.lv
[3] Riga Stradiņš University, Department of Human Physiology and Biochemistry, Dzirciema street 16, Riga, Latvia, Inara.Nokalna@rsu.lv

ROLE OF SKIN'S PH IN SKIN BARRIER FUNCTION AND SKIN DISEASE. POSSIBLE IMPACT OF MICELLAR WATERS

One of the factors contributing to optimal skin barrier function is the acidic pH of stratum corneum. Disruption of the barrier can make the skin more prone to inflammation among other adverse effects. The pH of stratum corneum can be affected by commonly used topical skin care products.
The first aim of this study was to review the available literature on the fluctuations of the skin's pH in different clinical settings. The second aim was to assess the pH of commercially available micellar waters as it is a popular personal skin care product.
Using a rapid review methodology, Scopus database was searched for relevant peer-reviewed studies. In a laboratory a total of 30 different micellar waters were tested using a Vernier LabQuest2 pH meter.
15 eligible articles were identified. Two studies involving atopic dermatitis showed an increase of transepidermal water loss (TEWL), pH and a decrease of stratum corneum hydration (SCH) on lesional skin in comparison to uninvolved skin, one also noted the same pattern when comparing non-lesional skin of subjects with and without current lesions. Three studies involving atopic xerosis, atopic dermatitis and obstructive sleep apnea showed disease severity-dependent increases in TEWL and pH. One study looking at barrier recovery in settings of topical application with pH 4 vs pH 5.8 emulsions saw an increase in barrier integrity, decrease in pH and TEWL when using the pH 4 emulsion. pH was noted to be higher in aging populations in comparison to younger controls without significant differences in TEWL and SCH.
Of the 30 micellar water samples 8 tested above the neutral pH of 7, 3 were in the range of 6-6.99, 14 were in the range of 5-5.99 and 7 samples tested in the range of 4-4.99.
In settings of barrier disruption pH often tends to directly correlate with TEWL. Physiological pH of facial skin typically ranges from 4 to 6, meaning 70% of the tested micellar waters are compatible with normal skin barrier function.

Dr. E. Misāne[1,2]
[1]University of Latvia, Faculty of Dentistry, Riga, Latvia, elina.misane@gmail.com
[2]Riga East Clinical University Hospital, Oncology Centre of Latvia, Department of Head and neck surgery Riga, Latvia

SURGICAL MANAGEMENT OF HEAD AND NECK SKIN TUMUROUS LESIONS. ANALYSIS OF 86 CLINICAL CASES

Introduction: One of the most common cancer in Latvia is skin cancer. Basal cell carcinoma, melanoma and squamous cell carcinoma are the most common types of skin cancer.
Aim of the study: To analyze 86 clinical cases with skin tumorous lesion surgical management.
Material and methods: Descriptive analysis. The study was to investigate patient's personal medical histories available at the Latvian Oncology Centre. In total, 86 patients were diagnosed with skin tumorous lesions and were surgically treated in Riga East Clinical University Hospital, Oncology Centre of Latvia, Department of Head and neck surgery.
Results: In total, 86 clinical cases were analyzed. Patient age distribution: 5.75% from 18-37years, 14.94% from 38-57years, 50.75% from 58-77 years, 21.84% from 78-97 years. Women were 57% and male were 43% of the cases. Malignant skin tumorous lesions were 80% and benign 20% of the cases. The most often used wound closuring technique: plastic with local tissue (61.4%).
Conclusions:
1.The most common skin cancer type is basal cell carcinoma (64.37%).
2. Plastic with local tissue (61.4%) are the most often used wound closuring technique.

Annija Holštroma[1], Dr. Ļubova Blumberga[2]
[1]Rīga Stradiņš University, Faculty of Medicine, Latvia
[2]Pauls Stradiņš Clinical University Hospital, Oncology Clinic, Latvia

THE ASSOCIATION BETWEEN KI-67 AS A PROGNOSTIC PARAMETER AND CLINICAL-HISTOPATHOLOGICAL CRITERIA OF BRCA POSITIVE BREAST CANCER PATIENTS

Keywords. *Breast cancer, prognostic factor, Ki-67 index, cancer registry*
Objectives. About 1 in 500 women has a BRCA gene mutation and the risk of developing breast cancer for carriers is 50%. As BRCA positive cancers are usually triple negative – HER2 protein and progesterone, estrogen receptor negative, hormone or target therapy is not effective, and patients are more complicated to treat. Ki-67 is a nuclear protein associated with cellular proliferation, and its expression could possibly be used as a prognostic parameter in BRCA patients.
The aim of the study is to evaluate the association between Ki-67 expression and clinical and histopathological criteria in BRCA positive patients with breast cancer before and after starting therapy.
Methods. A retrospective study with 28 patients, who underwent treatment in Pauls Stradiņš Clinical University Hospital Oncology Clinic from 2018 till 2020. Patients enrolled in the study were diagnosed with BRCA positive breast cancer and without distal metastasis. Blood count, oncomarker levels, TNM, Grade and Miller-Payne score and disease free survival were studied. Patients were divided in two groups based on the percentage of Ki-67 values (<45% - low, >46% - high). Data was analysed using IBM SPSS version 28.
Results. Pearson-Chi-square test did not show any significant association between Ki-67 values and metastasis in lymph nodes (p=0.705), Grade (p=0.216), Miller-Payne index (0.760), disease free survival (p.=0.468), CA15-3 (p=0.750).
Conclusions. No association was found between Ki-67 levels and different clinical and histopathological criteria of BRCA positive breast cancer patients. Ki-67 could not be used as a prognostic parameter.

Jurita Berģe[1], Paula Feldmane[2], Anita Vaģele[3]
1.University of Latvia, Raiņa Bulvāris 19, Rīga
2.University of Latvia, Raiņa Bulvāris 19, Rīga
3.University of Latvia, Raiņa Bulvāris 19, Rīga

THE AVERAGE HOSPITALIZATION DURATION OF PATIENTS IN THE UROLOGY DEPARTMENT AFTER URETEROSCOPY

Key words: ureteroscopy, flexible ureterorenoscopy, department of urology, kidney stones, urinary tract
Introduction: The average hospitalization duration after ureteroscopic procedures varies in uncertain numbers. Time spent in hospital directly affects economical situation and country budget for medicine. Retrospective study can find possible reasons for longer hospitalization duration in kidney stones patients and discuss about possible solutions to improve hospitalization duration after ureteroscopy. The authors are currently working in State Emergency medical Service. This retrospective study shows 200 patients with ureter stones and kidney stones that stayed in the hospital one or more days, to compare selected treatment methods between them and hospitalization duration.
Materials and methods: Quantitative research, retrospective study – analyzing data from 200 patient cards in Pauls Stradiņš Clinical University Hospital what are connected with following diagnosis – ureter stones and kidney stones. Patient hospitalization duration in 2022. Patients at age 18-88 years and treated with one of active treatment methods.
Results: 49% of all patients were diagnosed with kidney stones. 42% of all patients were diagnosed with ureter stones, remained 9% were diagnosed with both – ureter and kidney stones. For all patients treatment method was one of active treatment methods – ureteroscopy or flexible ureterorenoscopy. The average hospitalization duration after active treatment was 2 days. Minimal staying time in hospital were half a day and maximum hospitalization duration – 26 days.

Conclusions: the total length of hospitalization for patients after active treatment methods in urology is not long (average 2 days) and is unlikely to cause a large burden on health care. 10% from all patient cards were hospitalized half day and 53% stayed only 1 day in hospital. Active treatment methods like ureteroscopy and flexible ureterorenoscopy are quite effective for patients, can be done quickly and patient can continue treatment at home, not being a burden to economy and not occupy hospital beds.

Valērija Garaščenko[1], Dr. Mihails Timofejevs[1,2], Monta Feldmane[1.]
1University of Latvia
[2] Riga East University Hospital

THE EFFECT OF PATIENTS' GENDER AND AGE ON THE LOCATION, CLINICAL AND HISTOPATHOLOGICAL CHARACTERISTICS OF CUTANEOUS MELANOMA

Introduction: The incidence of melanoma has been rising steadily, and previous studies have suggested that gender and age could potentially influence the clinical and histopathological characteristics of cutaneous melanoma.
Aim: This study aimed to investigate the possible correlations between patients' gender, age, and the location, clinical and histopathological features of cutaneous melanoma.
Methods: 74 patients with primary cutaneous melanoma who underwent surgical treatment in Riga East Clinical University Hospital from 2019 till 2020 were enrolled in the study. Clinical and histopathological characteristics were evaluated based on the World Health Organization (WHO) and The American Joint Committee on Cancer (AJCC) 8th guidelines. Statistical analysis was performed by *IBM SPSS* software.
Results: Our study included 74 patients, consisting of 45 (60.8%) women and 29 (39.2%) men who fulfilled the eligibility criteria. The mean patient age was 63.20. The most frequent clinical stage was IA for both genders, but it was more prevalent in women than in men (21 women and 5 men). The back area was the most common site for melanoma occurrence, accounting for 28.4% (n=21) of cases, and this trend was observed in both genders. The average Breslow's thickness was 4.3 millimeters. Notably, we found significant correlations between patients' age and Breslow's thickness ($p = 0.001$) and between patients' gender and Breslow's thickness ($p = 0.01$). Our study did not find any significant correlations between patients' age or gender and the presence of ulceration or pigmentation in cutaneous melanoma.
Conclusions: There is a tendency for Breslow's thickness to increase with advancing age of patients. Our study's findings suggest that gender and age could potentially impact the location, clinical and histopathological characteristics of cutaneous melanoma, however, the limited study duration and sample size necessitate further research.

Loreta Korkunova[1], Zanda Maltauniece[1], Sigita Skrastiņa[1], Jeļena Reste[2], MD, PhD
[1]Rīga Stradiņš University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, korkunovaloreta@gmail.com, zanda.maltauniece@gmail.com, sigita.sk14@gmail.com
[2]Rīga Stradiņš University, Institute of Occupational Safety and Environmental Health, Dzirciema street 16, Riga, Latvia, jelena.reste@rsu.lv

THE EFFECT OF STANDING CHAIR ON THE TEMPERATURE OF THE HAND DURING PROLONGED WORK WITH A COMPUTER MOUSE

Keywords: Ergonomics, computer mouse, skin temperature, thermography, standing chair, office chair
Introduction: Along with the increase in computer usage, the need for ergonomic adaptations becomes actualized. Prolonged seated work results in static loading, which has been associated with the development of musculoskeletal disorders, decline of microcirculation in extremities and organs, as well as wrist hypothermia. Standing while working on a computer may improve static and dynamic aspects of working posture therefore preventing wrist hypothermia. The aim of this study was to determine the temperature

changes of the wrist skin for volunteers who have been working on a computer while using a standard office chair and a standing chair.
Material and Methods: Five volunteers participated in this study. Participants were asked to work on a computer for 3 hours. The test was repeated two times on different days changing the seat type: a standard office chair or a standing chair. Skin surface temperature of the right wrist was measured every 15 minutes by high resolution medical digital infrared camera (ICI ETI 7320 Pro) in controlled environmental conditions. Data statistical analysis was done by IBM SPSS Statistics program.
Results: After 3 hours of the trial temperature lowered more when a standing chair was used. On average, the temperature dropped to 16 degrees when a standing chair was used, while use of a standard office chair caused the temperature drop to 19 degrees. A strong negative correlation with time was found in both scenarios: while sitting on a standard office chair (Spearman's correlation coefficient rs= -0.996, $p<0.01$) and while using a standing chair (rs= -0.996, $p<0.01$). Mann Whitney U test significance was 0.158 which leads to the conclusion that there is no statistical difference in using standard office or standing chair.
Conclusion: Using a standing chair does not reduce hand hypothermia compared to a standard office chair. A greater temperature drop during the use of a standing chair could be associated with a possible strain on the cervical spine due to oblique standing. Other ergonomic designs or work organization solutions should be tested in future studies to find the most effective way of minimizing detrimental effects of prolonged computer work on wrist hypothermia.

Deniss Moisejevs[1], Aleksandrs Talanovs[2], Jūlija Kovaļova[3]
[1]Riga Stradiņš University, Dzirciema street 16, rnhmail@inbox.lv
[2]University of Latvia, Raiņa street 19, aleksandrs.talanovs@gmail.com
[3] University of Latvia, Raiņa street 19, julija.kovaljova@stradini.lv

THE EFFICIENCY OF AMIODARONE THERAPY IN PAROXYSMAL ATRIAL FIBRILATION IN LATVIA

Abstract*: The efficiency of amiodarone therapy in paroxysmal atrial fibrilationin Latvia.*
Key words: *Atrial fibrilation, cardiololgy, amiodarone, arytmia.*
Introduction: Amiodarone is considered a class III antiarrhythmic drug, but it possesses electrophysiologic characteristics of all four Vaughan Williams classes. Like class I drugs, amiodarone blocks sodium channels at rapid pacing frequencies, and like class II drugs, amiodarone exerts a noncompetitive antisympathetic action. Most known for its approved indication in life-threatening ventricular arrhythmias, it is also used off-label in the outpatient and inpatient setting for atrial fibrillation. Amiodarone is most often used drug to cure one of the most common arytmies - atrial fibrillation. The treatment with antiarrhythmic drugs in acute atrial fibrilation (<48h from start) is often called an medicamentosus carioversion.
Aim: The main goal of the research is to discover combined amiodarone effeciancy in paroxysmal atrial fibrilation patients. Other goals is to compare effeciancy of amiodarone in patients with different age, fibrilation time and calculate the medium effective dosage of drug.
Materials and methods: To investigate this matter, histories of the disease were used, which were taken from 3 emergency departments and aritmology department of 3 different hospitals. The main information, which we used was about lenght of the symptoms before treatment and for how long the patient stayed in emergency department, how much amiodarone did pacient recieve, heart frequency before treatment and did the therapy succeced. Data were processed using MS Excel 2020 and SPSS 20.
Results: Among 43 patients (16 were men and 27 were women with average age – 68.7 years) and 73 cases - 60 cases (82.19%) were acute, 35 (58.3%; 64.8% if we do not include the spontaneousrhythmstabilization)) of them effectively treated by an intravenosuos amiodarone, 6 times rhythm stabilized before treatment and14 times an electrical cardioversy was made. Average use of amioadrone was 750-900mg in successful cases. Almost inevery report (96%) we had relatively hight heart frequency (>80 beats per minute), which allowed to use amiodarone in acute cases. Average atrial fibrillationlength before treatment was 7-8 h. In 20 of cases the additional therapy (mostly with beta blockers) was used. Only in 8 times (10.9%) we had known about patients structural heart disease (miocardial infarction, aortic stenosis). This allows to hypothesize, that effectiveness of amiodarone as a drug is high and it should be continuing to use in emergency departments
Conclusion: Amiodarone is an effective drug for treating paroxismal atrial fibrillation. It is effective in 64.8% of paroxismal atrial fibrillation and require an average for 750-900 mg for successful treatment.

Lauma Kalnkambere[1], Krista Belija[2], Valērija Garaščenko[2], Agris Timofejevs[2], Renārs Deksnis[3]

[1]*University of Latvia, Faculty of Medicine, Riga, Latvia, lauma.kalnkambere@inbox.lv*

[2]*University of Latvia, Faculty of Medicine, Riga, Latvia, belija.krista@gmail.com, valeerijag@gmail.com, agris.timofejevs@gmail.com*

[3]*Oncology Centre of Latvia, Riga, Latvia, renars.deksnis@aslimnica.lv*

THE IMPACT OF THE COVID-19 PANDEMIC ON THE DIAGNOSIS AND SURGICAL TREATMENT OF HEAD AND NECK ONCOLOGICAL DISEASES

Introduction: The COVID-19 pandemic has had a significant impact on healthcare, both globally and in Latvia. During the pandemic crisis, millions of people had to postpone or cancel necessary healthcare procedures in order to maintain capacity for COVID-19 patients and avoid infections. Recent evidence suggests that the delay in seeking out and receiving healthcare may have worsened many patients health status.

Methods: A retrospective study analyzed patient demographic, clinical and tumor characteristics of primary head and neck cancer patients treated in november and december in 2019 and 2020 during COVID-19 pandemic using Excel and SPSS version 22. Analysis included histological tumor types, clinical and TNM stages, time from symptom onset to diagnosis, and time from diagnosis to surgery.

Aim: The aim of the study was to identify whether the COVID-19 pandemic had an impact on the timing of diagnosis and treatment initiation for HNC patients.

Results: A total of 179 patients met the inclusion criteria for this study. There were a total of 103 (57,5%) men and 76 (42,5%) women included. The mean age in each of the groups were 66,64 years, SD=14,35 in the control group and 62,77 years, SD=14,91 in the study group. Pre-COVID period had a total of 89 new diagnoses of HNCs. During the pandemic 90 new cases were diagnosed. The two most common tumors found were basilioma (37,4%) and squamous cell carcinoma (34,1%). The mean time from initial symptoms to diagnosis was 14,98 months, SD= 25,02 in the control group and 10,17 months, SD= 16,42 in the study group. Time from admission to surgery was 1,42 months, SD= 0,84 and 1,35 months, SD= 1,25 in the control group and study group. Early clinical T-stage results showed 59 cases in the control group and 55 in the study group. Advanced T-stage results showed 17 cases in the control group and 12 in the study group.

Conclusion: Literature suggests that the COVID-19 pandemic has had an impact on delaying the time of diagnosis and treatment for HNC patients. In our study we found no statistical evidence for this claim. In 2019 the time from symptoms to diagnosis was 4,81 months longer than in 2020, which shows contrary findings to the proposed hypothesis. Time from admission to surgery showed no statistically believable difference in time. Due to the limited study length and size, more studies with larger sample sizes and longer study periods are needed to make a definite statement.

Maiboroda Nataļja[1], Eglītis Jānis[2], Rubins Silvestrs[3], Zavorins Aleksejs[4], Jakuba-Zolotorjova Milēna [5]

[1] Faculty of Medicine, University of Latvia, Jelgavas street 3 Riga, Latvia, natalja.maiboroda@gmail.com
[2]Riga East University Hospital, Latvian Oncology Center, Hipokrāta street 4, Riga, Latvia janis.eglitis@aslimnica.lv
[3] University of Latvia, Department of Dermatology and Venereology, Jelgavas iela 3, Riga, Latvia silvestrs.rubins@gmail.com
[4] Riga Stradins University, Department of Dermatology and Venereology, Baznīcas street 18, Riga, Latvia aleksejs.zavorins@gmail.com
[5] "Helath Center 4" Aesthetic medicine clinic "4th Dimension", Tallinas street, Riga, Latvia, milenajakuba@gmail.com

THE IMPORTANCE OF HISTOPATHOLOGICAL REPORTING IN MELANOMA PATIENTS

Background.NCCN and CAP guideline principles of pathology include recommendations about the essential and additionally recommended parameters, that should be reported to the histological protocol. The reporting of additional parameters can play a crucial role in melanoma patient staging and treatment tactics.
Aim. To determine the percentage of patients having no complete histological information with minimally recommended parameters and to analyze the description frecuency of each additional parameter.
Materials and methods. 134 histopathological reports were analyzed during one center retrospective study. The following patient data was collected: diagnosis, age, sex, stage, Breslow thickness, Clark level, ulceration, mitotic rate, margin status, location, lymphovascular and perineural invasion, regression, tumor-inflitrating lymphocites (TIL), vertical growth phase (VGP), histologic subtype, desmoplasia, disease progression. This data was analyzed with descriptive statistics method using R-studio software.
Results. Complete histological information with minimally recommended parameters was not found in 5% (N=7) of investigated patients. In seven cases the ulceration was not described. The most frequent additionally recommended parameter of histological protocol was location of melanoma found in 99 % (N=133) of patients. While, tumor mitotic rate was described in 32% (N=43), lymphovascular and perineural invasion in 45% (N=60), tumor-inflitrating lymphocites (TIL) 56% (N=75), cutaneous melanoma subtype 43% (N=57), cell type 78% (N=104) and desmoplasia 2% (N=3). Regression and vertical growth phase (VGP) have not been described in any case.
Conclusions.A correct melanoma staging and change of treatment strategy depend on complete and properly performed histopathological protocol and that is why we want to emphasize the importance of additionally recommended parameters. Lymphovascular and perineural invasion, tumor mitotic rate, regression can play crucial role for making a decision about sentinel lymph node biopsy in thin (<1 mm) melanoma cases.
Acknowledgements. The authors declare no conflict of interest.

Ritvars Vereskuns[1], Valda Staņēviča[1,2]

[1]Riga Stradins University, Faculty of Medicine, Dzirciema street 16, Riga, Latvia, LV 1007, rvereskuns@gmail.com
[2]Children's Clinical University Hospital, Vienibas avenue 45, Riga, Latvia, LV 1004, valda.stanevica@rsu.lv

THE PREVALENCE OF BIOLOGIC DMARDS IN TREATMENT OF PATIENTS WITH JUVENILE IDIOPATHIC ARTHRITIS

Keywords: Juvenile idiopathic arthritis, biological disease modifying antirheumatic drugs, adalimumab
Introduction. Juvenile idiopathic arthritis (JIA) is the most common rheumatic disease in paediatric population, affecting approximately 1 in 1000 children. Medications, such as steroids and different non steroid anti-inflammatory drugs, as well as traditional disease modifying antirheumatic drugs (DMARD) are a mainstay of JIA therapy. However, in case of a traditional therapy resistant JIA, biological DMARDs (bDMARDs) are added. Sometimes, multiple different bDMARDs are tried, before the therapeutic goals are achieved.
Aim. To evaluate the popularity of different types of bDMARDs prescribed, and the treatment sequences in clinical practice.
Materials and methods. The study was performed by gathering data from patient histories, available in the online database of Children's Clinical University Hospital. The study included patients that were hospitalized

at least once at Children's Clinical University Hospital, to receive treatment for JIA, in the last five years (2017-2022). All types of bDMARDs, used up until the last hospitalization within the period of 2017-2022, were recorded.
Results. A total of 546 patients were included in the study. Out of them, 27,9% patients (n=147) received bDMARDs. The patients had received a maximum of 3 different bDMARDs, for a total of 183 unique prescriptions. The most common medication was adalimumab, prescribed in 55,8% of cases (n=82). It was also the most common first choice, prescribed in 52,4% of cases (n=77). Out of all patients receiving bDMARDs, 20,4% of patients (n=30) received a second drug, and 4,1% of patients (n=6) - a third.
Conclusions. Biological DMARDs were used in less than one third of the patients. The most common first choice drug, and the most common bDMARD over all was adalimumab.

Arturs Gorohovs [1], Kārlis Griķis [1,2,3]
[1]University of Latvia, Faculty of Medicine, Riga, Latvia
[2]Pauls Stradiņš Clinical University Hospital, Riga, Latvia
[3]University of Latvia, Department of Cardiology and Cardiac surgery

INVESTIGATION OF CHRONIC TOTAL OCCLUSION OF THE CORONARY ARTERIES

Background: Chronic total occlusion (CTO) of the coronary artery is a severe type of coronary artery disease that results from heavy atherosclerotic plaque buildup, leading to complete blockage of the vessel. CTO poses a high risk of heart failure, arrhythmia development, and negatively impacts a patient's quality of life.

Objective: The aim of this study was to detect the presence of CTO in patients undergoing elective coronary angiography and summarize the treatment strategy.
Methods: A total of 1000 patients who were admitted for elective coronary
angiography at Latvian Cardiology Center were included in this study. Demographic data and risk factors for patients were obtained. Coronary angiograms and treatment strategies were analyzed. All patients provided informed consent. The statistical analysis was performed using SPSS software.
Results: The avarage age of the included subjects was 66.4 (SD 11.5) years, and 523 (52.4%) were male. Among the total subjects, 656 (65.7%) had at least 50% stenosis in the coronary artery greater than 2.5 mm. Three-vessel disease was found in 23 (52.3%) cases. A CTO of the main branch (LAD, LCX, or RCA) was observed in 44 (6.7%) cases. The CTO locations were as follows: 10 (22.7%) in the LAD, 8 (18.2%) in the LCX, and 20 (45.5%) in the RCA. Six (13.6%) patients had multiple-vessel CTO. The most common cardiovascular risk factors in CTO patients were arterial hypertension (n=42, 95.5%), dyslipidemia (n=44, 100%), and diabetes mellitus (n=12, 27.3%). Previous revascularization was observed in 21 (47.7%) patients, among them previous percutaneous coronary intervention (PCI) in 19 (90.5%) and coronary artery bypass graft surgery (CABG) in 2 (9.5%). The recommended treatment strategies were medical treatment (n=13, 29.5%), PCI (n=22, 50%), or CABG (n=9, 20.5%). Age was found to be a statistically significant predictor of the type of revascularization (CABG vs. PCI 68.9 (SD 8.7) years vs. 63.1 (SD 13.6), p=0.04).
Conclusion: CTO is observed in 6.7% of patients, and the most common treatment strategy in CTO patients was PCI. Older age is a predictor of CABG as a revascularization method selection.
Acknowledgements. Authors have nothing to declare.

Berjoza Sintija [2], Lobanovs Sergejs[2], Garoza Raivis[3], Vradijs Viktors[2], Kalniņa Jolanta [1,2]
[1]*Latvian Maritime Medical Center, Riga, Latvia, jolanta.kaln@inbox.lv*
[2]*University of Latvia, Faculty of Medicine, Riga, Latvia, sintija_berjoza@inbox.lv*
[3]*Riga Stradiņš University, Riga, Latvia*

THE USE OF VIRTUAL REALITY TECHNOLOGY IN THE DIAGNOSIS OF NEUROLOGICAL DYSFUNCTIONS IN PATIENTS WITH MULTIPLE SCLEROSIS

Background. Virtual reality (VR) technology has become increasingly prevalent in healthcare, with its potential to revolutionize the diagnosis, treatment, and rehabilitation of a variety of conditions. Using VR in healthcare can enhance understanding of neurological conditions and develop more effective interventions to improve patient outcomes.
Aim. The objectives of the study are to check whether virtual reality technologies can be used in the diagnosis of neurological diseases, and to assess the difficulties with their implementation in clinical practice.
Methods. The total number of participants was 36, between 24 and 50 years old. 50% (n=18) were patients with multiple sclerosis and 50% (n=18) were the control group. As part of the study, software for virtual reality glasses Oculus Quest 2 was created. During the study, patients were asked to undergo four multiple sclerosis diagnostic tests created as part of the study. After that, the test results were compared. Also all patients underwent an anonymous questionnaire about user experience.
Results. Based on the results, it can be concluded that two of the four tests showed statistical significance results. The control group completed the first test faster compared to multiple sclerosis group ($p=0.004$). In the second test, the multiple sclerosis group choose less correct answers ($p < 0.001$) for the limited interval of time. The third and fourth tests showed no statistically significant difference between the two groups ($p=0.277$ and $p=0.174$, respectively). No correlation was found between age and test results ($p > 0.10$). According to the results of the survey 44% (n=16) of all respondents noted discomfort during the diagnostic tests, of which 22% (n=8) were patients and 22% (n=8) were the control group. The most frequent causes of discomfort in the surveys were: eye fatigue 22% (n=8), of which 11% (n=4) were patients and 11% (n=4) were the control group. Discomfort after wearing glasses was found in 22% (n=8) of all respondents of which 11% (n=4) were patients and 11% (n=4) were the control group. Problems with coordination was found in 33% (n=12) of which 22% (n=8) were patients and 11% (n=4) were the control group.
Conclusion. According to the results of the study, it can be concluded that virtual reality technologies are accurate enough to be used in the diagnosis of neurological diseases, such as multiple sclerosis. Nevertheless the question of reducing the discomfort associated with the prolonged use of virtual reality glasses, especially among neurological patients, with dysfunctions of the vestibular apparatus, remains open.
Acknowledgements. The authors declare absence of conflict of interest.

Monta Feldmane[1], Valērija Garaščenko[1], Elza Gārša[1], Sergejs Isajevs[1, 2, 3], Tatjana Zablocka [1, 2, 3]
[1]*University of Latvia, Faculty of Medicine, Riga, Latvia*
2*Riga East University Hospital, Riga, Latvia*
[3]*Hospital of Traumatology and Orthopaedics, Riga, Latvia*

THE VALUE OF PATIENTS GENDER AND AGE ON CLINICAL, HISTOPATHOLOGICAL AND GENETICAL CHARACTERISTICS OF CUTANEUOS MELANOMA

Background. The incidence of melanoma, a highly malignant form of skin cancer, has been significantly increases during recent years. Oncogenic BRAF and NRAS hotspot mutations are the most frequent genetic alterations identified in cutaneous melanoma. Studies suggested that the presence of these mutations, as well as Breslow thickness, corresponded to advanced disease stage. However, the association between BRAF and NRAS mutations with clinical and histopathological characteristics, as well as patient sex and age, is controversial.

Aim. The aim of our study was to evaluate the associations between the histopathological and genetic characteristics of melanoma, such as stage and Breslow thickness, BRAF and NRAS mutations and, patients age and sex.
Methods. 39 patients underwent surgical treatment for primary invasive cutaneous melanoma at Riga East University Hospital between 2011 and 2018 were enrolled in the study. The clinical, histopathological, and genetic characteristics of melanoma were assessed. The data was analysed using IBM SPSS software.
Results. 39 patients were enrolled in the study. The median patients age was 67 years (range from 29 to 85). 21 patients were females (54%) and 18 patients were males (46%). 3 female patients, 3 (14%) had IA stage melanoma, 3 (14%) had IB stage, 2 (10%) had IIA, 3 (14%) had IIB and 10 (48%) had stage IIC. 2 (11%) males' patients had IA stage melanoma, 1 (6%) had IB, 4 (22%) had IIA, 7 (39%) had IIB and 4 patients (22%) had IIC stage. 17 patients (44%) had a BRAF mutation, 11 patients (28%) had NRAS mutation, and 11 patients (28%) were wild type. The significant associations between BRAF, NRAS mutations and patients' sex has not been observed. The median Breslow thickness was 4.5 mm (range, 0.3-14.0 mm). The statistically significant association between Breslow thickness and patient sex has been identified (Rho=-0,324, p=0,044). In addition, the association between disease stage and BRAF mutation was found (Rho=-0,427, p=0,007).
Conclusions. The associations between clinical, histopathological, and genetic characteristics were observed in our study. BRAF mutant melanoma was associated with better prognosis. However, female gender was associated with poorer prognosis.
Acknowledgements. The study was supported by the project 'Strengthening of the capacity of doctoral studies at the University of Latvia within the framework of the new doctoral model' (grant no. 8.2.2.0/20/I/006).

Tomass Ernests Ansons[1]
[1]University of Latvia, Raiņa boulevard 19, Rīga, tomsernests@gmail.com

TREATMENT OF DIABETIC FOOT ULCERS WITH INNOVATIVE DRUG IN VASCULAR SURGEON PRACTICE

Chronic non - healing ulcers among *diabetes mellitus* patients are relatively often observed, are often disabling, with a tendency of slow and insufficient healing and can lead to severe complications.
The new, inorganic, synthetic substance Diperoxochloric acid (DPOCI) topically used and administered as wet bandage on diabetic foot ulcer has shown improved healing on five consecutive prospective controlled trials. The superiority of DPOCI solution on chronic non – healing wounds primarily is considered due to its dual mechanism of action.
The aim of this study is to demonstrate DPOCI healing promoting action on diabetic foot ulcers and to evaluate its efficacy and safety.
Multicentric, randomized, retrospective, double - blinded, standard moist wound dressing - controlled comparing study of efficacy and safety of topically used DPOCI solution - soaked cotton gauge bandage in patients with chronic non - healing diabetic foot ulcers of enrolled 40 patients, who were randomized and two groups defined, weekly receiving the appropriate applications: 1st group – DPOCI (*DermaPro*®) solution; 2nd group – control group of standard moist wound dressing (*Hartmann® Hydrosorb Comfort*).In this study, a total of 40 patients were enrolled. 16 at study center at Pauls Stradins CUS 24th department and 24 at Daugavpils hospital 2nd surgery department study center. Of all patients 23 were males and 17 females. Mean age of 63.7 (37 – 82). All patients were diagnosed with *diabetes mellitus* with mean 16.5 (SD=12.02) years of diabetes. At the study baseline, median DFU area was 3.8 (2.31 – 7.83 cm^2) in the DPOCI group, with mean length and width, respectively, 2.65 (SD=0.84) and 2.01 (SD=0.69). Ulcer's area at 12th or the end visit in this group reduced by 46%. Control group, respectively, 3.22 (2.70 – 7.25 cm^2) with 2.35 (SD=0.92) and 1.70 (SD=0.77). Ulcer's area at 12th or the end visit in control group reduced by 63%.
The use of DPOCI solution as treatment was very well tolerated being marked 14 different (five mild, eight moderate and one severe) intensity grade undesirable adverse events with unlikely or possible linkage with it (e.g., headaches, local edema, dry cough), (p=0.855).
Conclusions 1. When patients are offered and treated with a modern DFU treatment method and when they are trained in its use and are compliant towards it, a reduction in the area or a complete closure of the ulcer may be expected to patients with chronic non-healing DFU. 2. Healing of the ulcers was enhanced in both study groups. 3. Use of DPOCI as a DFU treatment method is safe and effective.

Keywords: *diperoxochloric acid, diabetic foot, ulcer, amputation, vascular surgery.*

Anna Jete Gauja[1], Mārtiņš Danefelds[1], Gunta Tīcmane[1]
[1] Rīga Stradiņš university, Dzirciema 16, Rīga, jetegauja@gmail.com

USE OF SGLT2 INHIBITORS IN GENERAL PRACTITIONERS' EXPERIENCE

INTRODUCTION
Type 2 Diabetes mellitus (DM2) is a very heterogeneous disease with variable age at onset, related degree of obesity, insulin resistance and tendency to develop complications. Individualised therapy is the key to management of the disease, also including new generation drugs available, especially for those individuals with a higher risk of the development of complications.
METHODS
A questionnaire was developed to assess the understanding and experience of general practitioners (GP) on DM2 newest generation medications. The study was approved by the Rīga Stradiņš University Ethics Committee. A total of 100 subjects were included in the study: 88 GPs and 12 residents of the speciality.
RESULTS
The respondents were asked to identify the situations to prescribe SGLT2i to DM2 patients. The majority (69) chose increased cardiovascular risk as an indication, as well as 69 would prescribe in case of insufficient metabolic compensation with other drugs. Only 35 identified chronic kidney disease as an indication.
On the question of what action is taken in case of insufficient metabolic compensation with metformin, 32 respondents chose to add SGLT2i, but a larger proportion (48) would advise the patient to consult with an endocrinologist.
Within the respondents 91 knew that from November (2022) SGLT2i are prescribable with government compensation for patients with DM2, 9 were not informed.
CONCLUSION
SGLT2i provides cardiovascular and renal protective properties and should be prescribed to patients with the related morbidities and/or risk factors. This study shows that still a small proportion of GPs do not provide DM2 patients with the newest generation medications or do not identify the indications properly, and therefore send the patients to an endocrinologist's consultation. The authors believe more educational work should be increased around this topic.

Līga Krūze[1]
[1] Riga Stradins university, Dzirciema street 16, Riga, liga.kruuze@gmail.com

WOMEN'S AWARENESS OF CERVICAL CANCER IN LATVIA

Keywords. Public health, cervical cancer awareness, women's knowledge
Objectives. Although cervical cancer is one of the most preventable and treatable malignant diseases, it is the fourth most commonly detected cancer in women worldwide, with an estimated 604 000 new cases and 342 000 deaths in 2020. In many countries the knowledge about cervical cancer is poor. This study aimed to evaluate the knowledge and understanding of cervical cancer among women aged 25 to 70 in Latvia and determine if there is a correlation between their understanding and their social-economic status.
Materials and methods. An anonymous, voluntary questionnaire was administered to 265 women between the ages of 25 and 70 from January 2023 to March 2023, and their understanding of cervical cancer was assessed based on their ability to identify risk factors, protective factors, symptoms, and whether or not cervical cancer is treatable. Fisher's exact test was used to compare the statistical significance of the results.
Results. The findings indicate that there were no significant relations between age, education level, and income groups of the respondents with their knowledge of whether cervical cancer is treatable or not. However, a significant correlation was observed between the area of profession and knowledge of cervical cancer treatment (p-value 0.014). Women working in education had a lower understanding of cervical cancer treatment than those in other professions. Additionally, a significant relation was found between age and incorrectly given answers regarding the risk and protective factors of cervical cancer (p-value 0.011).

Conclusion. This study highlights the importance of improving cervical cancer awareness among women, especially those in the education field. It also emphasizes the need for targeted educational programs to address the knowledge gaps identified among women of different age groups regarding the cervical cancer risk.

VĒSTURE UN KULTŪRAS VĒSTURE
≈
HISTORY AND HISTORY OF CULTURE

Rita Samuša
Daugavpils University, Parādes street 1, Daugavpils, ritasamusa@gmail.com

DAUGAVPILS STATE TEACHER INSTITUTE (1944-1952)

Keywords: *teacher training, educators, education system*

In October 1944, teacher training resumed in Daugavpils, and the former Daugavpils State Teacher Institute (DSTI) became a State Teacher Institute. On February 8, 1945, the first students began their studies in the faculties of Natural Sciences and Geography, History, Language and Literature, Physics, and Mathematics. From 1944 to 1952, 1593 new teachers graduated from the four faculties of DSTI, both in-person and remotely.

The German occupation of Latvia in 1944 was replaced by Soviet occupation, which occurred during the final stages of World War II. It was officially declared as the "restoration of legitimate Soviet power" and Latvia's liberation from German fascist invaders.

Teacher training with Marxist-Leninist school of thought was urgently needed to educate the new Soviet workers. The previous education system had to be quickly dismantled and reformed according to the model present in the USSR, which involved excluding religious education and classical languages from the curriculum, whilst replacing it with Soviet history, the Russian language, and the foundations of Marxism-Leninism.

The new approach is also evident in the selection of personnel for the State Teacher Institute. From December 5, 1946, to September 8, 1949, Luiza Brucere worked as a docent in the Pedagogy Department, and her biography reflects the features of the time. Born in 1888 in Riga, she graduated from Riga's private Kenins five-year gymnasium (1905-1910) and was a member of the All-Union Communist Party of Bolsheviks (VKPB) from 1905 to 1938. In 1938, she was arrested for espionage, but did not sign a confession, according to her autobiography. There was quite a high turnover of teaching personnel due to the fact that the institute could not provide employees with proper living space. Moreover, various day-to-day problems were one of the main reasons for changing their place of residence or work.

At the beginning of the 1950s, the largest teacher training institutes were reorganized into institutions of higher education - pedagogical institutes.

Anastasija Smirnova[1]
[1]University of Latvia, Museum of the History of Riga and Navigation, Lokomotives iela 141, Riga, anastasija.smirnova@rigamuz.lv

INSTITUTE OF THE RESEARCH OF YOUTH AND VOCATIONAL SUITABILITY OF THE CITY OF RIGA (IRYVSR) AND ITS ROLE IN PROF-ORIENTATION OF THE ORPHANS (1921- 1944)

Keywords: psychology, history of orphanages, social care history, Rūdolfs Drillis

In interwar Europe, following 19th-century traditions, social pedagogy stated that school institutions, especially children's social care institutions, should teach practical skills to guarantee future life. Education to work was crucial. In interwar Riga, special orphanages had educational and social care functions and gave different practical work specialisations. Compared to the 19th century, in interwar time, they started researching the orphan's interests, talents and personal characteristics before choosing the profession. The research resulted in establishing of the most modern Institute in the Baltic states.

Youth Research Institute (JRI) in Riga was established in 1921. Later JRI developed as a complicated centre for psychology research and became an essential social control institution. Psychotechnician Rūdolfs Drillis (1893—1983) was the first in Latvia who researched the Human personality and the choice of occupation. In

1924, the Ministry of Education of Latvia founded the Psychotechnical cabinet, and R. Drillis became its Head. In 1925, the Psychotechnical cabinet was united with the Student Nervous Outpatient Clinic (est. 1923) of the Riga City Health Department and renamed ISYVSR. ISYVSR was the successor of the JRI, but in 1925 it became a municipal institution of Riga. ISYVSR developed from the mentally disabled children ambulance into the research centre of the sociology of schoolchildren and youth and their abilities and talents. From 1929, ISYVSR was attached to the Ministry of education of Latvia, and in 1936, ISYVSR was renamed Institute of Psychotechnics and Vocational Selection of Riga and operated until 1944. The main "clients" of the IRYVSR were school graduates and orphans.
The paper aims to research the role of the IRYVSR in the education process in Riga-specialised orphanages in interwar time, forming the "national child".

Zintis Kārkliņš
Daugavpils University, Parādes street 1, Daugavpils, karkl.zin@gmail.com

THE BEGINNING OF HOSTILITIES IN LATVIA (JUNE-JULY 1941) IN SOVIET AUTHORS' WORKS: A CRITICAL ANALYSIS

The study critically examines the fundamental research of Soviet authors on the beginning of World War II in the territory of Latvia (June-July 1941). The analysis covers the collective works of authors - The Second World War. 1939-1945: A Consideration of War History (1958, edited by S.Platov); The History of the Great Patriotic War of the Soviet Union from 1941 to 1945 (1961, volume 2, edited by N.Fokin); History of the Latvian SSR (1974, 3rd edition, V.Kanāle, M.Stepermanis); History of the Second World War 1939-1945 (1975, volume 4, edited by A.Grechko); The Great Patriotic War in the Soviet Union 1941-1945. A Brief History (1984, 3rd edition, edited by B.Telpukhovsky) and publications of widely known researchers of the Soviet period (Anfilov, Samsonov, Savchenko, etc.). The critical analysis of the works revealed that during the Soviet power period, they often focused on the military achievements of the Red Army and the strengthening of power, while the description of the national resistance movement and the "counter-historical" context could be selective and ideologically concealed. Considering these limitations, the study also used publications by contemporary Latvian researchers that offer a broader and more neutral perspective on the national resistance movement in Latvia during World War II. The Soviet authors' works on the beginning of hostilities in the territory of Latvia have a pronounced ideological stance that reflects the interests of Soviet power and propaganda goals, thus influencing the interpretation of historical events. Over time, Soviet historiography evolved, and its works increasingly included more detailed and factual information about the hostilities in the territory of Latvia, but a certain ideological influence remained.

Gvido Grava[1]
[1]Daugavpils University, Parādes street 1, Daugavpils, gvido.grava@gmail.com

THE CASE OF KLAIPÉDA IN HISTORIOGRAPHY OF LATVIA AND LITHUANIA: THE INTERWAR PERIOD (1918-1939)

Ever since its establishment, the city of Klaipéda has been a strategically important city. This article will present the questions of the status of the city, being part of the border region of Lithuania Minor, and how it dealt with issues of national identity during the interwar period. Summarizing the research of both Latvian and Lithuanian historians regarding the history of Klaipéda, the conclusion revolves around the idea that the foreign policy of Lithuania towards the city was complicated. The city had a specific ethnic group in the interwar period, known in the historiography as the *Memellanders*. This ethnic group saw themselves as the subjects of Germany or had underlying loyalty to Germany and its culture, and did not wish to integrate themselves into the newly-found cultural history of Lithuania. The Germans living in the city of Klaipéda supported the idea of the city being annexed by Germany, organized themselves and participated in illegal activities for the duration of the interwar period. Meanwhile, the Lithuanians living in the city tried to resist the influence of these groups and activities, and even organized a court case against suspected Nazi

collaborators and supporters in 1935. The government of Latvia did not express particular interest to the events in the city of Klaipéda and most likely saw the city as a case of Lithuania's domestic policy and did not intrude on it. Therefore, the research aim of this paper is to discover and summarize the most important pieces of research, by drawing comparisons regarding their approaches towards the objects of research.

TIESĪBU ZINĀTNE
≈
LAW

Anita Kovaļevska

CONCEPT OF REAL ACTION (MATERIAL ACT) IN LATVIAN, AUSTRIAN AND SWISS ADMINISTRATIVE LAW

The concept of real action or material act of administration (*Realakt, tatsächliches Verwaltungshandeln, schlichtes Verwaltungshandeln, nichtförmliches Verwaltungshandeln* - in German; *opérations matérielles, agissement matériel, actes matériels* – in French) in Latvia was adopted from Germany and first appeared in Latvian administrative law in 2001, when the Administrative Procedure Law was adopted. Prior to that, the concept had not been used in laws, court decisions or legal literature.
Today, the real action or material act is one of the basic instruments of administrative law in Latvia, alongside the administrative act and the public law contract. The legal definition of real action or material act is provided in Article 89 of the Law on Administrative Procedure. The characteristics of a real action or material act and an administrative act are basically the same. There are two main differences between these legal institutions. First, an administrative act is a legal act, whereas a real action or material act is an act in the form of action or inaction. Secondly, an administrative act produces legal effects, whereas an actual act produces actual effects (actual consequences).
The concept of real action or material act is also familiar in Austrian and Swiss administrative law. The aim of this paper is to examine the understanding of this concept in Austria and Switzerland and to compare the commonalities and differences in the understanding of the concept of real action or material act in Latvian, Austrian and Swiss administrative law.

Georgijs Zotovs

HISTORICAL GENESIS OF THE LEGAL REGULATION OF THE LAW ON WATER MANAGEMENT SERVICES AND CONSIDERATIONS DUE TO WHICH THE LEGISLATOR HAS DECIDED ON THE CHOICE TO LIMIT THE PROVIDER OF WATER MANAGEMENT SERVICES TO A CERTAIN TYPE OF LEGAL FORM AND RELATED NEGATIVE CONSEQUENCES

According to Article 1, Clause 5 of the Law "On Pollution" and Article 1, Clause 12 of the Water Management Services Law, the association can be the addressee of the polluting activity permit - but, according to the current regulation, the association cannot be a provider of water management services, but can be an operator. Since the special legal provisions - Article 1, Clause 12 of the Law on Water Management Services and Article 1, Clause 5 of the Law "On Pollution" - define as a water management service provider a person (a merchant or an institution) that provides certain types of water management services in the territory of service provision, but as an operator - a private person, derived public person, direct or indirect administrative institution, which performs a professional activity or is responsible for performing such an activity or has a decisive economic influence on the technical performance of the relevant professional activity - the association does not comply with any of Article 1 of the Law on Water Management Services to the legal statuses mentioned in paragraph 12, but corresponds to the status mentioned in paragraph 5 of Article 1 of the Law "On Pollution" - a private person.
In the process of developing the legal framework, the reality of the provision of water management services was reversed, that some service providers do not meet the formal requirements set forth in the legal norm, and possible perspectives, about which the transitional provisions are actually silent - on the other hand, according to Article 5 of the Law on Local Governments, to organize communal services for residents (incl.

water supply and sewerage) regardless of the ownership of the housing fund, is an autonomous function of the municipality. During the development of the Law on Water Management Services, municipalities basically organized the performance of this autonomous function using municipal capital companies (merchants) or municipal institutions, although in some cases services were also provided by other (private) merchants. The drafters of the law were originally based on the assumption that a legal form such as an association, which is a voluntary association of persons for the achievement of a certain purpose, which is not of a profit-making nature, provides, for example, the water supply of a horticulture cooperative, and not public water management services. Therefore, in the definition of the law as service providers, merchants or institutions are indicated, but in reality the association can be an operator of water management services and physically provide residents with water management services.
In the process of developing the legal framework, the reality of the provision of water management services was not covered, that part of the service providers do not meet the formal requirements set forth in the legal norm, which the transitional provisions are actually silent about - while in accordance with Article 5 of the Law on Local Governments, to organize communal services for residents (including water supply and sewage) regardless of ownership of the housing fund, is an autonomous function of the municipality.

Evaldas Raisteniskis[1], Anatolijs Krivins[2]
Daugavpils University, Parādes street 1, Daugavpils, evaldas.raistenskis@gmail.com

THE IMPACT OF CORRUPTION TO EU GREEN DEAL

Analysing the theoretical aspects of corruption, it can be noted that corruption in the field of environmental protection is linked to political corruption. Corruption is an obstacle to both economic growth and good public administration. By shifting resources outside the economic and social system, the efficiency of public spending is significantly affected (Androniceanu et al., 2022). While the EU has shown the world's best performance in reducing corruption in recent years, the cost of corruption to the EU economy amounts to €120 billion a year (European Commission, 2020). Corruption discourages taxpayers from paying taxes (Osipov, Glotov and Karepova, 2018). Corrupt practices can have negative consequences for social protection and public services by reducing the available budget and undermining equal access to public services.
Over time, corruption deepens social inequalities and undermines trust in the state, institutions and public administration. Corruption can also undermine income distribution and lead to environmental neglect. One of the most important aspects of corruption in public governance is that it undermines trust in legitimate institutions, thereby reducing their ability to deliver adequate public services and provide an enabling environment for private sector development (Mircica, 2020). In extreme cases, corruption can lead to a failure to acknowledge the legitimacy of the state, which can lead to political and economic instability (Bilan, Mishchuk, Samoliuk and Grishnova 2019; Bilan, Hussain, Haseeb and Kot, 2020; Grayson, 2020). Reducing corruption is therefore also important for the sustainability of the Green Deal. This paper analyses how corruption can affect the implementation of the EU Green Deal and what the consequences are.
Keywords: corruption, Green deal, EU.

MENEDŽMENTS
≈
MANAGEMENT

Anna Russke
[1]*Daugavpils University, Parādes street 1, Daugavpils, anna.russke@gmail.com*

"EMPĀTIJA MĀKSLINIECISKĀS IEVIRZES IESTĀŽU VADĪBAS IZPRATNĒ. EMPĀTIJAS ATTIEKSMES ATTĪSTĪBAS VADĪBA"

Sabiedrības un organizāciju vadība, tās procesu izpratne joprojām turpina attīstīties un šobrīd darba devējs pievērš aizvien lielāku uzmanību savu darbinieku fiziskajai, garīgajai, psiholoģiskajai un emocionālajai veselībai. Vadība aizvien vairāk lūkojas labizjūtas, iejūtīgas attieksmes un empātijas virzienā. Pozitīva un taisnīga vide apvienojumā ar atbilstošiem darba vietas apstākļiem un atalgojumu ietekmē uzņēmuma vai iestādes izaugsmi, darba vai ražotās produkcijas kvalitāti, apjomu un darbinieku motivāciju sadarboties, sasniedzot savā, vadības un darba vietas labā aizvien augstākus mērķus.
Šī darba tēmas izvēle tiek pamatota ar nepieciešamību izpētīt un analizēt faktorus, kuri būtiski ietekmē, veicina vai bremzē empātiskas attieksmes attīstības vadību mākslinieciskās ievirzes iestādēs. Autorei ir vēlme izpētīt un secināt, kas ir nepieciešams, lai uzlabotu un veicinātu empātisku vidi mākslinieciskās ievirzes iestādes vadības, darbinieku un, piemēram, mācībspēku, audzēkņu ikdienā.
Autore reducē Latvijā pārstāvēto mākslinieciskās ievirzes iestāžu sarakstu un empātiskas attieksmes attīstības vadību pēta vidējās profesionālās (*PIKC NMV Rīgas Baleta skola*; *Pāvula Jurjāna mūzikas skola*) un augstākās profesionālās izglītības iestādēs (*Jāzepa Vītola Latvijas Mūzikas akadēmija*); *Latvijas Nacionālajā operā un baletā* (to veidojošās struktūrvienībās), kā arī interešu izglītībā jeb dejas studijās (*TS Dance Academy* - vad. Tālis Sils; deju skolā *Dzirnas* - vad. Agris Daņiļēvičš; deju kolektīvā *Zītariņi* - vad. Dace Druka).
Mākslinieciskās ievirzes iestādes veic ne tikai izglītojošu funkciju, bet arī sabiedrībai nodrošina plašas iespējas pieredzēt, izbaudīt šo iestāžu galaproduktus un piedāvājumu, apmeklējot tās kā skatītājiem, klausītājiem, iesaistoties kā dalībniekiem, dejotājiem vai kādā citā veidā. Turklāt, lielākā daļa šo iestāžu paralēli darbojas vairākās sfērās, apvienojot, piemēram, izglītību, kultūrizglītību, izpildītājmākslu un uzņēmējdarbību, tādēļ vēl jo svarīgāka kļūst iestādes vadības un administrācijas kompetence, stratēģija, plānošana, darbinieku labizjūta, kas ietekmē galaproduktu kvalitāti, kā arī iestādes veiktspēju un reputāciju.

Vladislavs Sardiko[1], Svetlana Ignatjeva[2], Dzintra Iliško[3]
[1]*Daugavpils University, Parādes street 1, Daugavpils, jaar@inbox.lv*
[2]*Daugavpils University, Parādes street 1, Daugavpils, svetlana.ignatjeva@du.lv*
[3]*Daugavpils University, Parādes street 1, Daugavpils, dzintra.ilisko@du.lv*

ACTUAL AND REQUIRED SUSTAINABLE COMPETENCIES OF CUSTOMS OFFICERS

The world is changing so fast and companies must keep up with new requirements, also in the field of personnel management. Consequently, many companies face the need to find the most effective ways to increase productivity and work efficiency.
In order to improve work efficiency, employees need competencies specific to their workplaces. After a careful literature review, the author came to the conclusion that the definition of "competence" in Latvia is mostly used in two large areas: in education and in the field of personnel management. In the field of personnel management in Latvia, "competence" is not so widely used and discussed. The aim of the article is to explore which competencies customs officers consider more important in their work. The questionnaire was applied as the research method. Employees had to select which competencies are more required for their job and which competencies they possess.

As a result, we have discovered the list of actual and real competencies among the "*Task and process management competencies*" and "*interpersonal effectiveness competencies*". According to the research data, "*organizational understanding and values adoption competencies*" as well as "*thinking and problem solving competencies*" are needed at work to a greater extent than they have. "*Thinking and problem-solving competencies*" are the same for women and men; men consider these competencies more necessary at work. According to the customs officers, they have more than what is need for the job in terms of "*personal effectiveness*." This is interesting that the opinions about this competence are opposite if the answers are sorted based on gender. Female representatives believe that these competencies are more necessary at work. On the other hand, male representatives believe that they have more of these competencies than are needed at work.
Key words: custom officers, sustainable competencies, job markets

Sergejs Poļanskis

MANAGEMENT AND CULTURE: DISNEYLAND PARIS CASE STUDY

Intercultural relations in the international business corporations – still an underestimated issue in management. Disney - one of the biggest American entertainment companies that came to the European market almost bankrupted there in the following one year. The main focus of the present research is to study the importance of the intercultural dimension for the top level management. After thirty years of running the biggest American attractions park in France there have been numerous researches on the quality of this management and the present report concentrates on the cultural theme because it can explain the basic errors committed by the first leaders of Disney company in France. The personal experience of the author of the present research in working for Disneyland Paris will enrich the overall data along with the conclusions that have been drawn in the framework of the present study.

Zigmars Atvars
Daugavpils University, Parādes street 1, Daugavpils, z.atvars@inbox.lv

NOVELTY IN PHD GRADUATE RESEARCH (2022)

Starting from 2011, www.DrClub.lv collects data on Latvian doctoral degree holders by university and number of program graduates.
The purpose of the report is to share the results collected in 2022 and compare them with the number of graduates from other years.
The situation of Latvia will be compared with the experience of other countries.

Vija Eglīte
Daugavpils Universitāte,Parādes iela1,Daugavpils, vija.eglite@inbox.lv

PERSONĀLA VADĪBAS PILNVEIDOŠANAS IESPĒJAS PĀRMAIŅU APSTĀKĻOS X ORGANIZĀCIJĀ

Atslēgas vārdi: *pārmaiņas, pārmaiņu apstākļi, personāla vadība, pilnveidošanas iespējas.*
Dzīve pārmaiņu laikā, kas aktualizē nepieciešamību adaptēties jauniem apstākļiem un pieņemt jaunus izaicinājumus, prasa arī jaunu pieeju personāla vadībā. Pilnveidojot personāla vadību, mainot personāla un vadības sadarbības veidu un korporatīvo kultūru, nospraužot mērķus veidot motivētu un uzticīgu personālu, ir iespējams nodrošināt organizācijas ilgtspējīgu un efektīvu darbību pārmaiņu apstākļos. Pētījuma mērķis ir izpētīt personāla vadības pilnveidošanas iespējas pārmaiņu apstākļos X organizācijā. Pētījumā tika izmantota zinātniskās literatūras un informācijas avotu teorētiskā analīze, aptauja, strukturētā intervija, aprakstošā statistika, X organizācijas SVID analīze. Literatūras un zinātnisko pētījumu apskats parāda, ka personāla vadībai jāspēj pārveidot darbinieku attieksme un vadības stils, lai spētu pielāgoties mainīgajiem apstākļiem,

kā arī adoptēt jaunas idejas, lai nodrošinātu organizācijas attīstību. Pētījuma rezultāti atklāj, ka pārmaiņu apstākļos personāla vadībai jabūt vērstai uz organizācijas ilgtspējīgas attīstības mērķiem un to sasniegšanu, kas rada motivētus, uz izaugsmi tendētus darbiniekus. Efektīva personāla vadība, bez kuras jebkuras organizācijas attīstība nav iespējama, var nodrošināt organizācijas ilgspējīgu politiku un izaugsmes iespējas mainīgajos apstākļos.

Olga Ļivitina[1], Mārīte Kravale-Pauliņa[2]
[1]Daugavpils University, Vienības street 1, Daugavpils, olga.livitina@inbox.lv
[2]Daugavpils University, Parādes street 1, Daugavpils, marite.kravale@du.lv

STRATEGIC LEADERSHIP OF HEADS OF EDUCATIONAL INSTITUTIONS AND ATTRACTIVENESS FACTORS OF WORK ENVIRONMENT

Keywords: Strategic leadership, quality of education, attractiveness factors of the work environment.
Discussions on the optimisation of the network of educational institutions, teachers' professional activities and teachers' salaries are increasingly discussed in the public space of Latvia, but it is no less important to analyse the professional skills of the heads of educational institutions. In 2021, the Latvian Teachers Union informed that there is a lack of approximately 1000 teachers in Latvia, however this number could be even higher. The authors of the study believe that it is important to understand not only the specifics of the teacher's work, but also the factors that make the working environment attractive. The efficiency of the management of educational institutions is one of the objectives that is used to monitor education quality. The aim of the study is to identify strategic leadership of the heads of educational institutions and attractiveness factors of the work. Surveys of teachers and heads of educational institutions and semi-structured interviews of the heads of educational institutions were used to collect data, and were analysed according to the methodology of qualitative and quantitative data analysis.
Research data indicate that supportive, innovative and bureaucratic organisational culture is essential for the heads of educational institutions, and as important factors for work environment attractiveness are mentioned: financial security, workplace location and relationships with colleagues.
The authors of the research intend to analyse the main attractiveness factors of the work environment that could potentially help the heads of educational institutions to better support and motivate by attracting new ones and by supporting existing teachers.

Valdis Jukšs, Dzintra Iliško
Daugavpils University, Latvia

SUSTAINABLE MANAGEMENT OF THE LATVIAN BORDER GUARDS' PROFESSIONAL DEVELOPMENT

Key words: *Professional development, border guards, sustainable development.*
The focus of this study is a professional development of border guards serving in different territorial structural units of the State Border Guard Organization of Latvia in the context of its sustainable management. The topicality of the study is determined by the fact that there are practically no scientific studies in the field of sustainable management about the professional development of border guards in the State Border Guard Service of Latvia.
There is no scientifically substantiated monitoring of the situation in the field of professional development of Latvian border guards. Scientifically based models of sustainable management of professional development of employees have not being tested. The research methods applied in this study are regression analysis for the assessment of level of professional development of Latvian border guards in relation to the attractiveness of workplaces and comparison of means. The degree of involvement of adult population in lifelong learning is considered as one of the indicators of sustainable development of human capital. At the same time, the development of lifelong learning makes it possible to solve a wide range of social and economic problems, the most important of which are: the use of new technologies, increasing labor productivity, the ability to combine an individual's desire for successful work and professional development. The professional development of employees requires to acquire relevant competences, including knowledge, skills and abilities. The study has

identified the competences necessary for the professional development of border guards to make workplace attractive.

Ineta Karule
Daugavpils Universitāte, Parādes iela 1, Daugavpils, ineta.karule@gmail.com

X MAZĀS SKOLAS PERSONĀLVADĪBAS VIRZIENI LATVIJAS IZGLĪTĪBAS REFORMAS KONTEKSTĀ

Atslēgvārdi: *Mazās skolas, stratēģiskā plānošana, pārmaiņas apstākļi, personāla vadība, izglītības reforma.*
Latvijas izglītības reforma ir liels izaicinājums mazajām skolām. Viens no izglītības reformas mērķiem ir skolu tīkla optimizācija. Optimizācijas rezultātā tiks slēgtas vairākas skolas. Lai mazās skolas izglītības reformas rezultātā varētu pastāvēt, būtiski ir nodrošināt pietiekamu skolēnu skaitu skolā. To lielā mērā nosaka skolas ģeogrāfiskais izvietojums, tomēr liela nozīme ir arī izglītības kvalitātei. Lai skola spētu sniegt kvalitatīvu izglītību, nepieciešams ieviest tādu personālvadības stratēģiju, kas veicinātu kvalitatīvu mācībspēku piesaisti. Savukārt kvalitatīvu mācībspēku ietekmē iespējama izglītības līmeņai celšanās skolā, tādējādi nodrošinātu konkurētspēju ar citām skolām.
Lai noskaidrotu patreizējo situāciju un nākotnes redzējumu personālvadībā, tika intervēti skolu atbildīgie darbinieki. Bez tam tika veikta aptauja pārējo skolas darbinieku vidū ar mērķi noskaidrot viņu domas par esošo stāvokli personālvadībā.

Iveta Šeršņeva
ivetasersneva@gmail.com

PROFESSIONAL BURNOUT OF STATE BORDER GUARD OFFICIALS UNDER THE INFLUENCE OF VARIOUS EXTERNAL FACTORS

Professional burnout of State Border Guard officials under the influence of various external factors
In the last three years, the socio-economic situation for Latvia, Europe and the whole world was very complicated and significant. First came the Covid-19 pandemic. Practically immediately, the Baltic states faced a hyper threat from Belarus, when thousands of illegal immigrants tried to illegally cross the country's border then on February 24, 2022, hostilities began on the territory of the European continent. All these events are united by one thing - lack of information and not knowing what will happen next. This is exactly the cause of stress that has seriously affected society.
The impact of stress on the body is increasingly associated with professional burnout at work. The danger of professional burnout exists in every profession, so many creative solutions are being sought to help protect against the effects of this syndrome.
Emotional exhaustion is viewed as the main component of professional burnout and is characterized by emotional overload, feeling of emptiness, exhaustion of personal emotional resources. The first symptoms of depression start to appear, particularly in severe cases there is an emotional collapse. In this study, emphasis is placed on the factors of the organisation and the work environment. Thus, the purpose of the study is to investigate the professional burnout of State Border Guard officers. The object of the study is the peculiarities of professional burnout of State Border Guard officials and the subject of the study is the correlation of various external factors that influence professional burnout. The following research methods were used: K. Maslača's survey "Determining the level of professional burnout" and A. Beck's survey "Depression scale".
As a result, data on the professional burnout of border guard officials is analysed according to various criteria, including place of service, age and time periods. The survey was repeated to observe the dynamics of the situation. At the end, recommendations are given for mitigating professional burnout syndrome.

MATEMĀTIKA
≈
MATHEMATICS

Anita Kiričuka
Daugavpils University, Vienības street 13, Daugavpils, anita.kiricuka@du.lv

BOUNDARY VALUE PROBLEMS FOR CONSERVATIVE AND DISSIPATIVE EQUATIONS

Differential equations are considered together with the two-point boundary conditions. The result of this study is the main conclusion: BVP $x''+ f(x) x'^2+ g(x)=0$, $x(a)=0$, $x(b)=0$ generally has at least the same number of solutions, as the BVP $x''+ g(x)=0$, $x(a)=0$, $x(b)=0$ had. The estimations of the number of solutions to the BVP for equations $x''+ f(x) x'^2+ g(x)=0$ and $x''+ f(x) x' + g(x)=0$ are different.

Diana Ogorelova
Daugavpils University, Parādes street 1, Daugavpils, diana.ogorelova@du.lv

ON LINEARIZATION ON SOME SYSTEM ARISING IN THE THEORY OF NEURAL NETWORKS, IN THE NEIGHBORHOOD OF A CRITICAL POINT

Artificial neural networks (ANN) can be understood as computing systems inspired by biological neural networks. Their mathematical models can be formulated in terms of systems of quasi-linear differential equations of the form

$x'1=\tanh(w11\,x1 + w12x2 + w13x3 - \theta1) - b1\,x1,$
$x'2=\tanh(w21\,x1 + w22x2 + w23x3 - \theta2) - b2\,x2,$
$x'3=\tanh(w31\,x1 + w32x2 + w33x3 - \theta3) - b3\,x3.$

We consider a three-dimensional artificial neural network model where the sigmoid function is a hyperbolic tangent function. Investigation of the critical points is needed for understanding the properties of the system. The local analysis is made using linearization. The characteristic equation is to be solved. The coefficients usually involve partial derivatives, which are expressed using complicated formulas. This can be improved by using the linearization on some systems arising in the theory of neural networks, in the neighborhood of a critical point.

Armands Gritsans[1], Andrei Kolyshkin[2], Diana Ogorelova[1], Felix Sadyrbaev[1], Inna Samuilik[2], Inara Yermachenko[1]
[1] Daugavpils University, Parādes street 1, Daugavpils, armands.gricans@du.lv, diana.ogorelova@inbox.lv, felix@latnet.lv, inara.jermacenko@du.lv
[2] Riga Technical University, Daugavgrīvas street 2-135, Rīga, Andrejs.Koliskins@rtu.lv, lvinna@inbox.lv

ON THE MULTIPLICITY OF SOLUTIONS FOR A BOUNDARY VALUE PROBLEM WITH THE ARRHENIUS NONLINEARITY

Dirichlet problem for a second order nonautonomous ordinary differential equation with the Arrhenius nonlinearity is considered. This problem arises in the theory of heat conduction. We study the existence and estimates of the number of positive solutions to the problem using the bifurcations analysis technique.

This research is funded by the Latvian Council of Science, project "Analysis of complex dynamical systems in fluid mechanics and heat transfer", project No. lzp-2020/1-0076.

Anita Sondore[1], Valentīna Beinaroviča[2]
[1]Daugavpils University, Parādes street 1, Daugavpils, anita.sondore@du.lv
[2]Daugavpils University, Parādes street 1, Daugavpils,valentina.beinarovica@du.lv

VALODDARBĪBAS PRASMJU AKTUALITĀTE MATEMĀTIKAS MĀCĪBU PROCESĀ

Valoddarbības prasmju aktualitāte matemātikas mācību procesā

Matemātiskās valodas jēgpilna lietošana gan saziņai, gan zinātniskai jēdzienu, ideju un problēmu risinājumu aprakstīšanai tiek akcentēta pirmajā matemātikas mācību jomas blokā, iekļaujot pilnveidotajā Latvijas pamatizglītības standartā konkrētas prasības plānotajiem skolēnam sasniedzamajiem rezultātiem. Risināt problēmu matemātikai raksturīgi nozīmē saskatīt struktūras, sakarības, veidot vispārinājumus un tos pierādīt. Tāpēc prasme veidot matemātisku komunikāciju gan skaidrojot mutiski, gan pierakstot tekstu un demonstrējot izpratni par matemātikā pieņemto apzīmējumiem lietojumu, aktuāla gan mācību procesā**,** gan skolēnu komunikatīvo prasmju attīstīšanai kopumā. Valoddarbības prasmju apguve ir aktuāla arī tādēļ, ka Latvijā skolēni izglītību apgūst valsts valodā, daļai no kuriem tā nav dzimtā valoda.
Lai realizētu ar valoddarbību saistītu prasmju attīstību, skolotāja atbildībā ir piedāvāto uzdevumu kopums, demonstrētie modeļi, uzdotie jautājumi. Piemēram, varētu piedāvāt uzdevumu: *Kas visiem dotajiem skaitļiem kopīgs? Kurš no uzrakstītajiem skaitļiem ir īpašs? Atbildi pamatot*. Ja uzdevums domāts izglītības posmam, beidzot 3. klasi, (ar sasniedzamo rezultātu- lasa un veido matemātisku tekstu, demonstrējot izpratni par cipariem kā simboliem skaitļu pierakstam, par aritmētisko darbību zīmēm, vienādības un nevienādības zīmēm), piedāvā skaitļu kopu **{15; 16; 17; 20}.** Ja uzdevums domāts izglītības posmam, beidzot 6. klasi (sasniedzamais rezultāts - pamato apgalvojumu, veidojot strukturētu tekstu, kas pārliecina par apgalvojuma patiesumu), piedāvā skaitļu kopu **{ ; -3,81; ; ; ; 0,4}.** Lai noskaidrotu topošo skolotāju prasmes izprast, lietot matemātisko valodu izteikuma patiesumvērtības noteikšanā, izteikumu veidošanā, tika veidots gadījuma pētījumu dizains (pētījums veikts 2022. gadā). Tajā noskaidrojām DU skolotāju programmās studējošo, ar tiesībām mācīt matemātiku 1.-6. klasei (n=25) prasmi veidot piemērus un pretpiemērus jau dotiem izteikumiem, kā arī prasmi pašiem izveidot izteikumus ar matemātisku saturu 1.-6. klasei, kurus varētu piedāvāt skolēniem patiesumvērtības noteikšanai. Šī pilotpētījuma rezultāti apliecina, ka topošajiem skolotājiem nepadodas matemātiska satura teksta pareiza konstrukcija un izpratne.
Topošo skolotāju studiju laikā nepieciešams akcentēt pakāpenisku pāreju uz citādu skolēnu mācību pieredzi un citādu metodisko paņēmienu izmantošanu pilnveidotā mācību satura apguvei, kas ir atšķirīga no pašu studējošo skolas mācību pieredzes. Lai nodrošinātu mūsdienīgas lietpratības izglītību, būtiski dot iespēju topošajiem skolotājiem plānot un vadīt mācīšanos, izvirzīt skaidrus sasniedzamos rezultātus, izvēlēties atbilstošus uzdevumus, veikt pašvērtējumu.

MŪZIKA
≈
MUSIC

Olga Gaile
Daugavpils University, Parādes street 1, Daugavpils

OPERAS ŽANRS FRANCIJĀ 19. GADSIMTA OTRAJĀ PUSĒ

Eiropas mūzikas attīstība 19. gadsimtā ieguva vēsturē vēl nepieredzētu pacēlumu un vērienu. Ārkārtīgi pieauga skaņu mākslas sabiedriskais nozīmīgums.

Tautas masu demokrātiskā kustība Francijā ietekmēja gan mākslu gan mūziku. Mūzikā – vērojama tieksme demokratizēties, kas izpaudās no tautas dzīves aizgūto sižetu izmantojumā, mākslas reālistiskajā ievirzē, māksliniecisko tēlu un izteiksmes līdzekļu saprotamība.

Darbā ir raksturotas 19. gadsimta otrās puses romantisma iezīmes, operas žanra vēsture, nozīme un īpatnības Francijā 19. gadsimta otrajā pusē.

FILOLOĢIJA
≈
PHILOLOGY

Diāna Jaunmuktāne
Daugavpils University, Vienibas street 13, Daugavpils

OPOZĪCIJA „DABA–CIVILIZĀCIJA" K. HAMSUNA UN G. JANOVSKA PROZĀ

Gunars Janovskis (1916–2000) ir latviešu trimdas rakstnieks, kas lielāko mūža daļu pavadījis Lielbritānijā. Viņa devums latviešu literatūrā ir vairāk kā 20 romāni, virkne stāstu un noveļu. G. Janovska kā radošas personības, rakstnieka tapšanā un savdabīgas mākslinieciskās pasaules izveidē nenoliedzami nozīmīga loma bijusi norvēģu prozaiķim Knutam Hamsunam.

K. Hamsuna ietekme Janovska prozā ir vērojama jau no pirmajiem nopietnajiem mēģinājumiem literārajā laukā. Turklāt radošās darbības sākumposmā tā ir ļoti blīva. Var teikt, ka G. Janovska pirmais romāns „Vilragā" vēl nav gluži patstāvīgs teksts, bet darbs ar tendenci kopēt Hamsuna romānu „Pāns". Pakāpeniski formējas G. Janovska individuālais stils un Hamsuna iespaids vairs nav tik visaptverošs.

Janovska prozā bieži vērojamas tiešas atsauces uz K. Hamsunu un viņa romāniem; tiek izmantoti norvēģu autora daiļradei raksturīgie motīvi; līdzība konstatējama tēlu modelējumā utt.

K. Hamsuna prozas īpatnību iespaids uz G. Janovska tekstiem produktīvi analizējams, pievēršot uzmanību opozīcijas „daba–civilizācija" aktualizācija abu autoru daiļradē.

Viens no tekstiem, kurā vērojams akcentēts K. Hamsuna prozas pasaules sabalsojums ar G. Janovska mākslinieciskо pasauli, ir romāns *Dziesma mežam*. Romāna centrā ir vēstījums par trimdinieku Mārci Umuru, kas mitinās kādā Anglijas nomales ciematā un apmeties savrup meža ieskautā mājā. Umurs, tāpat kā Hamsuna prozas cilvēki, ir savādnieks, klaidonis-vientuļnieks, kas nealkst sabiedrības un arī īsti tajā neiederas. Ja leitnanta Glāna atsvešinātība no sociuma akcentē viņa tuvību dabai, viņa kā dabas bērna statusu, tad Umura nošķirtību galvenokārt ietekmē trimdinieka nevēlēšanās komunicēt ar mītnes zemes sabiedrību, kas gūst izpausmi klaiņošanas, ceļošanas motīvā. Mārča uzticamākais draugs ir suns Juka, līdzīgi kā Glānam Ezops.

Glāna, Nāgela, Knuda un arī Umura patvēruma vieta un organiski nepieciešama vide ir mežs. Tas reprezentē dabas pasauli, kuras atribūti ir harmonija, miers, klusums. Mežs iemieso dzīvības spēku radošo sākotni. Mežs īpašu nozīmes papildniansi gūst sasaistē ar noteiktu laika nogriezni, proti, nakti. K. Hamsuna romānos *Mistērijas* un *Pāns* nakts ir laiks, kas saistīts ar saasināti jūtīgu, smalku un nedaudz smeldzīgu dvēseles dzīves vibrāciju. Nāgelā nakts burvības apjausma rada savādi skurbu saviļņojumu un neizskaidrojamu, gaišu līksmi. Tas ir arī laiks, kad sapnis savijas ar realitāti, paverot ceļu iracionālam pārdzīvojumam. Romānā *Dziesma mežam* Mārtiņš Umurs vakara un nakts stundas pavada mežā. Šis diennakts periods saistāms ar akcentēti piesātinātu jūtu un domu strāvojumu, tādējādi G. Janovska atveidotajā trimdiniekā ļaujot saskatīt dvēselisku tuvinājumu K. Hamsuna personāžiem. Taču latviešu autora cilvēkam nakts kļūst īpaša, to tverot caur pagātnes prizmu. Nakts Mārcim (arī citiem G. Janovska trimdiniekiem) galvenokārt ir atmiņu laiks.

Valerii Kremenchutskyi[1]
[1]*Daugavpils University, Parādes street 1, Daugavpils, valerii.kremenchutskyi@du.lv*

TERMS IN SCIENCE FICTION TEXT

Terms are commonly associated with scientific and popular science sources. Nevertheless, they often serve as an integral part of fiction as we can note in sci-fi works. The research aims to dwell into the peculiarities of the terminology use in science fiction.

FIZIKA
≈
PHYSICS

Vadims Kolbjonoks, Andrejs Bulanovs

DIFRAKCIJAS OPTISKO ELEMENTU IZGATAVOŠANA UZ AR-N 7520 REZISTA BĀZES

Fokusēts elektronu stars tika izmantots lai mijiedarboties ar AR-N 7520 plānās kārtiņas virsmu. Mijiedarbības rezultāts tiek parādīts kā kontrolēta reljefa veidošanās uz substrāta virsmas pēc kodināšanas metilspirtā. Mainot fokusēta elektronu stara kūļa parametrus, izmantojot digitālās hologrammas metodi, tika ierakstīti difrakcijas optiskie elementi un slēptā attēla hologramma. Rezultātā, no plānās kārtiņas virsmas atstarotais lāzera stars tuvajā laukā rekonstruē slēpto attēlu, kas ir ierakstīts uz parauga kā fona elements. Tiek apspriestas šī materiāla praktiskās izmantošanas iespējas.

Jans Kevišs[1], Irena Mihailova[2], Vjaceslavs Gerbreders[2], Marina Krasovska[2], Eriks Sledevskis[2], Valdis Mizers[2], Andrejs Bulanovs[2] and Andrejs Ogurcovs[2]

[1]Daugavpils University, Parādes street 1, Daugavpils, jans.keviss@gmail.com

[2]G. Liberts' Innovative Microscopy Centre, Department of Technology, Institute of Life Sciences and Technology, Daugavpils University, Parades Street 1, Daugavpils, LV-5401, Latvia

ELECTROCHEMICAL HYDROGEN PEROXIDE SENSOR BASED ON COPPER OXIDE NANOSTRUCTURES

This text considers the creation of a sensor capable of detecting hydrogen peroxide. The sensor is based on nanostructured copper oxide obtained by single-phase, low-temperature geothermal synthesis. Copper oxide nanostructures grown on a wire electrode show high uniformity and density and have good adhesion to the substrate surface. The structure, surface and composition of the obtained samples were studied by field emission scanning electron microscopy, energy dispersive spectroscopy, and X ray diffractometry. Obtaining samples of nanostructured electrodes were used for electrochemical determination of the content of hydrogen peroxide in 0.1 M NaOH buffer solution. For the quantitative analysis of H_2O_2 in solution, the methods of cyclic voltammetry and a differential pulse voltammeter were used, and the dependence of the current on time was obtained with an increase of the concentration of hydrogen peroxide at regular intervals. Studies of sensitivity to interferences such as ascorbic acid, uric acid, dopamine, NaCl, glucose, and acetaminophen showed that interfering substances did not affect the electrochemical response. Analysis of a milk sample showed a high degree of extraction (more than 95%). The sensitivity of the resulting CuO electrode is 439.19 μA mM^{-1}. A good linear dependence was obtained between the peak current and the H_2O_2 concentration in the range from 10 to 1800 μM. According to the results obtained, this sensor is suitable for practical use for the qualitative detection of H_2O_2in real samples, as well as for the quantitative determination of its concentration.

Irēna Mihailova*, Vjačeslavs Gerbreders, Marina Krasovska, Ēriks Sļedevskis, Valdis Mizers

*Daugavpils University, Parādes street 1a, Daugavpils, *irena.mihailova@du.lv*

ELECTROCHEMICAL HYDROGEN PEROXIDE SENSOR BASED ON TITANIUM DIOXIDE NANOSTRUCTURES

Hydrogen peroxide (H_2O_2) is a strong oxidant and an essential intermediate product in many biomedical reactions. In high concentrations, it can cause serious harm to human health and the environment. Therefore, rapid and accurate determination and control of H_2O_2 concentration is an important task in many areas, including pharmaceuticals, environmental protection, industrial areas and others.
Nanostructured titanium dioxide (TiO_2) is a promising material for H_2O_2 detection due to its unique properties, such as high surface area, good biocompatibility, high chemical stability, and excellent electron transport properties. TiO_2 is insoluble in water and in organic solvents.
This study proposes a non-enzymatic H_2O_2 electrochemical sensor using titanium rod electrodes with nanostructured TiO_2 coatings. TiO_2 nanostructures were obtained by a one-step hydrothermal oxidation method. The structure, surface and composition of the obtained samples were studied using FESEM along with EDS and XRD. The obtained nanostructured samples were used for electrochemical determination of the H_2O_2 content in a 0.1 M phosphate buffered saline (PBS) using cyclic voltammetry, differential pulse voltammetry and i-t measurements. According to the obtained results, this sensor is suitable for practical use for the qualitative and quantitative determination of H_2O_2 in aqueous solutions.
Overall, nanostructured TiO_2-based sensors have great potential for H_2O_2 detection due to their high sensitivity, low cost, and easy fabrication. They could find applications in various fields, such as medical diagnosis, food quality control, and environmental monitoring.
ACKNOWLEDGEMENTS: This work was supported by the European Regional Development Fund's programme "Post-doctoral Research Aid" (a project title "Development of nanomaterial-based electrochemical sensor for detection of hydrogen peroxide"; research application No 1.1.1.2/VIAA/4/20/743; research application agreement Nr.1.1.1.2/16/I/001).

Viesturs Silamiķelis[1], Aigars Apsītis[1], Jānis Sniķeris[1,2], Austris Pumpurs[1]
[1]Institute of Atomic Physics and Spectroscopy, University of Latvia, Skunu street 4, Riga, viesturs.silamikelis@lu.lv
[2]G. Libert's Center of Innovative Microscopy, Daugavpils University, Parādes street 1, Daugavpils, janis.snikeris@du.lv

ELECTROMAGNETIC LEVITATION FOR CRYSTAL GROWTH – MEASURING EM FIELD, EMITTED HEAT AND ACTING FORCE WITHIN AN ELECTROMAGNETIC LEVITATION COIL

Crystals of ultra-high purity are expected to be indispensable for development of a variety of scientific and technological fields in near future. One of those fields is production of high-precision radiation detectors. Traditional crystal growth methods use a crucible for producing and holding the melt of crystal material. However, the crucible acts as a limiting factor to the purity of the resulting crystals since it acts as a source of defects due to contamination. Electromagnetic levitation (EML) can be used to contain the crystal melt within an EML coil during its crystallization process in order to avoid contamination from crucible. However, the understanding of the interplay between EML coil and the levitating sample is currently lacking, which impedes the process of designing EML coils and systems for crystal growth. There are theoretical models of EML coils, but they generally do not consider the effects of the sample on the EM field generated by the coil. The acting force, emitted heat and axial EM field in EML coils have been measured separately in the past. In this work we present high-precision simultaneous measurements of emitted heat, acting force, as well as axial and radial EM field in an EML coil (3 turns and 1 counter-turn setup). We discovered that the levitation zone and the bulk of heat emission are displaced – most of the heat is emitted beneath the levitation zone. We believe that these results will be useful for verifying and advancing theoretical models of EML coils.

Andrejs Ogurcovs [1], Kevon Kadiwala [1], Eriks Sledevskis [2], Marina Krasovska [2], Valdis Mizers [2]
[1]Institute of Solid State Physics, University of Latvia, Kengaraga Street 8, LV-1063 Riga, Latvia, kevon.kadiwala@cfi.lu.lv
[2]G. Liberts' Innovative Microscopy Centre, Department of Technology, Institute of Life Sciences andTechnology, Daugavpils University, Parades Street 1A, LV-5401 Daugavpils, Latvia, eriks.sledevskis@du.lv, marina.krasovska@du.lv, valdis.mizers@du.lv
Correspondence: andrejs.ogurcovs@cfi.lu.lv

GLYPHOSATE SENSOR BASED ON NANOSTRUCTURED WATER-GATED CUO FIELD-EFFECT TRANSISTOR

This research presents a comparative analysis of water-gated thin film transistors based on a copper oxide (CuO) semiconductor in the form of a smooth film and a nanostructured surface. A smooth CuO film was deposited through reactive magnetron sputtering followed by annealing in atmosphere at a temperature of 280 °C. Copper oxide nanostructures were obtained by hydrothermal synthesis on a preliminary magnetron sputtered 2 nm thick CuO precursor followed by annealing at 280 °C. An X-ray diffraction (XRD) analysis of the samples revealed the presence of a tenorite(CuO) phase with a predominant orientation of (002). Scanning electron microscopy (SEM) andatomic force microscopy (AFM) studies of the samples revealed a highly developed surface with crystallites having a monoclinic syngony and dimensions of 15–20 nm in thickness, 150 nm in length, and 100 nm in height relative to a 2.5 nm height for the CuO crystallites of the smooth film. Electric measurements of the studied devices revealed typical current–voltage characteristics of semiconductors with predominant hole conductivity. The maximum ON/OFF ratio at a drain-source voltage of 0.4 volts and −1.2 volts on the gate for a smooth film was 10^2, and for a nanostructured transistor, it was 10^3. However, a much stronger saturation of the channel was observed for the nanostructured channel than for the smooth film. A test solution containing glyphosate dissolved in deionized water in three different concentrations of 5, 10, and 15 µmol/L was used during the experiments. The principle of operation was based on the preliminary saturation of the solution with Cu ions, followed by the formation of a metal–organic complex alongside glyphate. The glyphosate contents in the analyte led to a decrease in the conductivity of the transistor on the axis of the smooth film. In turn, the opposite effect was observed on the nanostructured surface, i.e., an increase in conductivity was noted upon the introduction of an analyte. Despite this, the overall sensitivity of the nanostructured device was twice as high as that of the device with a thin film channel. The relative changes in the field-effect transistor (FET) conductivity at maximum glyphosate concentrations of 15 µmol/L reached 19.42% for the nanostructured CuO film and 3.3% for the smooth film.

Valentin Kosykh, Valdis Mizers, Eriks Sledevskis, Vjaceslavs Gerbreders, Irena Mihailova, Marina Krasovska

Daugavpils University, Parades Street 1a, Daugavpils valentinkosykh72@gmail.com, valdis.mizers@du.lv, eriks.sledevskis@du.lv, vjaceslavs.gerbreders@du.lv, irena.mihailova@du.lv, marina.krasovska@du.lv

METHODS FOR DETERMINING H2O2 IN LIQUIDS BASED ON IRON IONS

Title: Methods for determining H2O2 in liquids based on iron ions

The following topics are considered: the role of hydrogen peroxide in various areas of human life and science, methods for determining the amount of hydrogen peroxide, and the theory of the electrochemical reaction between hydrogen peroxide and iron oxide.

Iron oxide cyclometry plots were obtained and processed by adding small portions of hydrogen peroxide to a basic solution (0.15 mol/l NaOH in distilled water).

In this research, a sensor with a nanostructured Fe2O3 were studied. The purpose of this sensor is to detect and determine amount of hydrogen peroxide.

Attention was paid to the importance of determining hydrogen peroxide in various fields of human life: chemical, biological and health spheres.

This work can be used by researchers, students and teachers as additional literature in the process of studying physics.

Andrejs Ogurcovs [1], Kevon Kadiwala [1], Eriks Sledevskis [2], Marina Krasovska [2], Edgars Butanovs [1]

[1]Institute of Solid State Physics, University of Latvia, Kengaraga Street 8, LV-1063 Riga, Latvia, kevon.kadiwala@cfi.lu.lv, edgars.butanovs@cfi.lu.lv

[2]G. Liberts' Innovative Microscopy Centre, Department of Technology, Institute of Life Sciences andTechnology, Daugavpils University, Parades Street 1A, LV-5401 Daugavpils, Latvia, eriks.sledevskis@du.lv, marina.krasovska@du.lv

Correspondence: andrejs.ogurcovs@cfi.lu.lv

REACTIVE MAGNETRON DEPOSITION OF NICKEL OXIDE THIN FILMS FOR ELECTROLYTE-GATED THIN FILM TRANSISTORS

Nickel oxide (NiO) thin films have shown promising properties as the active material in electrolyte-gated thin film transistors (EG-TFTs) due to their high charge carrier mobility, optical transparency, wide band gap and good thermal and *chemical stability*. In this study, we investigate the deposition of NiO thin films by reactive magnetron sputtering for use in EG-TFTs. NiO thin films were deposited onto polyimide substrates using a reactive magnetron sputtering system with a metallic nickel target at power level of 500 W and an oxygen flow rate of 100 sccm, and argon flow of 20 sccm. After deposition the half of the prepared samples were annealed at 300 ^{o}C for 40 min at atmosphere. The films characterized by *X-ray photoelectron spectroscopy*, scanning electron microscopy, and atomic force microscopy. Electric properties characterized by two Keithley 2400 source-meter units. The resulting films found to be crystalline and uniform, with a thickness of around 45 nm. Phosphate buffered saline at concentration of 0.1 M used as an gate electrolyte during measurements. Non-annealed NiO FET's demonstrated ON/OFF ratio equal to 10^3, annealing improved ON/OFF ratio to 10^5. Our results show that reactive magnetron sputtering is a viable method for producing high-quality NiO thin films for application in EG-TFTs. The properties of the resulting films can be optimized by adjusting the deposition conditions, making NiO a promising candidate for future electronic applications.

Andrejs Sapkins

Daugavpils University, Parādes street 1, Daugavpils, nonzeroseven@gmail.com

VOLTAMMETRIC SENSOR BASED ON MICRO- AND NANOSTRUCTURES COBALT OXIDE FOR DETERMINATION IN H2O2 AQUEOUS SOLUTIONS

Created platforms are suggested to use them in order to create electrochemical sensors. An electrochemically active coating synthesis procedures was developed, that can be used to enhance electrode`s sensitivity and selectivity.

PSIHOLOĢIJA
≈
PSYCHOLOGY

Sergejs Andrejevs[1], Vitālijs Raščevskis[2]
[1]Daugavpils University, Parādes street 1, Daugavpils, sergejs193@gmail.com
[2]Daugavpils University, Parādes street 1, Daugavpils, wiras@inbox.lv

EMERGING ADULTHOOD RELATIONSHIPS BETWEEN PERCEIVED PARENT–CHILD RELATIONSHIP CLUSTERS AND IDENTITY STATUSES

The aim of the present study using person-centred approach distinguish perceived parent–child relationship clusters and explore relationships with identity statuses during emerging adulthood. Emerging adulthood is a development period in a person's life that stays between adolescence and adulthood. Emerging adults feeling themselves to be adults, often remain in the family home and continue to be financially dependent on their parents. Also, this period is characterized by a period of identity exploration thereby identity development. To study emerging adults and their parent's relationships used Perceptions of Parents Scales (POPS) the College-Student Scale measured the following 6 subscales: mother and father Autonomy Support, mother and father Involvement, and mother and father Warmth. Identity was measured using The Dimensions of Identity Development Scale (DIDS) that explores identity by following identity dimensions: Commitment making, Identification with commitment, Exploration in breadth, Exploration in depth (Reflective exploration in depth and Reconsideration of commitment) and Ruminative exploration. Based on dimensions it is possible to distinguish identity statuses – Diffusion, Moratorium, Foreclosures and Achievement. The study included emerging adults (total N = 56, 83,9% women) aged between 18–29 (M = 22,07, SD = 2,82). For the creation of perceived parent–child relationship clusters and identity statuses were used two-step cluster analyses. In the first step, a hierarchical cluster analysis was carried out using Ward's method and in the second step k-means clustering procedure. In the end were distinguished perceived parent–child relationship clusters - high quality family relationships (HQ), low quality family relationships (LQ), high mother quality family relationships (MHQ) and non-differentiated. Regarding relationships to identity statuses - Foreclosure identity status respondents were not found in low quality family relationships and individuals who were placed in achievement identity status had high quality family relationships.
Keywords: Emerging adulthood, family relationships, identity dimensions, identity statuses.

Evija Nagle[1], Solveiga Blumberga[2], Ingūna Griškēviča[1], Sandra Mihailova[1]
[1]Riga Stradiņš University, 16 Dzirciema Str., Riga, Latvia
[2]RISEBA, University of Applied Sciences, 3 Meža Str., Riga, Latvia

VESELĪBAS APRŪPES DARBINIEKU PROFESIONĀLĀ DEFORMĀCIJA: IZDEGŠANAS LĪMENIS COVID – 19 PANDĒMIJAS LAIKĀ

Adaptācijas problēmu sekas rada negatīvas izmaiņas indivīda rīcībā – profesionālās darbības efektivitātes samazināšanās, agresija, motivācijas samazināšanās veikt savu darba pienākumus, destruktīvas personības izmaiņas, psihosomatiskas slimības. Veselības aprūpes sistēmā palielinās risks nekvalitatīva veselības aprūpes pakalpojuma sniegšanai. Profesionālā deformācija vecina ārstniecības personu psihiskās veselības pasliktināšanos, radot emocionālu un fizisku izdegšanu. Šī pētījuma mērķis bija izpētīt ārstniecības personu profesionālo deformāciju un tās saistību ar izdegšanu vienā no Latvijas slimnīcām. Pētījuma izlases respondenti (n=195) – bija ārsti, rezidenti, medicīnas māsas, ārstu palīgi. Šajā šķērsgriezuma pētījumā profesionālās deformācijas noteikšanai tikai izmantota autores izveidota aptauja, kur tik izdalītas 4 apakšskalas: agresija, autoritārisms, demonstrativitāte un konservatīvisms. Izdegšana tika pētīta izmantojot MBI (Maslach Burnout Inventory) aptauju. Aptaujas rezultāti uzrāda augstu emocionālu izsīkumu, vidējā līmeņa depersonalizāciju un personīgo sasniegumu redukciju zemu līmeni. Profesionālās deformācijas

rezultāti uzrāda, ka 24 % respondentiem ir novērojama agresija profesionālajā darbībā. Autoritārisms novērojams 16%, demonstrativitāte 28%, profesionālā deformācija izpaužas kā konservatīvisms 17% ārstniecības personām. Novērota pozitīvā korelācija sekojošās skalās: agresija - emocionālais izsīkums r =0,320, p < 0,000, agresija un depersonalizācija r = 0,417, p <0,000, demonstrativitāte un personīgo sasniegumu redukcija r = 0,293, p < 0,000, konservatīvisms un emocionālais izsīkums r = 0,246, p < 0,001, konservatīvisms un depersonalizācija r = 0,297, p < 0,000. Nozīmīga negatīvā korelācijas novērojama demonstrativitāte un emocionālais izsīkums: r = -0,141, p < 0,050. Iegūtie rezultāti izceļ Covid - 19 pandēmijas laikā radīto paaugstinātu emocionālo izdegšanu un izteikto profesionālo deformāciju ārstniecības personām. Nopietni ir jāapsver preventīvu pasākumu kopums, lai maksimāli samazinātu profesionālās deformācijas un emocionālās izdegšanas tendences ārstniecības personām, kā arī veicināt veselības sistēmas efektivitāti.
Atslēgvārdi: *Profesionālā deformācija, izdegšana, veselības aprūpes darbinieki.*