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# THE BOOK OF ABSTRACTS

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## **TABLE OF CONTENTS**

### **HUMANITIES SCIENCES PRESENTATIONS**

<b>Jerzy Chojecki</b> THE IMPACT OF GLOBALIZATION ON HUMAN RESOURCES MANAGEMENT IN THE TOURISM SECTOR	8
<b>Weronika Przyboś, Wiktoria Schabowska</b> KUPALA NIGHT AT THE RZESZÓW REGION. BETWEEN THE TRADITION AND CONTEMPORANEITY ....	9
<b>Leon Tabor</b> CRUCIAL ASPECTS IN DESIGNING FOR THE PEOPLE WITH VISUAL DISABILITIES .....	10

### **HUMANITIES SCIENCES POSTERS**

<b>Kamil Kulas</b> GENERATION Z AND ENVIRONMENTAL AWARENESS – A REVIEW OF SECONDARY RESEARCH .....	12
<b>Brygida Stanek</b> THE IDEA OF A CIRCULAR ECONOMY AND THE PHENOMENON OF GREENWASHING AS PERCEIVED BY CONSUMERS .....	13

### **MEDICAL SCIENCES PRESENTATIONS**

<b>Anna Glinkowska</b> FLAVONOIDS IN MEDICINE – A REVIEW OF SELECTED FLAVONOIDS IN THERAPIES .....	15
<b>Tomasz Klaudel, Jakub Sadowski, Michał Sikorski, Michał Pelczarski, Agnieszka Rombel-Bryzek</b> REVIEW OF THE LITERATURE – CURRENT STATE OF KNOWLEDGE ABOUT GAUCHER'S DISEASE .....	16
<b>Kinga Kogut</b> HEALTH TOURISM OFFER IN RURAL AREAS IN THE PODKARPACKIE VOIVODESHIP .....	17
<b>Adrianna Liedke</b> UNUSUAL ACCOMMODATION FACILITIES AS A TOURIST ATTRACTION BASED ON SELECTED EXAMPLES FROM POLAND .....	18
<b>Olga Paprzycka</b> MICRORNAS IN UNDERSTANDING THE ETIOLOGY AND TREATMENT OF DEPRESSION .....	19
<b>Michał Pelczarski, Michał Sikorski, Jakub Sadowski, Tomasz Klaudel, Agnieszka Rombel-Bryzek</b> LITERATURE REVIEW, SUMMARY OF KNOWLEDGE ABOUT GUILLAIN-BARRÉ SYNDROME .....	20
<b>Jakub Sadowski, Tomasz Klaudel, Michał Sikorski, Michał Pelczarski, Agnieszka Rombel-Bryzek</b> THE CURRENT STATE OF KNOWLEDGE ABOUT POMPE DISEASE – TYPE II GLYCOGENOSIS .....	21
<b>Michał Sikorski, Michał Pelczarski, Tomasz Klaudel, Jakub Sadowski, Agnieszka Rombel-Bryzek</b> BRUGADA SYNDROME – DIAGNOSIS AND TREATMENT .....	22
<b>Małgorzata Stulin</b> PHYSICAL RECREATION IN THE PREVENTION OF CIVILIZATION DISEASES – THE ROLE AND IMPORTANCE AMONG YOUTH FROM SECONDARY SCHOOLS IN RZESZÓW .....	23
<b>Bartosz Twarowski, Mariola Herbet</b> THE ROLE OF OXIDATIVE STRESS IN ALZHEIMER'S DISEASE .....	24
<b>Jan Wieczorek</b> NEW DISCOVERIES IN METHODS OF EXAMINING AND THE SOURCES OF PRIONS .....	25



10 th edition  
National Scientific Conference  
"e-FACTORY OF SCIENCE"  
November 25, 2023

<b>Julia Ziemińska, Anna Zielińska, Magdalena Zapalska, Małgorzata Koziol</b> ANALYSIS OF POTENTIAL FACTORS INFLUENCING ON THE NUMBER OF NEW PERTUSSIS CASES IN POLAND .....	26
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## MEDICAL SCIENCES POSTERS

<b>Małgorzata Belczyk, Małgorzata Knapik-Czajka, Jagoda Drąg, Anna Gawędzka</b> EFFECT OF ATORVASTATIN AND CHOLESTEROL-ENRICHED DIET ON RENAL A-KETOGLUTARATE DEHYDROGENASE COMPLEX (A-KGDH) IN RATS .....	28
<b>Joanna Burzyńska</b> HEALTH-RELATED SOCIAL MEDIA USE – ASSOCIATION WITH SOCIODEMOGRAPHIC VARIABLES AMONG ADULT USERS .....	29
<b>Sabina Galiniak, Marek Biesiadecki, Marta Rachel</b> THE ROLE OF OXIDATIVE STRESS IN ATOPIC DERMATITIS .....	30
<b>Magdalena Janczura</b> ARE SGLT-2 INHIBITORS NEW HYPERTENSION DRUGS? .....	31
<b>Ada Kaczmarek, Kamila Sieradocha, Mariusz Dotka, Wiktoria Jedlikowska, Natalia Strzyżewska, Beata Begier-Kraśnińska, Bogna Gryszczyńska</b> OXIDATIVELY MODIFIED PROTEIN PRODUCTS AND LIPID PEROXIDATION PRODUCTS IN HYPERTENSIVE PATIENTS .....	32
<b>Ada Kaczmarek, Katarzyna Plagens-Rotman, Grażyna Jarząbek-Bielecka, Małgorzata Mizgier</b> THE ROLE OF A FAMILY DOCTOR AND GYNECOLOGIST IN THE CARE OF A WOMAN .....	33
<b>Natalia Kubryń, Adrianna Witczyńska, Łukasz Fijałkowski, Alicja Nowaczyk</b> ASPIRIN REPOSITIONING .....	34
<b>Monika Kuśmierz-Wojtasik, Agnieszka Kuligowska, Anna Machalińska</b> COMPARATIVE ANALYSIS OF CORNEAL PARAMETERS IN SWEEP-SOURCE IMAGING BETWEEN DMEK AND UT-DSAEK EYES .....	35
<b>Michał Markowski, Zuzanna Czarnomska, Agnieszka Pietrosiuk</b> USE OF BIOLUMINESCENT REPORTER SYSTEM IN CRISPR/CAS9 SILENCING COMPETITIVE CAFFEIC ACID BIOSYNTHETIC PATHWAYS IN NICOTIANA TABACUM PLANTS .....	36
<b>Krzysztof Pociecha, Katarzyna Zięba, Małgorzata Szafarz, Grażyna Chłoń-Rzepa</b> MICROSOMAL HALF-LIFE AND INTRINSIC CLEARANCE OF NOVEL XANTHINE DERIVATIVES - PDE 4/7/8 INHIBITORS .....	37
<b>Janina Rzeszot</b> THE IMPACT OF SURROUNDING CONDITIONS ON THE PATIENT IN HOME PHYSIOTHERAPY .....	38

## TECHNICAL AND NATURAL SCIENCES PRESENTATIONS

<b>Radosław Mirski, Bartosz Bezubik, Dariusz Joka, Dorota Dziurka</b> TECHNOLOGICAL CHANGES APPLIED BY BIAFORM SA IN PRODUCING NON-STANDARD PLYWOOD FOR SPECIALISED APPLICATIONS IN THE CONSTRUCTION AND AUTOMOTIVE SECTORS .....	40
<b>Władysław Blocki, Wojciech Gołędzinowski</b> APPLICATION OF GRAPH THEORY TO THE ANALYSIS OF HIGH VOLTAGE POWER NETWORKS .....	41
<b>Wojciech Cież</b> UNI-BUS SYSTEM BY ELPLANT SP. Z O. O. AS AN EXAMPLE INNOVATION, INTUITIVENESS AND EFFICIENCY IN AGRICULTURE .....	42





<b>Jerzy Dorobisz</b> APPLICATION OF ARTIFICIAL INTELLIGENCE IN MILITARY APPLICATIONS .....	43
<b>Marta Durska</b> MELANOPHROMA IN AXOLOTL (AMBYSTOMA MEXICANUM) – A CASE STUDY .....	44
<b>Ewelina Godek, Elżbieta Grządka</b> COMPARISON OF THE INFLUENCE OF CATIONIC CELLULOSE ON STABILITY OF THE AQUEOUS SUSPENSIONS OF MONTMORILLONITE, HALLOYSITE AND BENTONITE .....	45
<b>Wojciech Goledzinowski, Władysław Blocki</b> NEW MEDIA TODAY. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON COMMUNICATION .....	46
<b>Weronika Jabłońska, Aleksandra Kalińska, Magdalena Kot, Marcin Gołębiewski</b> COMPARISON OF ANTIMICROBIAL PROPERTIES OF SINGLE TYPES OF NANOPARTICLES AND THEIR COMPLEXES AGAINST RARELY ISOLATED MASTITIS PATHOGENS OF PROTOTHECA SP. GENUS AND KLUYVEROMYCES MARXIANUS .....	47
<b>Jakub Jarecki</b> PSYCHOLOGY OF GAMES: RESEARCH ON THE IMPACT OF GAMES ON BEHAVIOR AND PLAYER DEVELOPMENT .....	48
<b>Jędrzej Fulara, Marcin Kamionowski, Michał Kręglewski, Kornel Kania</b> SPARKSENSE – SMART CAMERA FOR CONTEXTUAL DRIVING ASSESSMENT .....	49
<b>Vitaliy Kolotylo</b> PRODUCTION OF MICROBIAL TRANSGLUTAMINASE IN A MEDIUM SUPPLEMENTED WITH CORN STEEP LIQUOR BY STREPTOVERTICILLIUM CINNAMONEUM .....	50
<b>Patryk Korban</b> COMPARISON OF INERT GAS REFINING PROCESS PARAMETERS ON COMPRESSIVE STRENGTH OF EN AN 44200 AND 46000 ALLOYS .....	51
<b>Julia Korczyk</b> COMPARATIVE ANALYSIS OF SLEEP IN SELECTED GROUPS OF ANIMALS .....	52
<b>Mateusz Kosyl</b> MATERIALS WITH INCREASED FIRE RESISTANCE USED IN IOT SYSTEMS WITH THE FUNCTION OF DETECTING VIOLATION OF THE INTEGRITY OF FIRE PROTECTION OF SERVICE PENETRATIONS .....	53
<b>Anna Łapeta, Anna Olejnik</b> IN VITRO EVALUATION OF UV FILTER PERMEABILITY .....	54
<b>Przemysław Mazurek, Krzysztof Maruszewski</b> ENERGY SAVING STRATEGIES IN TELEMATICS DEVICES .....	55
<b>Adrianna Michniewicz</b> SUBCUTANEOUS TISSUE INFLAMMATION IN DOMESTIC ANIMALS: LITERATURE REVIEW AND CLINICAL CASE DESCRIPTION .....	56
<b>Aleksandra Orlef, Joanna Mazurkiewicz, Aleksandra Wajda, Agnieszka Kaczor</b> CHIROPTICAL SPECTROSCOPES AS A METHOD TO STUDY ENCAPSULATION PROCESS OF ACTIVE COMPUND IN NANOPARTICLES .....	57
<b>Robert Pacan, Izabela Puchyrska, Piotr Sacha</b> DEVELOPMENT OF TECHNOLOGY FOR CERAMIC TILES WITH AN ANTIBACTERIAL NANO-AG BASED FUNCTIONAL COATING .....	58
<b>Natalia Pietrzkowska, Dagmara Wężyk</b> APTAMER-BASED SOLUTION TO PREVENT THE DEVELOPMENT OF ACUTE KIDNEY INJURY IN DOGS INFECTED WITH BABESIA CANIS .....	59

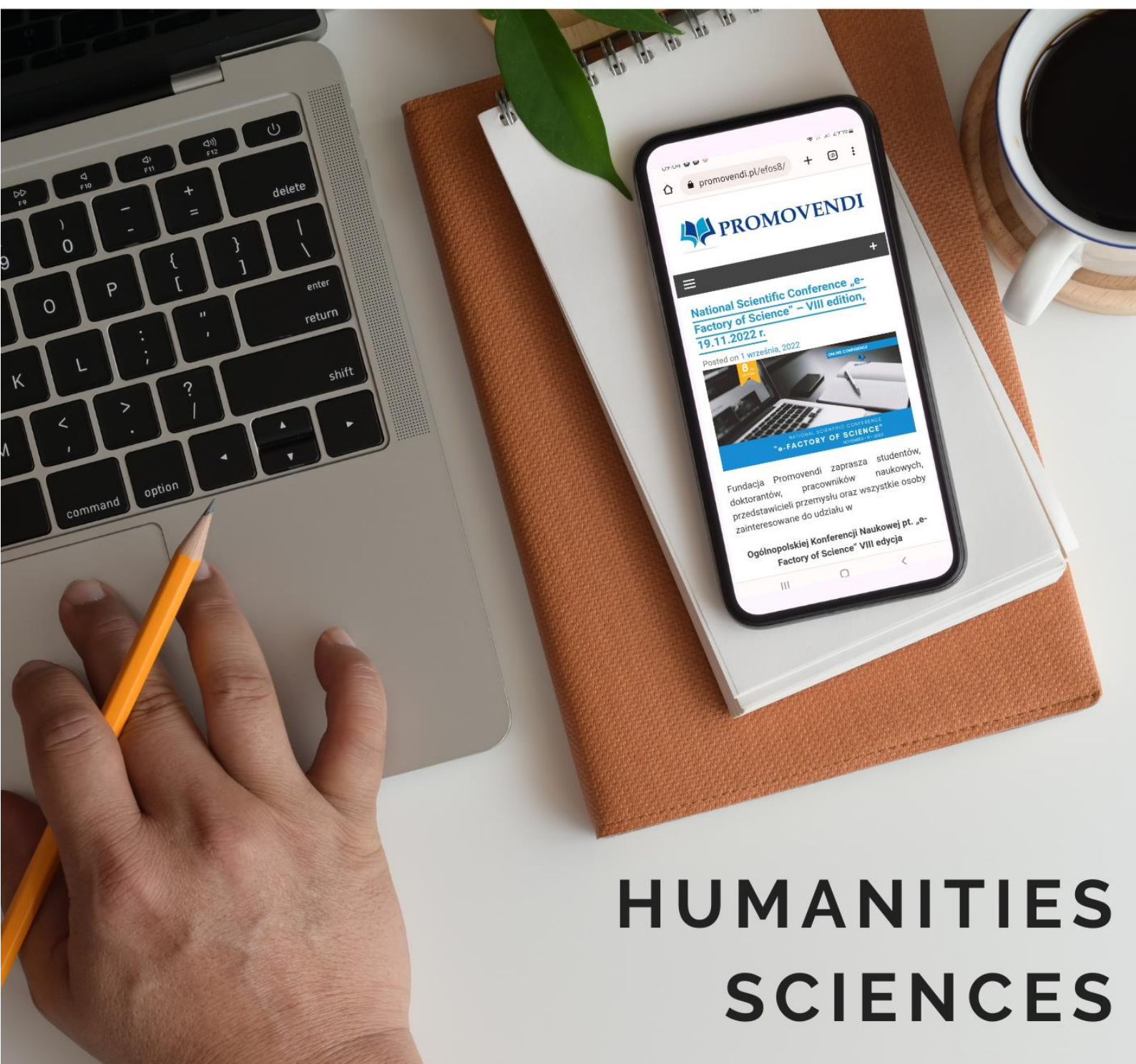


<b>Regina Przywara, Mateusz Przywara, Wojciech Zapala</b> RETENTION ANALYSIS OF TEST SUBSTANCES ON AN AMINE COLUMN .....	60
<b>Wioletta Sęk</b> THE INFLUENCE OF INORGANIC SELENIUM ON THE PHYSIOLOGICAL ACTIVITY OF SACCHAROMYCES CEREVISIAE AND RHODOTORULA GLUTINIS YEAST CELLS .....	61
<b>Hanna Smolej</b> FUTURE OF MUSIC COMPOSING WITH THE USE OF AI TOOLS .....	62
<b>Szymon Sobieraj</b> APPLICATION OF ARTIFICIAL INTELLIGENCE IN COMPUTER GRAPHICS .....	63
<b>Jakub Sulkowski</b> HOW VIDEO GAMES MAKE OUR LIVES EASIER .....	64
<b>Kamil Szot</b> ARTIFICIAL GENERAL INTELLIGENCE: HOW CLOSE ARE WE TO ACHIEVING THIS GOAL? .....	65
<b>Rafał Toczko</b> ECONOMIC AND HEALTH-PROMOTING IMPORTANCE OF OATS (AVENA SATIVA) .....	66
<b>Kamil Załęski</b> EVALUATING THE TRANSFORMATION OF WEB DEVELOPMENT PARADIGMS: CATALYSTS OF EFFICIENCY IN CLOUD ARCHITECTURES VIA SERVERLESS TECHNOLOGY INTEGRATION .....	67
<b>Anna Zdubek, Irena Maliszewska</b> THE USE OF METHYLENE BLUE IN THE PHOTODYNAMIC INACTIVATION O PROTEUS MIRABILIS .....	68

## TECHNICAL AND NATURAL SCIENCES POSTERS

<b>Paweł Głowacki, Anna Łowisz-Soból, Marta Kutyna-Bakalarska</b> RESEARCH AND DEVELOPMENT ON THE CREATION OF HIGH-QUALITY EXTRUDED FUNCTIONAL FOOD BASED ON AN INNOVATIVE TECHNOLOGICAL PROCESS ENSURING AN INCREASE IN THE NUTRITIONAL VALUE OF OBTAINED PRODUCTS .....	70
<b>Joanna Korzeniewska, Barbara Burnat</b> MICROSCOPIC AND ELECTROCHEMICAL CHARACTERIZATION OF SILVER NANOPARTICLES PHOTODEPOSITED ONTO ANATASE COATING .....	71
<b>Piotr Lewko, Magdalena Szydłowska-Tutaj</b> ASSESSMENT OF THE TECHNOLOGICAL SUITABILITY OF SEMOLINA OBTAINED FROM POLISH DURUM WHEAT CROPS .....	72
<b>Sławomir Napiórkowski, Katarzyna Zielińska, Bogusław Tkacz, Beata Wąsik, Przemysław Bartoszewicz, Beata Koreń-Szwarc</b> TECHNOLOGY OF OBTAINING BISPHENOL TMC MODIFIER OF INNOVATIVE POLYCARBONATES .....	73
<b>Katarzyna Nejman, Anna Brillowska-Dąbrowska, Łukasz Zedler, Agnieszka Pladzyk</b> ASSESSMENT OF THE ABILITY OF CANDIDA SUBHASHII TO BIODEGRADE POLYOCTENAMER .....	74

# ABSTRACTS OF PRESENTATIONS



## HUMANITIES SCIENCES





## **THE IMPACT OF GLOBALIZATION ON HUMAN RESOURCES MANAGEMENT IN THE TOURISM SECTOR**

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### **A few words about the author(s):**

The author is a soldier of the Polish Army and a PhD student at the Academy of The War Studies University in Warsaw. His scientific interests include human resources management, globalization processes and state security.

### **Abstract:**

The 21st century is a period of intensification of globalization processes around the world, which covered all sectors of the economy. Every day, more and more international enterprises are established using global resources, including human resources. Due to the cross-border nature of many enterprises, standardization of the services provided has become a significant trend. However, globalization does not impose only one form of a given product on consumers. Technological development also results in easy access to a wide range of products from around the world. Entrepreneurs who want to expand internationally as much as possible must offer each consumer a product or service that meets their expectations. The tourism sector has also been forced to assimilate to the conditions created by globalization. This applies in particular to the aspect of human resources management, which is the foundation for the proper functioning of every enterprise in the tourism industry. The greatest challenges faced by tourism companies in the context of human resources management include: multiculturalism, global competition, increasing quality requirements set by consumers, technological development and turnover of specialized staff. Efficient human resources management, taking into account the evolutionary nature of globalization and the cross-border nature of the tourism industry, determines the company's success.

### **Keywords:**

human resources management, tourism, globalization, international enterprises, global market



## **KUPALA NIGHT AT THE RZESZÓW REGION. BETWEEN THE TRADITION AND CONTEMPORANEITY**

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### **A few words about the author(s):**

Raised in a small village. Social activist, feminist and volunteer. Student of Tourism and foundern of Equality Students' Club. Privately, a lover of art, hospitality and plant mom. She most appreciates a good book, coffee, star gazing and her cat.

### **Abstract:**

The above work describes and analyses contemporary sobórki organised in the Rzeszow region. It is an old Polish ritual, typically Slavic, dating back to the times of the Proto-Slavs. It contains Slavic elements such as cults of fire, water, nature; emerging divine figures from Slavic mythology such as Weles, Perun, Łado, Kupala; classic elements of Slavic culture. Today, the rite has a new version - a Christian one - which excludes some traditional components, changing the meaning, time, name, appearance and course of the spectacle. The differences between the Christian and pagan versions of the ritual are noticeable and obvious. The aim of my work will be to analyse these factors and describe the modern sobórka. The main research problems are: "What does today's sobórka look like?", "How does it differ from the traditional Kupala night ?", "What functions does it perform"? In order to answer these, representative modern sobórka events in the Rzeszow region will be analysed and the final conclusions of the work will be included.

### **Keywords:**

tradition, slavic, culture, subcarpathia



## **CRUCIAL ASPECTS IN DESIGNING FOR THE PEOPLE WITH VISUAL DISABILITIES**

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### **A few words about the author(s):**

I am a design student, my field of interest is the influence of culture on design, pro-social design and sustainable design.

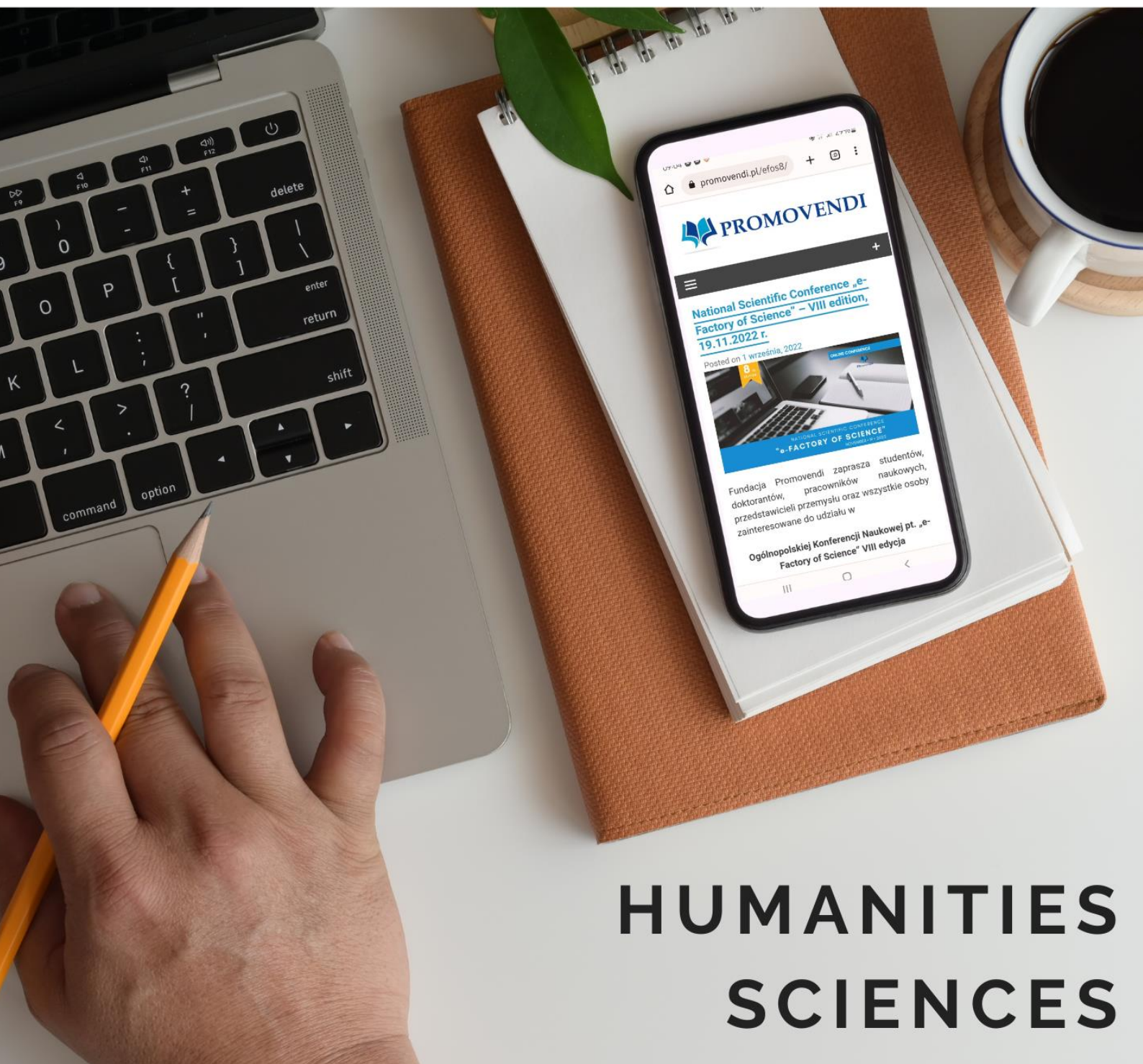
### **Abstract:**

Designing for the people with visual disabilities is an area that presents many challenges, while being closely linked to growing public awareness. The presentation will discuss in detail the key issues related to inclusive and universal design for this group of people.

### **Keywords:**

design, visual, disabilities, aspects

# ABSTRACTS OF POSTERS



## HUMANITIES SCIENCES





## **GENERATION Z AND ENVIRONMENTAL AWARENESS – A REVIEW OF SECONDARY RESEARCH**

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### **A few words about the author(s):**

I am a management and production engineering student at Poznan University of Economics and Business. My research mainly focuses on the topic of sustainable development and sustainable consumption among younger generations.

### **Abstract:**

Younger generations, especially Generation Z, represent the future of our world. They will be the ones most profoundly affected by the consequences of environmentally unsustainable actions taken by older generations. Therefore, the aim of this study is to analyze the environmental awareness among Generation Z representatives and determine the role this age group plays in shaping a more environmentally friendly future.

The research methodology is based on the analysis of available literature and reports related to this subject. The results reveal that Generation Z prefers eco-friendly products and services, expecting responsible environmental practices from companies. Furthermore, members of Generation Z oppose traditional forms of transportation, opting for more environmentally friendly alternatives to minimize their carbon footprint. Research findings unequivocally confirm that Generation Z is characterized by a particularly broad ecological awareness, which influences their consumer choices and expectations of businesses. Representatives of Generation Z are pioneers of environmental protection, and therefore, companies should incorporate their values into their business strategies.

### **Keywords:**

environmental awareness, Generation Z, sustainability, environment protection



## **THE IDEA OF A CIRCULAR ECONOMY AND THE PHENOMENON OF GREENWASHING AS PERCEIVED BY CONSUMERS**

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### **A few words about the author(s):**

I am management and production engineering student and I have been a member of the Qualitas student research club. I am interested in the topic of the closed loop economy in the clothing industry.

### **Abstract:**

Consumer awareness of environmental care is growing. More and more products with the word 'organic' on the label are appearing on shop shelves. There is more and more talk of a circular economy, especially in the clothing sector. Well-known fashion brands declare their desire to make a positive impact on the environment and organise second-hand clothing collections. On the other hand, greenwashing is a growing phenomenon. Companies mislead consumers by suggesting that a product is green. Consumers' lack of knowledge on this subject can contribute to supporting brands that want to increase sales without thinking or caring about the environment. This study aims to assess consumer awareness of greenwashing and the circular economy.

### **Keywords:**

circular economy, greenwashing, environment

# ABSTRACTS OF PRESENTATIONS



## MEDICAL SCIENCES



## **FLAVONOIDS IN MEDICINE – A REVIEW OF SELECTED FLAVONOIDS IN THERAPIES**

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Doctoral Student at the Doctoral School in Discipline of Medical Sciences at the Medical University of Silesia in Katowice. A medical biotechnologist by profession. Most interested in toxicology, microbiology, surgery and experimental medicine.

### **Abstract:**

Flavonoids are organic compounds of plant origin from the group of polyphenols. They have been of interest to scientists around the world for centuries. They aroused the greatest interest only in the last century, and it was then that scientists began to appreciate their healing or treatment-supporting properties.

Their most promising features are: antioxidant, antiallergic, anti-inflammatory, anticancer, antibacterial, antiviral, antifungal and many other activities. Flavonoids tested for use in medicine and pharmacy.

The aim of this work is to review flavonoids in terms of their healing and treatment-supporting effects in medicine.

### **Keywords:**

flavonoids, therapy, cancer, microbiology





## **REVIEW OF THE LITERATURE – CURRENT STATE OF KNOWLEDGE ABOUT GAUCHER'S DISEASE**

**Tomasz Klaudel (1)\*, Jakub Sadowski (1), Michał Sikorski (1), Michał Pelczarski (1),  
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Tomasz Klaudel – student scientific society at institute of medical sciences. Agnieszka Rombel-Bryzek – doctor in biological sciences, assistant in Department of Clinical Biochemistry and Laboratory Diagnostics University of Opole.

### **Abstract:**

The aim of this study is to summarize the current state of knowledge about Gaucher disease. Focusing on the characteristics of the materials and methods used as well as the results obtained and conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed, Embase and Google Scholar. The work particularly focuses on the pathogenesis of the above phenomenon, taking into account differential diagnosis and therapeutic procedures depending on the type of disease and leading symptoms.

### **Keywords:**

Gaucher disease, type 1, 2, 3, chitotriosidase, CCL18, glucosylsphingosine



## **HEALTH TOURISM OFFER IN RURAL AREAS IN THE PODKARPACIE VOIVODESHIP**

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### **A few words about the author(s):**

Student of Tourism and Recreation at University of Rzeszów, member of the Student Scientific Circle of Travellers.

### **Abstract:**

Rural tourism is one form of alternative tourism, and leisure closer to nature can cause more benefits to local people and tourism entrepreneurs. Health tourism is a fast-growing global market sector. The purpose of this paper is to present the importance of health tourism, with a special focus on agritourism farms and spas, as well as contemporary trends in the development of agritourism farms in Podkarpacie. The way to gain knowledge from the designated area was to use various indirect sources. Health tourism has as its main goal the improvement of health, the improvement of psycho-physical condition and the slowing down of the formation of new diseases. Based on an analysis of the literature on the subject, agritourism is defined as a form of recreation that takes place in rural areas. Spa tourism is a form of health tourism and is an element of the tourism market listed by motivation for tourism. Spa tourism in Podkarpacie is constantly developing, and the proposed treatment programs are tailored to the needs of customers. The potential of the health tourism offer in rural areas in Podkarpacie is satisfactory, and health tourism itself, due to its favorable natural and health values, has great opportunities for development. However, one area is worth noting – namely advertising, as many farms have a rich offer, but do not have a proper website, let alone advertising.

### **Keywords:**

tourism, health tourism, health, leisure



## **UNUSUAL ACCOMMODATION FACILITIES AS A TOURIST ATTRACTION BASED ON SELECTED EXAMPLES FROM POLAND**

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Student of the University of Rzeszow, member of the student scientific association of travellers.

### **Abstract:**

The contemporary tourist market is becoming increasingly diverse and demanding, and the popularity of atypical accommodation facilities is growing as they offer unforgettable experiences and emotions.

The aim of this study is to find out the respondents' opinions on atypical accommodation facilities, to find out their preferences for accommodation and to investigate whether such facilities can be a tourist attraction.

Materials were collected from the literature on the subject, scientific articles and articles from websites. The study was conducted by means of a diagnostic survey, the research technique was surveying and a questionnaire with 16 questions was used as the research tool. A total of 101 people took part in the survey, these were mainly people from the thematic groups of the community platform.

Almost all respondents thought that an unusual accommodation facility could be an attraction. More than half had not stayed in such a facility, but the vast majority show a desire to do so. Hotels have long ceased to be just an element of tourist development and are an equal component of the whole holiday experience of the tourist. On the other hand, following Ziółkowska-Weiss's study, the uniqueness and originality of the facility, determines the choice of accommodation to the greatest extent, as answered by 43.2% of the respondents.

An atypical accommodation facility can be an attraction and destination as travellers seek new experiences.

### **Keywords:**

unusual accommodation, hotel, accommodation, tourist attraction



## **MICRORNAS IN UNDERSTANDING THE ETIOLOGY AND TREATMENT OF DEPRESSION**

**Olga Paprzycka**

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### **A few words about the author(s):**

Olga Paprzycka is a master's student at the Medical University of Silesia in Katowice. She is a member of the scientific circle of the Department of Molecular Biology. She is an active participant in conferences and scientific publications.

### **Abstract:**

Major depressive disorder is an evolving lifestyle disease. It is known that the disease is influenced by environmental and genetic factors, but the etiology is not fully known. In recent years, more and more attention has been paid to examining the level of microRNA (micro ribonucleic acid) in sick people and searching for potential molecular biomarkers that can be used as a diagnostic tool. MicroRNAs are short, non-coding nucleic acids capable of degrading messenger RNA and repressing the translation process. It has been shown that a decrease or increase in the expression of appropriate miRNAs affects neurotransmission, neurogenesis, neuroplasticity and dysregulation of inflammatory processes and the hypothalamic-pituitary-adrenal axis (HPA). Interestingly, miRNAs extracted from blood samples of depressed patients have been reported to have diagnostic potential. Correlations were also observed between the treatment used and the miRNA level in patients' blood, which suggests the possibility of using miRNA as a therapeutic marker. In conclusion, miRNA shows great diagnostic and therapeutic potential, however, more research needs to be performed to use miRNA in clinical practice.

### **Keywords:**

microRNA, mental disorders, depression, molecular biology





## **LITERATURE REVIEW, SUMMARY OF KNOWLEDGE ABOUT GUILLAIN-BARRÉ SYNDROME**

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Michał Pelczarski – student scientific society at institute of medical sciences. Agnieszka Rombel-Bryzek – doctor in biological sciences, assistant in Department of Clinical Biochemistry and Laboratory Diagnostics University of Opole.

### **Abstract:**

The aim of this study is to review and summarize the current state of knowledge about Guillain-Barré syndrome (GBS – Guillain-Barré syndrome) – the most commonly acquired polyneuropathy. Considering the characteristics of the materials and methods included and the results obtained leading to the conclusions stated in each article, a systematic literature review was conducted using databases: PubMed, Elsevir and Google Scholar. The work particularly focuses on the etiology and pathogenesis of the aforementioned phenomenon, including: diagnosis, etiology, differential diagnosis, and therapeutic procedures depending on the clinical course.

### **Keywords:**

Guillain-Barré syndrome, immunoglobulins, neuromuscular paresis



## **THE CURRENT STATE OF KNOWLEDGE ABOUT POMPE DISEASE – TYPE II GLYCOGENOSIS**

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### **Abstract:**

The aim of this study is to summarize the current state of knowledge about type II glycogenosis – Pompe disease. Focusing on the characteristics of the materials and methods used as well as the results obtained and conclusions contained in each article, a systematic literature review was conducted using the following databases: PubMed, Elsevier, Embase and Google Scholar. The work particularly focuses on the pathogenesis of the above phenomenon, taking into account differential diagnosis and therapeutic procedures depending on the type of disease and leading symptoms.

### **Keywords:**

Pompe disease, type II glycogenosis, pathomechanism of Pompe disease



## **BRUGADA SYNDROME – DIAGNOSIS AND TREATMENT**

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Michał Sikorski – student scientific society at institute of medical sciences. Agnieszka Rombel-Bryzek – doctor in biological sciences, assistant in Department of Clinical Biochemistry and Laboratory Diagnostics University of Opole.

### **Abstract:**

The aim of this study is to review and summarize the current state of knowledge about Brugada syndrome, which is a rare hereditary arrhythmia syndrome that leads to an increased risk of sudden cardiac death. It is characterized by typical ECG changes in right precordial leads and a tendency toward life-threatening ventricular tachyarrhythmias. The genetic abnormality involves the SCN5A gene, which encodes proteins of ion channels, therefore Brugada syndrome is classified as a channelopathy, which is not associated with concomitant structural changes of the heart. ECG changes can occur spontaneously, or be triggered by a pharmacological trial with a class I antiarrhythmic drug. The only effective method of preventing life-threatening ventricular tachyarrhythmias and sudden cardiac death is implantation of a cardioverter-defibrillator.

### **Keywords:**

Brugada syndrome, Sudden cardiac death, Arrhythmia



## **PHYSICAL RECREATION IN THE PREVENTION OF CIVILIZATION DISEASES – THE ROLE AND IMPORTANCE AMONG YOUTH FROM SECONDARY SCHOOLS IN RZESZOW**

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### **A few words about the author(s):**

I am a student of Tourism and Recreation. I am a member of the Student Scientific Club "Travelers".

### **Abstract:**

The essence of this work is to present the subject of physical activity and how it affects the health of young people. The aim of this thesis was to determine the role and importance of physical recreation in the prevention of civilization diseases among high school students in Rzeszów. The author performed research in secondary schools in Rzeszów, using the survey method. The surveys were conducted between the second and third week of April. 100 respondents replied. The analysis shows that physical recreation plays an important role among young people. However, the level of knowledge about civilization diseases was described by the respondents as average. The creator of the work proved that physical recreation has a huge impact on health.

### **Keywords:**

physical recreation, civilization diseases, secondary school





## THE ROLE OF OXIDATIVE STRESS IN ALZHEIMER'S DISEASE

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### **A few words about the author(s):**

The presentation is a continuity of previous work of Authors.

### **Abstract:**

Reactive oxygen species (ROS) and reactive nitrogen species (RNS) are by-products of metabolism, excessive concentrations of which in cells can lead to the development of oxidative stress. Disruption of the intracellular redox balance leads to disruption of intracellular homeostasis, resulting in cell and tissue damage. Oxidative stress is one of many mechanisms leading to the development of neurodegenerative diseases. Excess oxygen free radicals can modify proteins, such as beta-amyloid peptides, can damage structures inside brain cells and even cause cell death. Damage to nerve cells underlies the development of Alzheimer's disease, the most common form of senile dementia, characterized by progressive memory loss and cognitive impairment. A better understanding of the mechanisms of development and consequences of oxidative stress may enable a more thorough understanding of the mechanisms of neurodegeneration, and thus could become the basis for developing effective treatments for Alzheimer's disease, which would significantly contribute to improving patients' lives.

### **Keywords:**

oxidative stress, neurodegeneration, reactive oxygen species (ROS), Alzheimer's disease



## **NEW DISCOVERIES IN METHODS OF EXAMINING AND THE SOURCES OF PRIONS**

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### **A few words about the author(s):**

Student of medical biotechnology at the pharmacy department of the Medical University of Silesia.

### **Abstract:**

Prions are disease-causing molecules that, despite advances in medicine, continue to induce incurable and fatal neurodegenerative diseases. The process of de novo prion formation remains poorly understood. Traditionally, it was believed to occur only in cases of rare mutations in the PrP gene; however, recent research suggests that other factors may influence their formation. There are several directions in which prion research can be conducted, such as the mechanism of prion infectivity, which is poorly understood. Another important research direction is finding ways to counteract disease progression. Effective and cost-efficient methods for testing populations to detect prions are considered crucial because early diagnosis can prolong patient survival. Prion research is both challenging and costly, so new molecular analysis methods should be evaluated for their potential to advance our understanding.

### **Keywords:**

prions, neurodegenerative disease, molecular analysis



## **ANALYSIS OF POTENTIAL FACTORS INFLUENCING ON THE NUMBER OF NEW PERTUSSIS CASES IN POLAND**

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### **A few words about the author(s):**

Authors of this work are students attending 4th year of medical faculty. We conduct a great deal of science work in Medical Microbiology Students Research Group supervised by Małgorzata Koziół, PhD in microbiology.

### **Abstract:**

Pertussis (whooping cough) is a contagious bacterial disease caused by *Bordetella pertussis*. There are three stages of the disease during which appears runny nose, fever, and then specific chronic cough. Because of the severity and potential complications after, especially during childhood, vaccination is mandatory and leads to an important reduction in cases. But still, according to the data from the last years in Poland there were reported 180 cases in 2021, 376/2022, and 599/2023. The disease is referred as re-emerging so the cause of new cases must be sought in loss of immunity over time, as well in percentage of vaccinated children and then transmission in the household (infected mothers/family members), and also increased movement of people from other countries (not necessarily vaccinated or properly controlled) observed in last years on our territory. The aim of the work was to present the clinical manifestation of whooping cough and analyze potential sources of infection and factors influencing the spread in light of newly emerging cases in Poland.

### **Keywords:**

whooping cough, infection, *Bordetella pertussis*, vaccination

# ABSTRACTS OF POSTERS



## MEDICAL SCIENCES





## **EFFECT OF ATORVASTATIN AND CHOLESTEROL-ENRICHED DIET ON RENAL $\alpha$ -KETOGLUTARATE DEHYDROGENASE COMPLEX ( $\alpha$ -KGDH) IN RATS**

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### **A few words about the author(s):**

Małgorzata Belczyk received her Master's degree in Medical Analytics from Jagiellonian University Medical College. Her research area currently focuses on involvement of  $\alpha$ -KGDH in different tissues under various metabolic conditions in animal models.

### **Abstract:**

**INTRODUCTION:**  $\alpha$ -Ketoglutarate dehydrogenase complex ( $\alpha$ -KGDH) is a regulatory enzyme of tricarboxylic acid cycle (TCA), that catalyzes the oxidative decarboxylation of  $\alpha$ -ketoglutarate ( $\alpha$ -KG) to succinyl-CoA, NADH and CO<sub>2</sub>.  $\alpha$ -KGDH controls cellular energy production and therefore plays a crucial role in kidneys, which demand high energy supply to maintain electrolyte and acid-base homeostasis. Previous studies demonstrated that dietary patterns as well as statins affect renal  $\alpha$ -KGDH.

**AIM:** The aim of our study was to investigate whether cholesterol enriched diet and/or atorvastatin, which is one of the most commonly prescribed statins, influences renal  $\alpha$ -KGDH in hypercholesterolemic rats.

**MATERIAL AND METHODS:** To induce hypercholesterolemia, 20 rats were fed with diet enriched with 2% cholesterol for 8 weeks. Afterwards, animals were divided into HC group (treated with vehicle, n=10) and HC+A group (treated for 21 days with atorvastatin 20 mg/kg bw., n=10). ST group (n=10) was fed standard diet and treated with vehicle.  $\alpha$ -KGDH activity was determined spectrophotometrically (at 340 nm).

**RESULTS:** In HC rats  $\alpha$ -KGDH activity increased by 31% as compared to ST group ( $p < 0.05$ ). In comparison to HC group, atorvastatin treatment enhanced  $\alpha$ -KGDH activity by 6% ( $p > 0.05$ ).

**CONCLUSIONS:** Present study demonstrated that diet enriched with 2% cholesterol enhanced renal  $\alpha$ -KGDH activity. Atorvastatin at dose 20mg/kg bw. had no influence on  $\alpha$ -KGDH in hypercholesterolemic rats.

### **Keywords:**

$\alpha$ -ketoglutarate dehydrogenase complex ( $\alpha$ -KGDH), atorvastatin, hypercholesterolemia



## HEALTH-RELATED SOCIAL MEDIA USE – ASSOCIATION WITH SOCIODEMOGRAPHIC VARIABLES AMONG ADULT USERS

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### **A few words about the author(s):**

Researcher with over 10 years of experience. Interested in the relationship between new communication technologies and health issues, the observer of new media and their impact on health care.

### **Abstract:**

Social media (SM) are becoming an increasingly common source of health information and can influence an individual's decision-making and overall health. This study aimed to explore how sociodemographic variables are associated with SM use for health-related purposes. 1,527 adult SM users participated in the study – 1,371 women and 156 men. The average age of the respondents was  $32 \pm 10.37$  years. 44.1% of participants ( $N = 673$ ) declared interest in health-related content on SM. Moderate interest was reported by 28.2% of respondents ( $N = 431$ ), and 27.1% ( $N = 423$ ) declared no such interest. Age and gender are significantly associated with SM use. The older the users, the more interested in the area of health ( $p < 0.001$ , Kendall's Tau-c=0.27). Women compared to men were also more interested in health issues on SM ( $p < 0.001$ , Cramer's  $V = 0.34$ ,  $\chi^2 = 28.36$ ,  $df = 3$ ). It has been shown that the higher the level of education of the respondents, the interest in health issues on SM increased ( $p < 0.001$ , Kendall's Tau-c=0.29). A slightly higher level of interest in health issues occurs among pensioners ( $p < 0.001$ , Kramer's  $V = 0.35$ ,  $\chi^2 = 103.61$ ,  $df = 21$ ). There was no significant difference regarding place of residence and health status of participants in this aspect. Our results suggest that age, gender, level of education and profession of users are the strongest determinants of SM use in the area of health which should be taken into consideration by public health practitioners and healthcare providers.

### **Keywords:**

social media, health, health information



## THE ROLE OF OXIDATIVE STRESS IN ATOPIC DERMATITIS

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### A few words about the author(s):

Researchers from the Rzeszów University, scientific interests: oxidative stress.

### Abstract:

Atopic dermatitis (AD), often referred to as eczema, is a chronic disease that causes inflammation, redness, and irritation of the skin. Emerging evidence suggests that oxidative stress, which is a prooxidant-antioxidant imbalance and leads to macromolecules damage, plays a role in AD. The purpose of the single-center cross-sectional study was to compare markers of oxidative stress in the serum of patients with AD and healthy controls. The products of protein oxidation, total antioxidant capacity (TAC), and markers of lipid peroxidation were estimated in the serum of the subjects. AD patients had a higher level of advanced protein oxidation products and a lower level of thiol groups than healthy participants. There was no difference in serum concentration of lipid peroxidation products between AD patients and healthy subjects. We found a moderate positive significant correlation between advanced protein oxidation products and age in patients with AD. In conclusion, these results may shed light on the etiopathogenesis of AD, and confirm an oxidative burden in these patients. Furthermore, our study could be useful in the development of new therapeutic methods that include the use of antioxidants in dermatological diseases.

### Keywords:

atopic dermatitis, lipid peroxidation, protein oxidation



## ARE SGLT-2 INHIBITORS NEW HYPERTENSION DRUGS?

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### **A few words about the author(s):**

Magdalena Janczura is a PhD student at the Department of Pharmacognosy and Biomaterials of the Medical University of Poznań and works in the R&D Department of a pharmaceutical company. She is interested in developing new drugs and clinical trials.

### **Abstract:**

SGLT-2 inhibitors are an important group of drugs with pleiotropic effects. SGLT-2 inhibitors have well-established clinical indications in the treatment of: type 2 diabetes, chronic kidney disease, heart failure with reduced left ventricular ejection fraction and heart failure with preserved left ventricular ejection fraction. These drugs have an antihypertensive effect by reducing body weight, increasing natriuresis and osmotic diuresis, reducing vascular stiffness, reducing SNS activity, improving vascular endothelial function, having a beneficial effect on the intestinal microbiota, and reducing the concentration of uric acid. The results of clinical trials indicate that the use of SGLT-2 inhibitors reduces systolic and diastolic blood pressure by an average of 4 mmHg and 2 mmHg respectively, which makes them have antihypertensive properties, but they are not antihypertensive drugs (an antihypertensive drug should reduce systolic blood pressure by at least 10 mmHg). An important advantage of SGLT-2 inhibitors compared to other diuretics is the lack of effect of these drugs on the occurrence of electrolyte disorders. The 2023 ESH guidelines include SGLT-2 inhibitors among additional antihypertensive drugs. It is worth remembering that in patients with well-controlled blood pressure who are started on SGLT-2 inhibitors for other medical indications, it may be necessary to reduce the dose of the basic antihypertensive drug.

### **Keywords:**

SGLT-2 inhibitors, dapagliflozin, type 2 diabetes, hypertension, meta-analysis





## **OXIDATIVELY MODIFIED PROTEIN PRODUCTS AND LIPID PEROXIDATION PRODUCTS IN HYPERTENSIVE PATIENTS**

**Ada Kaczmarek (1)\*, Kamila Sieradocha (1), Mariusz Dotka (1),  
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### **A few words about the author(s):**

Ada Kaczmarek – 6th year student of the Faculty of Medicine at Poznan University of Medical Sciences and Student Scientific Association of Adult Psychiatry chairperson.

### **Abstract:**

Oxidative stress plays a crucial role in the onset of hypertension. Scientific evidence demonstrates that an excess of free radicals and reactive oxygen species, combined with reduced antioxidant activity in the body, can result in the oxidative alteration of vital biomolecules such as proteins and lipids. The disparity between pro-oxidants and antioxidants directly influences the emergence and progression of cardiovascular disorders, including high blood pressure. The study that I present outlines essential details about oxidative stress and its connection to the origin of arterial hypertension. It explores different forms of oxidative modifications in proteins and lipid peroxidation. Additionally, it presents research findings that underline the significant impact of oxidative stress on the development of this condition.

### **Keywords:**

hypertension, biomarkers of oxidative stress, oxidatively modified proteins, lipid peroxidation products, antioxidants



## **THE ROLE OF A FAMILY DOCTOR AND GYNECOLOGIST IN THE CARE OF A WOMAN**

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### **A few words about the author(s):**

Ada Kaczmarek – 6th year medical student at Poznan University of Medical Sciences.

### **Abstract:**

The risk of many gynecological diseases can be remarkably reduced by making several changes in patients' lifestyles. In this respect, emphasize the importance of family doctor care.

Even if only through education on hygiene, proper diet, and physical activity. From the point of view of prevention and treatment, it is essential to understand the factors contributing to inflammation and oxidative stress in various diseases. Moreover, clinicians should know the patient's body's defense mechanisms. Undoubtedly, it is also crucial to ensure universal access to women's reproductive health services, including in rural areas. The importance of early detection of neoplastic lesions at any age is emphasized, especially in genetically predisposed individuals with an increased risk of cancer. In this case, more frequent medical examinations are recommended from the patient's childhood.

### **Keywords:**

women, family medicine, gynecology



## ASPIRIN REPOSITIONING

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### **A few words about the author(s):**

PhD Student at Doctoral School of Medical and Health Sciences, Collegium Medicum Nicolaus Copernicus University.

### **Abstract:**

Drug repositioning is finding new uses for drugs already approved or under investigation that are beyond the scope of their original medical indications. Drug repositioning takes less time than new drug discovery because several discovery and development phases are skipped. Investment costs are definitely lower by about USD 10 billion. We know of many drugs that have been successfully repositioned, including sildenafil, fentanyl and thalidomide.

Acetylsalicylic acid (ASA, aspirin) has been used for many years only as an analgesic and anti-inflammatory drug. Then, as a result of repositioning, it began to be used in low doses as an antiplatelet drug. The beginning of many diseases is inflammation, therefore ASA, due to its anti-inflammatory effect, can reduce the incidence of many diseases. Aspirin is used for cancer prevention and as an adjuvant therapy.

Aspirin may act on epithelial cells, cancer cells, endothelium, platelets, and immune cells. In the course of cancer, ASA may inhibit growth, metastasis to other organs, angiogenesis, inflammation and avoidance of the immune response. Studies show that ASA affects such cancers as: colon cancer, ovarian cancer, prostate cancer, endometrial cancer, liver cancer, skin cancer, esophageal cancer, pancreatic cancer, breast cancer, bladder cancer, and head and neck cancer. Further studies are needed to help assess the effect of acetylsalicylic acid on cancer tissue.

### **Keywords:**

cancer, aspirin, repositioning, ASA



## COMPARATIVE ANALYSIS OF CORNEAL PARAMETERS IN SWEPT-SOURCE IMAGING BETWEEN DMEK AND UT-DSAEK EYES

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### A few words about the author(s):

The co-author of scientific publications in foreign journals (IF 6,938), congress reports, the winner of the Student Grant for the Scientific Project and the author of the work awarded at the Conference of Medical University Students (3rd place).

### Abstract:

**BACKGROUND:** The need to provide a comparative analysis of corneal parameter changes compared to their preoperative values between Descemet membrane endothelial keratoplasty (DMEK) and ultrathin Descemet stripping automated endothelial keratoplasty (UT-DSAEK) patients.

**METHODS:** The study included 24 eyes after UT-DSAEK and 24 eyes after DMEK. Visual acuity, endothelial cell count (ECC), central corneal thickness (CCT), mean keratometry (MK), mean astigmatism (MA), astigmatism asymmetry (AA) and higher-order aberrations (HOAs) were assessed at baseline and 1, 3, 6 and 12 months after the surgery.

**RESULTS:** From the 3rd month post operation, ECC was higher in the DMEK eyes than in the UT-DSAEK eyes ( $p = 0.01$ ). In a bivariate analysis that was adjusted for age, DMEK was associated with a smaller decrease in posterior MK at the 1-month ( $\beta = -0.49$ ,  $p = 0.002$ ), 3-month ( $\beta = -0.50$ ,  $p < 0.001$ ), 6-month ( $\beta = -0.58$ ,  $p < 0.001$ ) and 12-month ( $\beta = -0.49$ ,  $p < 0.001$ ) follow-up visits. There were no significant differences in changes in anterior or combined surface MK throughout the observation period. Accordingly, no significant differences in changes in MA, AA or HOAs compared to the baseline values were identified between the eyes after DMEK and UT-DSAEK at any follow-up time point.

**CONCLUSIONS:** UT-DSAEK seemed to be an easier and safer technique than DMEK while maintaining similar outcomes regarding irregular astigmatism and total keratometry values.

### Keywords:

DMEK, HOA, UT-DSAEK, astigmatism, keratometry





## **USE OF BIOLUMINESCENT REPORTER SYSTEM IN CRISPR/CAS9 SILENCING COMPETITIVE CAFFEIC ACID BIOSYNTHETIC PATHWAYS IN NICOTIANA TABACUM PLANTS**

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### **A few words about the author(s):**

The team working on the development of a gene silencing system using the CRISPR/Cas9 method consists of students – members of the SKN Herba and employees of the Department of Pharmaceutical Biology.

### **Abstract:**

One of the most modern methods available in biotechnology is CRISPR/Cas9. This technology allows for highly effective and precise editing of genome, giving the possibility to manipulate the activity of selected genes. The molecular effector of the system CRISPR is the Cas9 protein – a DNA endonuclease guided by engineered gRNA. This could be used to a complete inhibition of competitive biosynthetic pathway.

The potential use of the CRISPR/Cas9 system brings a unique opportunity to obtain plant biomass with highly specific genetic modifications that silence the genes, which enzymes uses the same substrate in different secondary metabolite biosynthesis pathways. These leads to one pathway domination and focus on one pathway metabolite biosynthesis.

The aim of the study was to develop a method based on the CRISPR/Cas9 technique, that allow to increase caffeic acid accumulation in *Nicotiana tabacum* plants by inactivation of NtCHI1 gene.

Accumulation of caffeic acid were visualized by transfecting cells with bioluminescent biochemical cycle sensitive to caffeic acid. This construct consist of five genes coding enzymes which in series of biochemical events converts caffeic acid to highly energetic 3-hydroxyhispidin which compound during oxidation emits visible light and next product of these reaction is converted again to caffeic acid. Transformed were *N. tabacum* leaves followed by somatic organogenesis to obtain transformed mature plants and suspension cell line of *N. tabacum* BY-2.

### **Keywords:**

bioluminescent plants, CRISPR, *Nicotiana tabacum*, BY-2



## MICROSOMAL HALF-LIFE AND INTRINSIC CLEARANCE OF NOVEL XANTHINE DERIVATIVES – PDE 4/7/8 INHIBITORS

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### A few words about the author(s):

The author of this presentation works at the Department of Pharmacokinetics and Physical Pharmacy, UJ. The author's research interests include studying the use of phosphodiesterase inhibitors in asthma and chronic obstructive pulmonary disease.

### Abstract:

Increased levels of intracellular cyclic adenosine-3',5'-monophosphate (cAMP) produce anti-inflammatory and immunosuppressive effects through inhibition of the transcription factor NF- $\kappa$ B. Phosphodiesterases (PDEs) are enzymes that catalyze the breakdown of cAMP. Pharmacology has long used theophylline, which non-selectively blocks the action of PDEs, thereby dilating the bronchi and attenuating the release of inflammatory cytokines. Currently, efforts are being made to develop new PDE inhibitors with high selectivity, as exemplified by the introduction of PDE 4 inhibitors for the treatment of chronic obstructive pulmonary disease, psoriatic arthritis and atopic dermatitis. An essential step in the introduction of a new therapeutic substance is to determine its metabolic stability during the preclinical testing phase. The aim of the project presented here was to determine the microsomal half-life and intrinsic clearance of four new PDE inhibitors in vitro. The compounds studied are xanthine derivatives with described high selectivity towards PDE 4, 7 or 8 and were synthesized at the Department of Medicinal Chemistry, Faculty of Pharmacy, Jagiellonian University. Metabolic stability was determined in an incubation mixture containing human, rat or mouse microsomes in the presence of NADPH. Changes in compound concentrations over time were determined using the LC-MS/MS technique. The tested compounds generally exhibited satisfactory stability in vitro.

### Keywords:

intrinsic clearance, PDE inhibitors, xanthine derivatives, microsomes



## **THE IMPACT OF SURROUNDING CONDITIONS ON THE PATIENT IN HOME PHYSIOTHERAPY**

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### **A few words about the author(s):**

Master's degree in physiotherapy, I from Poland, I want to be a scientist.

### **Abstract:**

Physiotherapy treatment – health service provided in cycles corresponding to the health needs of the recipient undergoing rehabilitation or physiotherapy treatment. Based on a literature review, I present various observations on the subject. The duration of rehabilitation at home for one recipient is 80 treatment days a year and no more than 5 treatments a day. Home services cannot be combined with home hospice services. Special problems regarding home patient care, nursing crisis, problems with living and living environment, lack of houses adapted to the needs of disabled people or with special equipment, lack of infrastructure, insufficiently equipped public transport for people with disabilities, doctor's practices, pharmacies or shops inaccessible to the public disabled. Older people with low socioeconomic status are more likely to live in inadequate housing, eat poorer quality food, exercise less frequently, are less likely to have a normal body weight, and are more likely to experience functional impairment. Gaps in offerings include long-term care and crisis/emergency intervention, especially for single people. They require preventive actions, mainly counseling and information centers, early recognition and early promotion of disabled people, especially children, as well as rehabilitation or medical, professional and social integration.

### **Keywords:**

physiotherapy treatment, rehabilitation at home, people



# ABSTRACTS OF PRESENTATIONS



## TECHNICAL AND NATURAL SCIENCES





## **TECHNOLOGICAL CHANGES APPLIED BY BIAFORM SA IN PRODUCING NON-STANDARD PLYWOOD FOR SPECIALISED APPLICATIONS IN THE CONSTRUCTION AND AUTOMOTIVE SECTORS**

**Radosław Mirski (1)\*, Bartosz Bezubik (2), Dariusz Joka (2) Dorota Dziurka (1)**

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### **A few words about the author(s):**

Radosław Mirski – researcher, Faculty of Forestry and Wood Technology, Poznań University of Life Sciences. Bartosz Bezubik – President of Management Board, BIAFORM, Białystok. Dariusz Joka – Production Director/Main Technologist, BIAFORM, Białystok.

### **Abstract:**

The Project entitled "Removal of technological barriers in the efficiency of production of highly processed and non-standard plywood for specialised applications in the construction and automotive industries" was realised under the Project: Operational Programme Intelligent Development 2014-2020.

The Project aimed to develop a process innovation – a highly efficient technology for manufacturing highly processed custom plywood for the construction and automotive industries.

As a result of the R&D work, a demonstrator unique on a global scale was developed, consisting of a set of isolated, critical nests of the process demonstrating potentially the highest impact on maximising production efficiency to the whole production line, allowing for reduction of the cost intensity of the process, i.e. raw material and resource consumption (semi-finished product - veneer, human labour) and shortening the time for order completion while increasing the quality of final products. The creation of the demonstrator consisted of developing innovative solutions and their targeted integration into the technological line used in the current production plant (BIAFORM SA). The Project responded to the unsatisfied needs of the Biaform Company, determined by the existing efficiency barriers resulting from the high cost (labour intensity, personnel costs) and time intensity of the realisation of the production of customised formats.

### **Keywords:**

non-standard plywood, veneer, construction and automotive industries



## **APPLICATION OF GRAPH THEORY TO THE ANALYSIS OF HIGH VOLTAGE POWER NETWORKS**

**Władysław Błocki\*, Wojciech Gołędzinowski**

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### **A few words about the author(s):**

Wojciech Goledzinowski is a PhD student at the University of Information Technology and Management in Rzeszów. Władysław Błocki is a PhD student at the University of Information Technology and Management in Rzeszów.

### **Abstract:**

This study explores the application of graph theory in the analysis of high voltage power networks, aiming to enhance the understanding of complex interconnections within these critical infrastructures. High voltage power networks play a pivotal role in efficiently transmitting electrical energy from generation sources to end-users. The increasing complexity of modern power systems, characterized by numerous interconnected components and diverse transmission pathways, necessitates advanced analytical tools.

In this research, we model high voltage power networks as directed graphs, where nodes represent key components such as generators, transformers, and substations, and edges signify transmission lines with directional flow. By employing graph theory concepts, including connectivity analysis, weighted edges, and network flow algorithms, we gain insights into the structural and operational aspects of the power grid. The study addresses key challenges such as optimal power flow, fault tolerance, and resilience, which are crucial for maintaining a reliable and robust power supply.

### **Keywords:**

power grid analysis, graph theory, networks, connectivity analysis, applications, network flow optimization



## **UNI-BUS SYSTEM BY ELPLANT SP. Z O. O. AS AN EXAMPLE INNOVATION, INTUITIVENESS AND EFFICIENCY IN AGRICULTURE**

**Wojciech Cież**

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### **A few words about the author(s):**

Wojciech Cież, CEO Elplant, higher education in agriculture, farm owner, originator of control systems for agricultural machines.

### **Abstract:**

The article presents the Elplant company, which deals with the design and production of electronic devices for controlling and controlling the work of working units in agricultural machines. The company's mission and its achievements to date were presented, and above all its latest solutions, which are the result of the implementation of a research and development grant, financed by the National Center for Research and Development. Seven innovative special-purpose solutions with a high proportion of electronics and advanced automation systems were discussed, intended for use in such machines as: cylinder bale wrapper, seed drill combination, pneumatic seed drill and seed drill.

### **Keywords:**

precision farming, agricultural machines, electronics, controlling, bale wrapper, seed drill



## APPLICATION OF ARTIFICIAL INTELLIGENCE IN MILITARY APPLICATIONS

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### **A few words about the author(s):**

Assistant of the Military University of Technology, Faculty of Cybernetics, Institute of Information Technology and Cybernetics.

### **Abstract:**

The use of artificial intelligence (AI) in military applications has a broad spectrum of applications. AI can be used to support military operations by analysing data, planning and making better decisions. It can also be used in unmanned systems, such as drones, to perform missions that are too risky for humans. AI can help with supply chain and logistics management. AI can also be used in data analytics and intelligence to gather information, estimate and predict future actions. However, ensuring the security of AI systems and protecting against cyber attacks is a major challenge.

### **Keywords:**

military, AI, usage





## **MELANOPHOROMA IN AXOLOTL (AMBYSTOMA MEXICANUM) – A CASE STUDY**

**Marta Durska**

*Student Scientific Circle of Veterinary Pathologists, Department of Pathological Anatomy,  
Faculty of Veterinary Medicine, University of Warmia and Mazury*

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### **A few words about the author(s):**

My name is Marta Durska and I am a fifth-year veterinary student at the Faculty of Veterinary Medicine at the University of Warmia and Mazury in Olsztyn. I am interested in veterinary pathology and exotic animal medicine.

### **Abstract:**

Chromatophoromas are neoplasms arising from cutaneous pigment cells (chromatophores), which are responsible for the skin patterns of amphibians. Based on the pigment the malignancy can be categorized as: melanophoromas, erythrophoromas, xanthophoromas and iridophoromas. In amphibians brown to black melanophoromas are most common, but there is also a single report of amelanotic melanophoroma. All chromatophoromas must be distinguished from reactive chromatophore hyperplasia.

A tumour located in the skin was surgically excised from a 1-year-old male axolotl (*Ambystoma mexicanum*), sampled, fixed in 10% neutral buffered formalin and processed routinely for histopathology. Histopathological diagnosis was based on H&E staining.

The histopathological examination revealed a poorly demarcated, pigmented neoplasm located in the skin. The neoplastic cells were polygonal or elongated with frequent anisocytosis and anisokaryosis, round to oval or irregular nuclei with finely stippled chromatin and poorly visible nucleoli. The mitotic figures were absent. The cytoplasm was scant to moderate and pigmented. Based on the histopathological findings, the tumour was diagnosed as a melanophoroma (benign form). In conclusion, all chromatophoromas, including melanophoromas, should be surgically excised with a margin of healthy tissue, because metastases to internal organs have been observed in histologically benign and malignant forms.

### **Keywords:**

amphibian, axolotl, melanophoroma, cutaneous neoplasm, histopathology



## COMPARISON OF THE INFLUENCE OF CATIONIC CELLULOSE ON STABILITY OF THE AQUEOUS SUSPENSIONS OF MONTMORILLONITE, HALLOYSITE AND BENTONITE

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Maria Curie-Skłodowska University in Lublin*

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### A few words about the author(s):

Ewelina Godek – PhD student at the PhD School of Quantitative and Natural Sciences at UMCS. Elżbieta Grządka – assistant professor. Interests include the physicochemistry of the dispersed systems, as well as the stability of the colloidal systems.

### Abstract:

The aim of the study was to compare the influence of cationic cellulose (CC) on stability of the aqueous suspensions of montmorillonite (MMT), halloysite (N-H) and bentonite (N-HB). Cationic cellulose is widely used in the cosmetics industry as a thickener, emulsifier, and an ingredient in scalp and hair care products. Montmorillonite improves water quality, absorbs organic substances and has a very high cation exchange capacity. Halloysite is used in the cosmetics industry as an ingredient of powders, creams, masks and tonics. Bentonite is used primarily in cosmetics for the production of cleansing agents and soothing skin irritations. In the experimental part, measurements of MMT, N-H and N-HB suspensions stability were performed in the presence of CC. The adsorption amount of CC on surface of negatively charged clay minerals was also investigated. The obtained data show that cationic cellulose can be used as an effective stabilizer of the aqueous suspensions of MMT, N-H and N-HB. Based on the adsorption measurements, it can be concluded that the cationic polymer adsorbs very well on the surface of negatively charged clay minerals. Electrostatic interactions are mainly responsible for the adsorption process. Therefore, the most likely stabilization mechanism is electrosteric stability. As the concentration of the polymer increases, the adsorption amount of the polymer on the clay minerals surface also increases, which translates into the increase in stability.

### Keywords:

stability, cationic cellulose, montmorillonite, halloysite, bentonite



## **NEW MEDIA TODAY. THE IMPACT OF ARTIFICIAL INTELLIGENCE ON COMMUNICATION**

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### **A few words about the author(s):**

The authors are currently pursuing their doctoral studies in Rzeszów, with a primary focus on the application of Artificial Intelligence in the media, which underpins their ongoing research and analysis in this domain.

### **Abstract:**

New media is a dynamic communication sphere in the digital world, significantly influenced by artificial intelligence (AI). This presentation delves into AI's impact on modern media and information transmission. AI, through advanced machine learning and natural language processing, has revolutionized content creation. It enables automation of editorial processes like generating finance, sports, or weather reports, thus enhancing newsroom resource management. AI-based recommendation systems tailor content to user preferences, improving reader engagement. Computer vision, an AI facet, aids investigative reporting by analyzing images and videos for information verification, crucial in the disinformation era. However, AI in new media brings challenges, with its development often reliant on large tech companies, raising concerns about media dependency. It also brings ethical concerns regarding transparency, objectivity, and content accountability. The profound impact of AI on new media is set to continue shaping the media landscape, necessitating further analysis to foster ethical and responsible AI utilization in the media. Further research is imperative for identifying best practices to maximize AI's benefits in media while mitigating associated risks.

### **Keywords:**

new media, artificial intelligence (AI), machine learning, natural language processing



## **COMPARISON OF ANTIMICROBIAL PROPERTIES OF SINGLE TYPES OF NANOPARTICLES AND THEIR COMPLEXES AGAINST RARELY ISOLATED MASTITIS PATHOGENS OF PROTOTHECA SP. GENUS AND KLUYVEROMYCES MARXIANUS**

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### **A few words about the author(s):**

The team's work focuses on finding innovative approaches in cattle breeding, that involve nanotechnology and AI.

### **Abstract:**

Antibiotics are the most common mastitis treatment in dairy cows. However, this treatment is ineffective against algae or yeast. Therefore, new agents for treating udder disease are required. *Kluyveromyces marxianus* and *Prototheca* sp are less occurring mastitis pathogens, but still hazardous. Metal nanoparticles (NPs) are currently used in fields, as in biomedicine, as they can be non-toxic to human fibroblast cells with a wide range of activity against pathogens. The study aimed to compare the biocidal effects of single nanoparticles and their complexes against *K. marxianus* and *Prototheca* sp. Milk samples were collected. On Sabouraud Dextrose Agar, strains were cultured aerobically at 37°C. Isolated strains were placed in 0.9% NaCl, and 6 dilutions of AgNPs, CuNPs, AuNPs and complexes AgCuNPs, AgAuNPs, CuAuNPs, AgCuAuNPs were made. The pathogen suspensions and NPs dilutions were pipetted into a 96-well plate. Incubation lasts 24 hours. The XTT reagent was added. The data was statistically analyzed. Complexes and single nanoparticles both reduced pathogen viability, according to the results. AgNPs and AgCuNPs had reduced pathogen viability most to 11.63% and 4.70% for *K. marxianus* and 13.37%, 12.39% for *Prototheca* sp. The CuAuNPs complex reduced pathogen viability by 99%, with a score of 0.92%. AuNPs scored 1.32%. AgCuAuNPs were less effective than other complexes. Single NPs and NPs complexes may be used to treat less prevalent mastitis pathogens. In vivo tests are required.

### **Keywords:**

NPs, complex, mastitis, yeast, algae





## **PSYCHOLOGY OF GAMES: RESEARCH ON THE IMPACT OF GAMES ON BEHAVIOR AND PLAYER DEVELOPMENT**

**Jakub Jarecki**

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### **A few words about the author(s):**

I am a person who has been primarily shaped by games. I have formed new friendships. I have learned the English language. They have taught me how to confront challenges and thanks to them, I have a healthy moral compass.

### **Abstract:**

Computer games have become an integral part of contemporary culture and entertainment. However, their influence on the behavior and development of these players has become the subject of intensive research in the field of psychology.

Computer games, both single-player and multiplayer, evoke diverse reactions in the player's psyche. Research indicates that games can influence emotions, stress levels, cognitive abilities, and player behavior. For instance, games can trigger positive emotions such as satisfaction and joy, but also negative ones, like frustration or aggression. The influence of games on player behavior can vary depending on the game genre, the time spent playing, and the individual personality traits of the player.

Player development is another crucial aspect of research in the psychology of games. Games can contribute to the development of skills such as problem-solving, cooperation, creativity, and social abilities. Furthermore, games can also impact players' perception of the world and shape their values.

Studies in the field of game psychology provide insights into the complex mechanisms that regulate player behavior and development. As games become increasingly interactive and technologically advanced, game psychology becomes an increasingly significant research area. Understanding how games affect people can aid in creating more educational, developmental, and safe gaming experiences, as well as in defining their role in contemporary culture.

### **Keywords:**

games, gaming, psychology, behavior, development



## **SPARKSENSE – SMART CAMERA FOR CONTEXTUAL DRIVING ASSESSMENT**

**Jędrzej Fulara, Marcin Kamionowski, Michał Kręglewski, Kornel Kania\***

*Sparkbit Labs sp. z o.o.*

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### **A few words about the author(s):**

Software engineers with over a decade of experience in Research & Development projects financed by public and private entities.

### **Abstract:**

This project aimed to build an IT system and an intelligent monitoring device - SparkSense - to analyze and score the driver's driving style considering safety, fluidity, and economy.

The system, equipped with sensors (camera, GPS receiver, accelerometer), will gather and analyze telematic data to assess road behavior (e.g., speeding, acceleration and braking frequency). The system will have two end devices: the driver's mobile phone and the SparkSense telematics device.

The project's device is meant to be used by business clients:

- Insurance companies can use it in UBI-type policies (where the fee depends on the driver's driving style).
- Vehicle fleets can use it for monitoring vehicle usage, particularly the economic aspect.

The designed device will use technologies such as:

- Deep Learning with the use of convolutional neural networks (CNN) for advanced image analysis
- Processing, analysis, and visualization of geoinformation, especially newly designed algorithms to process and analyze GIS data and algorithms for projection of GPS trace (snap-to-road algorithms)
- Processing complex variables and big data as GPS data collected monthly from 100,000 drivers reaches 3 - 5 billion measuring points.

A distinguishing feature, compared to products available on the market, is the contextual assessment of the driving style, considering the actual situation on the road.

### **Keywords:**

computer vision, smart camera, deep learning, Insurtech, R&D



## **PRODUCTION OF MICROBIAL TRANSGLUTAMINASE IN A MEDIUM SUPPLEMENTED WITH CORN STEEP LIQUOR BY STREPTOVERTICILLIUM CINNAMONEUM**

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Warsaw University of Life Sciences – SGGW, 159C Nowoursynowska St., 02-776 Warsaw, Poland*

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### **A few words about the author(s):**

PhD student at the Warsaw University of Life Sciences (WULS/SGGW).

### **Abstract:**

The aim of the study was to optimize the production of microbial transglutaminase (MTG) by the non-genetically modified strain of *Streptovorticillium cinnamoneum*. Tryptone soy broth (TSB) was selected as the optimal inoculation medium. The optimal incubation time was 24 hours, and the inoculum dose was 10%. Different nitrogen sources (aminobac, corn steep liquor, ammonium nitrate, and ammonium sulfate) were examined to achieve the highest microbial transglutaminase activity. A combination of aminobac with corn steep liquor and a 72-hour cultivation (28°C; pH 6.0-6.5) resulted in an MTG activity level of 6.59 U/mL.

### **Keywords:**

microbial transglutaminase, *Streptovorticillium cinnamoneum*, biosynthesis



## **COMPARISON OF INERT GAS REFINING PROCESS PARAMETERS ON COMPRESSIVE STRENGTH OF EN AN 44200 AND 46000 ALLOYS**

**Patryk Korban**

*AGH University of Science and Technology*

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### **A few words about the author(s):**

PhD student at the Department of Materials Science and Engineering of Non-Ferrous Metals, dealing with the influence of inert gas refining process on the parameters of the metal casting.

### **Abstract:**

The research presented in the presentation is based on the analysis of the results of compressive strength tests for EN AN 46000 and EN AN 44200 alloys. Tested samples contained various amount of circulating scrap content and were subjected to inert gas refining of different lengths. The test results show disparities in the level of compressive strength between two different alloys and a small impact of refining parameters on the test results.

### **Keywords:**

aluminum, refining, compressive strength





## COMPARATIVE ANALYSIS OF SLEEP IN SELECTED GROUPS OF ANIMALS

**Julia Korczyk**

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### **A few words about the author(s):**

I am studying biology at the Jagiellonian University. In my research I focus on animal cognition and neuroscience.

### **Abstract:**

Sleep is defined as a state of consciousness which is observed as decrease in body activity and reaction to different types of external stimuli. Studies show that during sleep a harmful metabolic products are removed from the interneuron spaces. Sleep seems to be universal physiological need that will be observed in all animal species. However, it is not found in all phyla. However, we observed a lot of variation between different species and phyla in sleep architecture. In this manuscript I presented sleep mechanism focusing on different invertebrates and vertebrates. Here, I want to show that sleep mechanics depends on complex environmental factors such as presence of predators, climate, etc., than on the complexity of species brains. Behavioral signs of sleep are observed in invertebrates such as nematodes and arthropods. The two sleep stages have been documented in crayfish and octopuses. In fish and amphibians, scientists did not always observe behavioral signs of sleep. Reptiles, birds and mammals have complex sleep cycles with several sleep stages.

To sum up, the occurrence and number of sleep stages is influenced by many external factors. The studies presented that the mechanism and complexity of sleep did not depend on development of organism. The number of stages, duration and response to stimuli is significantly changed between different species within the same phyla.

### **Keywords:**

sleep, animals, mammals, REM, NREM



## **MATERIALS WITH INCREASED FIRE RESISTANCE USED IN IOT SYSTEMS WITH THE FUNCTION OF DETECTING VIOLATION OF THE INTEGRITY OF FIRE PROTECTION OF SERVICE PENETRATIONS**

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### **A few words about the author(s):**

MSc. Mateusz Kosyl, a graduate of the Szczecin University of Technology, Chief technologist at Intuseal Sp. z o.o.

### **Abstract:**

For many years, the use of passive fire protection systems has been required in construction. These systems are divided into the active part and the passive part. Installing passive fire protection systems generally allows you to protect pipes, cables, etc. in a way that does not require future supervision. Unfortunately, some of such protections are damaged, stolen, etc. In order to improve security, attempts have been made to integrate such systems with sensors communicating in a mesh network. As part of the research, modern materials expanded under the high temperature were developed. These materials achieved increased thermal and fire resistance parameters. Additionally, a system for detecting passage damage and other unforeseen accidental events such as flooding or temperature effects has been integrated with these protections. The sensors created an early warning network about events that occurred when the protection was installed.

This work was supported by the National Center for Research and Development [project number: POIR.01.01.01-00-0732/19]

System of passive fire protection (PFP) IoT (Internet of Things) products able to detect integrity infringement of the fire evacuation route.

### **Keywords:**

fire, passive, mesh, IoT



## IN VITRO EVALUATION OF UV FILTER PERMEABILITY

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### A few words about the author(s):

Anna Łapeta is a chemistry student at AMU in Poznań. Her master thesis focuses on the development and characterization of sunscreens containing new UV filters. Dr Anna Olejnik is an adjunct at AMU. Her research concerns cosmetic chemistry.

### Abstract:

Sunscreens contain UV filters that shield the skin from harmful UV radiation. However, recent research has raised concerns about the potential permeability of certain UV filters through the skin, which could lead to hormonal disruption. Oxybenzone, also known as benzophenone-3 (BP-3), is a compound under suspicion.

Our study focuses on the characterization of emulsions containing the UV filter BP-3, as well as the examination of its permeability through skin-mimicking membranes. The stability of the emulsions was characterized using multiple light scattering, and their droplet sizes were assessed through laser diffraction and optical microscopy.

The release and permeation of BP-3 were evaluated in in vitro studies using cellulose and Strat-M membranes. Our findings reveal that the prepared emulsions were stable and their droplet size distribution was in the range of 0.1 - 10  $\mu\text{m}$ . The release of BP-3 through the cellulose membrane depended on its concentration in the emulsion, with a higher concentration of the UV filter in sunscreen leading to an increased release of BP-3. The permeation of BP-3 through the Strat-M membrane was below 1% after 1 day. The release and permeability studies emphasize the importance of selecting an appropriate membrane to reflect the multiple layers of skin. However, it is essential to conduct in vivo studies to provide a more comprehensive understanding of this issue.

This research was supported by NCBR, grant no. LIDER/5/0036/L-12/20/NCBR/2021.

### Keywords:

oxybenzone, release, sunscreen, benzophenone-3, emulsions



## ENERGY SAVING STRATEGIES IN TELEMATICS DEVICES

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### A few words about the author(s):

The authors were involved in the implementation of the telematics device project as part of the Project. TYLDA sp. z o. o. is a company focused on the use of IT software solutions and modern hardware technologies.

### Abstract:

Telematics devices dedicated to passenger cars and trucks must meet a number of requirements resulting from their intended use and ensure energy savings. This is especially important for semi-trailers and trailers, where disconnection from the tractor is a normal process. The task of telematics devices is to remotely monitor the cargo in terms of parameters such as temperature, but also to detect attempted theft and intrusion into the cargo space. Devices of this type must be able to be located using satellite navigation systems and communicate via a GPRS wireless network with the monitoring center. These requirements make it necessary to work in energy saving mode through the design process consisting in the selection of energy-saving components, reduction of the number of power blocks in which DC-DC converter systems and voltage stabilizers are used, energy management using the internal battery power supply, switching off and economical use of peripheral devices and reduction of power consumption by connected measuring and executive devices.

### Keywords:

telematics devices, energy saving, embedded devices, microcontrollers





## **SUBCUTANEOUS TISSUE INFLAMMATION IN DOMESTIC ANIMALS: LITERATURE REVIEW AND CLINICAL CASE DESCRIPTION**

**Adrianna Michniewicz**

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Faculty of Veterinary Medicine University of Warmia and Mazury in Olsztyn*

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### **A few words about the author(s):**

Adrianna Michniewicz, a fifth-year veterinary medicine student at UWM Olsztyn, delves into veterinary physiology and pathomorphology outside her classes. I'm passionate, actively engage in scientific circles exploring these branches of knowledge.

### **Abstract:**

Inflammation of subcutaneous tissue encompasses a group of disorders characterized by a primary focus of inflammation within the subcutaneous fat. These changes may manifest broadly or be confined to specific body regions. Distinguishing features include the presence of deep skin nodules situated in the subcutaneous tissue, movable in relation to the skin, and often exhibiting ulceration. The inflammation can manifest in both sterile and non-sterile forms, with the disease's etiology in dogs linked to diverse factors such as bacterial and fungal infections, nutritional deficiencies, vasculopathy, pancreatic disorders, and various immunologic and physicochemical factors. In certain instances, the cause of the inflammatory response in subcutaneous fat tissue remains unclear (idiopathic cases). Most commonly, panniculitis in animals is associated with preceding subcutaneous injections or injuries. In my presentation, I aim to recount a compelling clinical case involving a 5-year-old Australian Shepherd. The owners noticed a sizable tumor near the last ribs on the right side of the body. Following surgical intervention and histopathological examination, the tumor was identified as a benign inflammation of subcutaneous tissue, despite the initial clinical examination and post-surgery appearance not strongly indicating such a diagnosis.

### **Keywords:**

panniculitis, dog, australian shepherd, histopathology, surgery



## CHIROPTICAL SPECTROSCOPIES AS A METHOD TO STUDY ENCAPSULATION PROCESS OF ACTIVE COMPOUND IN NANOPARTICLES

**Aleksandra Orlef (1, 2)\*, Joanna Mazurkiewicz (1, 2), Aleksandra Wajda (2),  
Agnieszka Kaczor (2)**

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### **A few words about the author(s):**

Aleksandra Orlef is a young doctoral student at the Doctoral School of Exact and Natural Sciences. Her research work focuses on the application of chiroptical spectroscopy methods in the study of nanoparticles.

### **Abstract:**

A nanoparticle (NP) is a particle with a minimum of one dimension below 100 nm. [1] Due to their small size, nanoparticles exhibit unique physicochemical and biological properties and are used in various scientific fields such as nanotechnology, medicine, electronics and materials science.

In our research, we focus on polymer micelles, constructed with pluronic F-127 to encapsulate the chiral active compounds inside the nanocarriers. Chiroptical spectroscopies, in particular Electronic Circular Dichroism (ECD) and Raman Optical Activity (ROA), were used to study the assembling process of active compound (using carotenoids as an example) inside nanoparticles. Polymer micelles have also been used to encapsulate chiral nickel complexes, which exhibit ECD-Raman effects in apolar solvents, making it impossible to obtain a resonant ROA signal. [2] Encapsulation of chiral molecules in nanocarriers and their measurement in water can eliminate or reduce the ECD-Raman signal and make it possible to record real ROA spectra of chiral molecules, which provide detailed information about the structure of the compounds.

This work was supported by the National Science Centre Poland (NCN, OPUS19, project no. 2020/37/B/ST4/01168) and Research Support Module (WSPR.WCh.1.10.2022).

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- [2] T. Wu, et al., Angew. Chem. Int. Ed. 2020, 59, 21895-21898.

### **Keywords:**

chiral spectroscopy, nanoparticles



## DEVELOPMENT OF TECHNOLOGY FOR CERAMIC TILES WITH AN ANTIBACTERIAL NANO-AG BASED FUNCTIONAL COATING

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### A few words about the author(s):

The authors of the study are representatives of the Technological Department of Cerrad Ltd. company. The presented material is one of the topics realized by team as a part of R&D works.

### Abstract:

The developed technology allows the production of large-format dry-pressed ceramic tiles with low water absorption  $E \leq 0.5\%$  (BIa group). Obtained slabs can be used in practical applications as a wall tile, countertop, window sill or casing elements where the highest hygiene and sanitary standards are required. The described innovative antibacterial coating was made based on the modification of glaze by impregnating it with silver nanoparticles during the polishing process of the ceramic tile surface after firing at a temperature of approximately 1200 degrees C. The impregnation was performed using standard machines and tools using a developed antibacterial colloid (impregnation). The method allows to obtain a finished product with parameters consistent with the EN 14411:2012 standard and without deterioration of aesthetic and decorative values. Two types of antibacterial impregnations were used in the research, differing in the particle size distribution of the active substance (silver). In order to verify the effectiveness of the developed functional coatings, the samples were tested for antibacterial activity in accordance with the PN-EN ISO 22196:2007 standard. Using the same method, an attempt was also made to determine the durability of the obtained antibacterial coatings. For this purpose, was made a simulation of use by treatment surfaces of tiles by abrasion, detergents and strong acids and alkalis.

### Keywords:

nanosilver, functional coatings, antibacterial coatings, ceramic tiles, stoneware



## **APTAMER-BASED SOLUTION TO PREVENT THE DEVELOPMENT OF ACUTE KIDNEY INJURY IN DOGS INFECTED WITH BABESIA CANIS**

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*(2) Department of Parasitology, Institute of Zoology, Faculty of Biology, University of Warsaw*

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### **A few words about the author(s):**

I am MSc in biology. I am interested in innovative therapeutic agents in the field of kidney diseases.

### **Abstract:**

Babesiosis is a tick-borne disease caused by protozoa of the genus *Babesia*. It turns out that the most common complication of babesiosis in dogs is acute kidney injury (AKI). The mortality rate in dogs with this complication is approximately 50%. The main causes of kidney damage in babesiosis include renal hypoxia caused by anemia and hypotension, and the release of pro-inflammatory cytokines as a result of the systemic inflammatory response.

Due to the above, new solutions are being sought to reduce the risk of developing complications of babesiosis – including AKI.

Aptamers are single-stranded RNA or DNA oligonucleotides with a precisely defined spatial structure. Due to its properties – including, among others: specificity towards specific targets (e.g. proteins), low immunogenicity, non-toxicity or low production costs – these molecules may be a promising agent in preventing the development of AKI in the course of babesiosis.

In the proposed solution, aptamers should be directed against molecules involved in the development of AKI, including, among others, components of complement and TNF- $\alpha$  – a pro-inflammatory cytokine associated with, among others, dilation of blood vessels. This, in turn, may cause renal ischemia and hypoxia, and consequently AKI. Binding of selected enzymes produced by these protozoa also seems to be promising.

Further research is needed to assess the effectiveness and safety of the proposed solution in preventing AKI due to babesiosis in dogs.

### **Keywords:**

AKI, nephrology, babesiosis, aptamers





## RETENTION ANALYSIS OF TEST SUBSTANCES ON AN AMINE COLUMN

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*(2) Department of Chemical and Process Engineering, Chemical Faculty,  
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### **A few words about the author(s):**

Graduate of the Faculty of Chemistry at Rzeszow University of Technology, faculties: Biotechnology and Chemical and Process engineering. She is currently working on her doctoral dissertation on the study of the mechanism of sorption.

### **Abstract:**

Liquid chromatography (LC) processes are widely used in many areas, including the pharmaceutical, biotechnology, chemical industries. In liquid chromatography, it is important to take into account the influence of process conditions on the sorption mechanism. Experimental research is carried out to determine the impact of various factors, such as temperature, modifier composition or pH, on the sorption mechanism in liquid chromatography. Based on the conducted research, it is possible to select optimal conditions for the determination of test substances. In this presentation, experimental research was carried out on the effect of temperature on the sorption mechanism (using the van't Hoff relationship) and assessment of the efficiency of the tested column for selected chromatographic systems (using van Deemter's relationship). The test substances were phenol and caffeine, eluents 95%:5% v/v ACN:H<sub>2</sub>O/MeOH:H<sub>2</sub>O while the chromatographic column was filled with silica gel modified with amine groups. The process of determining the van Deemter curve is used in chromatography to examine the efficiency of a chromatographic column depending on the eluent flow rate which allows for optimization of chromatographic analysis conditions and improvement of sample resolution. Temperature changes affect the selectivity and efficiency of chromatographic separation of mixtures. Van't Hoff plots provide information on whether retention mechanisms change over the temperature range studied.

### **Keywords:**

adsorption, adsorbent, liquid chromatography, van Deemter, van't Hoff



## **THE INFLUENCE OF INORGANIC SELENIUM ON THE PHYSIOLOGICAL ACTIVITY OF SACCHAROMYCES CEREVISIAE AND RHODOTORULA GLUTINIS YEAST CELLS**

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### **A few words about the author(s):**

PhD student at the Warsaw University of Life Sciences (SGGW), conducting research as part of a grant project on the impact of selenium on the anhydrobiosis process and its influence on the physiological activity of yeast cells.

### **Abstract:**

In the study, the ability of selenium binding by the biomass of two different yeast strains, *S. cerevisiae* and *R. glutinis*, was investigated. The research examined how selenium influenced the yeast biomass yield and the extent of selenium accumulation by the tested yeast strains. Additionally, changes in the contents of carotenoid pigments in the biomass of *R. glutinis* yeast were observed. Finally, the impact of selenium on the intracellular protein and lipid content in yeast biomass was determined. The studies revealed that *S. cerevisiae* yeast strains, when grown in a medium containing an initial selenium concentration of 20 mg/L, were able to accumulate 4.27 mg of selenium per gram of dry weight. Red yeast *Rhodotorula glutinis*, on the other hand, could accumulate 7.53 mg of selenium per gram of dry weight when cultivated in a medium with selenium supplementation at a level of 40 mg/L. Selenium also had a significant impact on the production of carotenoid pigments, the quantity of which decreased with an increase in the selenium concentration in the medium.

This study was co-financed by the Preludium Bis 2 (2020/39/O/NZ9/00639) from the National Science Centre (NCN), Poland.

### **Keywords:**

selenium, *Saccharomyces cerevisiae*, *Rhodotorula glutinis*, selenium accumulation, yeast, supplementation



## **FUTURE OF MUSIC COMPOSING WITH THE USE OF AI TOOLS**

**Hanna Smolej**

*Maritime University of Szczecin*

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### **A few words about the author(s):**

I am keen on music. It has been one of the most influential things in my life. Not only do I love listening to music, I also love the process of how it's being produced.

### **Abstract:**

Nowadays most creative processes are being aided by AI tools. They include drawing, writing and music composing. The main focus of this presentation involves music composing and how ChatGPT and other AI tools can speed it up.

The first point to note is that by no means can AI replace human creativity, as of 2023 of course. Yet used properly can provide vast inspiration for further composing.

The second and a crucial issue is that ChatGPT isn't a general purpose machine that is capable of everything. That particular AI tool can make mistakes and, unless after a proper and prolonged training, is vulnerable to its limitations.

The goal of this presentation is to show, how cooperative work of a human and an AI can be in the future. What's more, how they can complete each other.

### **Keywords:**

AI, music, composing, creativity



## APPLICATION OF ARTIFICIAL INTELLIGENCE IN COMPUTER GRAPHICS

**Szymon Sobieraj**

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### **A few words about the author(s):**

My name is Szymon Sobieraj, I am a third-year student of IT at the Maritime University of Szczecin. I am highly empathetic and willing to help other people. My interests are the gym, computer games, building computers, and overclocking.

### **Abstract:**

In recent years, the use of artificial intelligence (AI) in computer graphics has expanded rapidly, offering new possibilities for generating graphics. Artificial intelligence can be used for a variety of tasks, such as automating graphics generation, recognizing objects in images, and automatically composing images. Machine learning algorithms analyze large datasets to identify patterns and replicate complex visual elements, which are used to generate realistic images and animations. This significantly reduced the time and effort required to create high-quality graphics. The article discusses the current state of artificial intelligence in computer graphics and its potential to transform the field, as well as the challenges and opportunities it faces.

### **Keywords:**

artificial intelligence, computer graphics, machine learning





## HOW VIDEO GAMES MAKE OUR LIVES EASIER

**Jakub Sulkowski**

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### **A few words about the author(s):**

An IT student that likes video games, cars. Has a head full of ideas but not enough life to put all of them to reality. "Speed and power" is my main motto.

### **Abstract:**

As we know, video games are a part of our everyday life and nothing is going to change about it anytime soon. Many media outlets picture them as a threat to society that promotes violence and anti-social behaviors. My presentation, „How video games make our lives easier” was made to contradict that image. In this presentation I’m going to explain how these works of culture saved millions taxpayers’ money, how they help stroke victims in the process of recovering and how, thanks to them, it was possible to crack the HIV virus.

### **Keywords:**

video games, HIV, save



## **ARTIFICIAL GENERAL INTELLIGENCE: HOW CLOSE ARE WE TO ACHIEVING THIS GOAL?**

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### **A few words about the author(s):**

Computer science student, who is passionate about programming and artificial intelligence tools on a daily basis.

### **Abstract:**

This paper aims to familiarize the reader more extensively with the concept of artificial general intelligence (AGI) and to determine when its development will take place. A literature review will be conducted as part of this paper.

The paper presents the advantages that the development of artificial general intelligence will bring to humanity, such as improvement of healthcare, combating climate change, and improving the effectiveness of companies. On the other hand, drawbacks are also outlined such as the threat to human security or the concentration of power in companies that have access to this technology. The literature review will also present the barriers and challenges in the development of AGI, the current state of research, and both contemporary and past estimates of when artificial general intelligence will be achieved.

The results of the research suggest that the development of artificial general intelligence is hard to determine, although speculations that this will happen within a few years are becoming more and more frequent.

### **Keywords:**

AGI, artificial general intelligence, artificial intelligence



## **ECONOMIC AND HEALTH-PROMOTING IMPORTANCE OF OATS (AVENA SATIVA)**

**Rafał Toczko**

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### **A few words about the author(s):**

PhD student at the Doctoral School at the University of Siedlce, Poland. My dissertation involves research in which the test crop is seed oats. Other agricultural interests include external soil organic matter, fertilization of winter wheat and corn.

### **Abstract:**

The cultivation of crops in monoculture for an extended period of time has been found to negatively affect the abundance of bacteria in both the soil and the rhizosphere of plants. Crop rotation is an important practice in protecting plants from disease, and careful consideration of phytosanitary impacts is necessary when arranging crop rotations. Oats have several advantages for farmers, including resistance to harsh climatic conditions and low heat requirements. It can be grown on poor soils and does not require much labor. Oats also show resistance to most root and stem base diseases and the ability to secrete compounds that limit the growth of certain fungi. Because of these properties, oats are considered the best forecrop for wheat in a rotation saturated with cereals. The presentation also discussed the herbal significance of oat straw and the health-promoting role of oats and ways to use them where oats and oat products are an important source of many valuable components of nutritional and biological importance, primarily proteins, fats, fiber, carbohydrates, and minerals and vitamins.

### **Keywords:**

oat, cultivation, crop rotation, oat straw, health properties of oats



# **EVALUATING THE TRANSFORMATION OF WEB DEVELOPMENT PARADIGMS: CATALYSTS OF EFFICIENCY IN CLOUD ARCHITECTURES VIA SERVERLESS TECHNOLOGY INTEGRATION**

**Kamil Załęski**

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## **A few words about the author(s):**

Expert in web development with over 15 y. experience, focused on AI, scalable infrastructures, and big data. Graduate of the University of Economics and Human Sciences in Warsaw, proficient in Ruby, Python, JavaScript, leading tech teams to innovate.

## **Abstract:**

The landscape of web development is undergoing a significant transformation, influenced by the advent of serverless technologies. This presentation by Kamil Załęski provides an in-depth analysis of the efficiency gains offered by serverless computing within cloud architectures. It explores the shift from traditional server-reliant models to event-driven, scalable systems, highlighting the practical implications through a case study of an AWS Lambda and DynamoDB-based reservation system. This system exemplifies the architectural evolution towards cost-effective, resilient, and manageable web applications. The session will critically assess the impact of serverless integrations on web architecture paradigms, offering insights into their potential for future web development practices.

## **Keywords:**

Cloud Infrastructure Efficiency, High-Performance Computing, Event-Driven Architecture





## THE USE OF METHYLENE BLUE IN THE PHOTODYNAMIC INACTIVATION OF *PROTEUS MIRABILIS*

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Wroclaw University of Science and Technology*

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### A few words about the author(s):

Anna Zdubek is currently a PhD student at the Wroclaw University of Science and Technology. Anna's research interests span the disciplines of chemistry and biology. Her work focuses on the photodynamic destruction of bacterial pathogens.

### Abstract:

The increasing resistance of bacteria to antibiotics is a major challenge for the modern world. A promising method to combat bacterial pathogens is photodynamic inactivation (PDI). This method is based on the use of light to excite a photosensitizer in order to generate ROS (reactive oxygen species). ROS react with compounds that are responsible for maintaining the integrity of cell membranes and/or genetic material, eventually leading to cell death [1]. The purpose of my study was to evaluate the effectiveness of the photosensitisation of bacteria using Methylene Blue. The study was carried out with the bacterial strain *Proteus mirabilis*. In this research, red laser light with a wavelength of 635 nm was applied. In order to obtain information on the viability of *P. mirabilis*, the bioluminescence assay was used, as well as culture techniques [2, 3]. The results obtained indicate that the use of red light and Methylene Blue in the photodynamic inactivation of *P. mirabilis* has proven to be effective.

### REFERENCES:

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- [2] Naghili H et al., Validation of drop plate technique for bacterial enumeration by parametric and nonparametric tests, *Vet Res Forum*, 4, 179-183, 2013.
- [3] Nguyen L.T. et al., The ATP bioluminescence assay: a new application and optimization for viability testing in the parasitic nematode *Haemonchus contortus*. *Vet. Res.*, 52, 124, 2021.

### Keywords:

photodynamic inactivation, photosensitizer, Methylene Blue, *Proteus mirabilis*, laser light

# ABSTRACTS OF POSTERS



## TECHNICAL AND NATURAL SCIENCES



## **RESEARCH AND DEVELOPMENT ON THE CREATION OF HIGH-QUALITY EXTRUDED FUNCTIONAL FOOD BASED ON AN INNOVATIVE TECHNOLOGICAL PROCESS ENSURING AN INCREASE IN THE NUTRITIONAL VALUE OF OBTAINED PRODUCTS**

**Paweł Głowacki (1), Anna Łowisz-Soból (2)\*, Marta Kutyna-Bakalarska (1)**

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### **A few words about the author(s):**

Paweł Głowacki – New Product Development Manager Team Leader in Maspex Group. Marta Kutyna-Bakalarska – Director of the Innovation Management Department in Maspex Group. Anna Łowisz-Soból – Technologist on the Research and Development Department in Lubella

### **Abstract:**

The subject of the project is to develop product innovation in the form of extruded products (pasta, breakfast cereals, texturized vegetable proteins) enhanced with natural ingredients—such as probiotics—and innovative manufacturing techniques, such as a new manufacturing method, guaranteeing better quality.

Within the framework of the 3 stages, various formulations of selected natural additives for blends were developed and tested from laboratory to industrial scale of the extrusion process, in order to select the combination with the best impact on nutritional value and quality parameters. The new technology has improved the efficiency of the manufacturing process and minimized its impact on the environment, significantly reducing energy and water consumption and allowing the dry production waste to be reused in greater quantities. After the implementation of the stage on a laboratory and semi-industrial scale the research team selected three groups of products for further research in the following stage, which include instant noodles, texturized vegetable proteins and extruded products with the addition of probiotic bacterial strains. Trials on full-industrial scale process lines were realized on these product groups. One of them is texturized vegetable proteins.

The product group was made from wheat, soy and pea raw materials. A conditioner and a twin-screw extruder were used (screw diameter  $D=42$  mm, (nominal) length of the screws  $L=1656$  mm and parameter  $L/D=40$ ).

### **Keywords:**

extrusion, cereal functional foods, high quality, enhanced nutritional value, texturized vegetable proteins





## MICROSCOPIC AND ELECTROCHEMICAL CHARACTERIZATION OF SILVER NANOPARTICLES PHOTODEPOSITED ONTO ANATASE COATING

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12 Tamka St., 91-403 Lodz, Poland*

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### **A few words about the author(s):**

Joanna Korzeniewska is a master student at the University of Lodz. Scientific interests: analytical chemistry, electrochemistry. Dr Barbara Burnat is a supervisor of Joanna Korzeniewska. Scientific interests: sol-gel method, biomaterials, corrosion.

### **Abstract:**

Silver nanoparticles (AgNPs) deposited onto biomedical coating ensures antibacterial properties of the metallic biomaterial. One of the possible ways to deposit the AgNPs on the biomaterial's surface is photochemical reduction of the silver ions.

The main goal of this study was to take the advantage of the photocatalytic activity of anatase to produce protective coatings modified with AgNPs for biomedical purposes. In this work, TiO<sub>2</sub> coatings were prepared on M30NW biomedical alloy samples using the dip-coating technique, and were heated at the temperature of 450°C to obtain an anatase structure. Further, three series of AgNPs were photochemically reduced on the samples coated with the anatase layer using silver nitrate at different concentrations and using different UV exposure times.

The influence of AgNPs on the properties of TiO<sub>2</sub> coating was determined by analysis of morphology, topography and corrosion properties in PBS solution that simulates body solution. It was found that the morphology and the amount of photochemically generated AgNPs differ depending on the concentration of AgNO<sub>3</sub> solution and the time of UV irradiation. It was found that the deposition of AgNPs on the TiO<sub>2</sub> surface caused an increase in the electrochemical reactivity of the tested samples.

The research was conducted within the Students Research Grant founded by the University of Lodz.

### **Keywords:**

nanoparticles, photochemical reduction, sol-gel, biomedical coating





## ASSESSMENT OF THE TECHNOLOGICAL SUITABILITY OF SEMOLINA OBTAINED FROM POLISH DURUM WHEAT CROPS

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### A few words about the author(s):

The authors of the poster are employees of PZZ Lubella in Lublin, the main manufacturer of pasta products and other cereal and flour products in Poland.

### Abstract:

Semolina, derived from *Triticum durum*, is a type of raw material that is chosen by pasta manufacturers in many countries, as it is considered the best raw material for pasta production. The quality of pasta is determined by the market, i.e. consumers, who choose pasta with a natural uniform yellow color, without gray discoloration. The quality of pasta available on the market is influenced by three main factors: the raw material, the pasta production process and the recipe. In order to obtain the above characteristics of pasta, it is necessary to meet certain conditions for high quality raw materials used in the production of pasta, i.e. optimal technology for milling durum wheat, from which semolina is obtained, and a properly conducted technological process of pasta production. The purpose of this study was to evaluate the effect of the addition of semolin from durum wheat varieties grown in Polish climatic conditions on the physicochemical and rheological parameters of the raw material for pasta production.

Based on the results obtained, the following relationships were observed: An increase in protein and gluten content and an increase in the gluten index. An increase in the elasticity of the dough P and an improvement in the baking strength W were found in the samples containing 25% of the durum wheat varieties grown in Poland.

### Keywords:

durum wheat, semolina, quality



## **TECHNOLOGY OF OBTAINING BISPHENOL TMC MODIFIER OF INNOVATIVE POLYCARBONATES**

**Sławomir Napiórkowski\*, Katarzyna Zielińska, Bogusław Tkacz, Betina Wąsik,  
Przemysław Bartoszewicz, Beata Koreń-Szwarc**

*Łukasiewicz Research Network – Institute of Heavy Organic Synthesis "Blachownia"*

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### **A few words about the author(s):**

PhD Sławomir Napiórkowski is senior specialist in the Catalytic Processes Research Group. His research activity focuses on developing technologies for obtaining phenol derivatives, catalytic processes in organic chemistry and plastic additives area.

### **Abstract:**

Bisphenol TMC is an organic compound belonging to the group of bisphenols. It is used as an innovative additive to polycarbonates based on bisphenol A, creating materials with unique properties. These properties include a high glass transition temperature (up to 220 °C) with unchanged transparency and improved rheological and structural properties. The demand for this type of plastics is the most dynamically developing market in the plastics sector. Bisphenol TMC is obtained as a product of the condensation reaction of phenol with 3,3,5-trimethylcyclohexanone in the presence of an acid catalytic system. Łukasiewicz - ICSO "Blachownia" is engaged in research on the production, purification and isolation of TMC bisphenol, implementing a research project financed from the PC\_MODULE special purpose subsidy "BPTMC - an addition to the production of innovative structural polycarbonates for modular construction.

### **Keywords:**

BPTMC, Bisphenol TMC, condensation, organic chemistry



## **ASSESSMENT OF THE ABILITY OF CANDIDA SUBHASHII TO BIODEGRADE POLYOCTENAMER**

**Katarzyna Nejman\*, Anna Brillowska-Dąbrowska, Łukasz Zedler, Agnieszka Pladzyk**

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### **A few words about the author(s):**

Katarzyna Nejman graduated with a master's degree in Biotechnology, specializing in molecular biotechnology, at the Gdańsk University of Technology. The research problem she presented was one of the goals of her master's thesis.

### **Abstract:**

The main problem faced by the plastics industry is the disposal of already used materials. Currently used methods of plastic waste management are insufficient and are not neutral to the environment. The growing problem of plastic pollution has a negative impact on aquatic and terrestrial ecosystems and the life and health of people and animals. There is an urgent need to improve current disposal methods, e.g. by using microorganisms and their enzymes for the initial biodegradation of plastics. This research focuses on the preliminary assessment of the biodegradability of polyoctenamer by fungi of the genus *Candida* spp. In order to assess the biodegradation of selected materials, FTIR spectra and surface imaging using SEM were performed for the tested samples. For TOR samples incubated with *C. subhashii*, the appearance of new functional groups, such as hydroxyl and carbonyl and the disappearance of the peak originating from the carbon-carbon double bond was observed. Observations using an electron microscope showed damage to the surface of the materials, which indicates colonization of their surface by the tested fungi.

### **Keywords:**

*Candida*, plastic, biodegradation, TOR, polyoctenamer



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