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9th edition

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TABLE OF CONTENTS

HUMANITIES SCIENCES PRESENTATIONS

Marek Bryja THE HISTORY AND DEVELOPMENT OF THE SLOVAK ASSOCIATION IN POLAND	8
Krzysztof Chmielewski MANAGING DECISION INERTIA IN CONTEMPORARY VIDEO GAMES: A CLASSIFICATION	9
Salih Ahmed Elfurti THE IMPACT OF INFLATION AND GDP PER CAPITA ON THE FOREIGN DIRECT INVESTMENT IN LIBYA	10
Sylvia Kaluża FOOD PACKAGING AS A COMMUNICATION VEHICLE: A PRAGMALINGUISTIC AND SOCIOLINGUISTIC ANALYSIS	11
Karina Adamkiewicz ARTIFICIAL INTELLIGENCE AS A KEY COMPETENCE OF THE FUTURE EMPLOYEE – HOW AI IS CHANGING LABOR MARKET REQUIREMENTS	12
Joanna Chrząszcz CIVIL LAW CONTRACTS DIFFERENCES FROM THE EMPLOYMENT CONTRACTS AND SELF EMPLOYMENT	13
Joanna Gregorczyk-Prosička FEATURES OF CONTEMPORARY MOTHERHOOD IN THE WOMEN-MOTHERS NARRATIVES	14
Aleksandra Krzywda COSTS OF OBTAINING INCOME, AND COSTS THAT ARE NOT TAX DEDUCTIBLE COSTS	15
Ewa Łapińska THE FORM OF A WILL IN POLISH INHERITANCE LAW – STAGNATION OR MODERNIZATION?	16
Martyna Rosa GENERATIONAL DIFFERENCES IN PERCEPTION AND USE OF TECHNOLOGY AT WORK	17
Piotr Rudnicki THE EXTENT OF THE IMPACT OF VARIOUS INDICATORS ON THE IMPLEMENTATION OF RENEWABLE SOURCES AS GRASPED BY THE STUDY OF THE PODKARPACIE PROVINCE	18

MEDICAL SCIENCES PRESENTATIONS

Klaudia Babiak, Natalia Gembarowska, Ewelina Polak-Szczybyło POPULARIZATION OF ALTERNATIVE TREATMENT METHODS AMONG THE AMAZONS FROM THE PODKARPACIE REGION	20
Karolina Jankowska, Weronika Wójtowicz, Karolina Bajdak-Rusinek PRESENCE AND INVOLVEMENT OF SPLICING REGULATORS ESRP1 AND ESRP2 IN THE EPITHELIAL-MESENCHYMAL TRANSITION (EMT) PROCESS IN BLADDER CANCER CELLS	21
Aleksandra Kiper THE USE OF BIOFEEDBACK IN SENSORY INTEGRATION THERAPY FOR CHILDREN WITH SENSORY PROCESSING DISORDERS – A CASE STUDY	22
Janina Rzeszot PHYSIOTHERAPY AS AN AID IN THE FUTURE FUNCTIONING OF A PATIENT WITH DEMENTIA	23



National Scientific Conference Knowledge - Key to Success

9th edition

Maja Świdarska NUTRITION IN HYPERTENSION: SUPPORTING CARDIOVASCULAR HEALTH THROUGH AN APPROPRIATE DIET	24
Justyna Tokarewicz THE IMPACT OF MYOCARDIAL INFARCTION ON THE QUALITY OF LIFE, ACCEPTANCE OF THE DISEASE AND HEALTH BEHAVIORS OF PATIENTS TREATED INTERVENTIONALLY	25
Katarzyna Bazylewicz-Zakrzewska THE PURPOSE AND UTILITY OF LI-RADS IN LIVER LESION DIAGNOSIS	26
Gabriela Biedroń CERVICAL AND LUMBAR SPINE PAIN AMONG PEOPLE WORKING REMOTELY – HOW TO MANAGE IT?	27
Joanna Huk, Martyna Mydlikowska, Julia Rarok, Kacper Kazimierczuk, Jakub Sadowski APPLICATION OF ARTIFICIAL INTELLIGENCE IN RADIOLOGY	28
Kacper Kazimierczuk, Julia Rarok, Martyna Mydlikowska, Joanna Huk, Jakub Sadowski EFFECTS OF CANNABINOIDS ON THE FUNCTIONING OF THE CENTRAL NERVOUS SYSTEM	29
Tomasz Klaudel, Jakub Sadowski, Michał Pelczarski, Michał Sikorski CURRENT STATE OF KNOWLEDGE ABOUT GITELMAN SYNDROME	30
Martyna Mydlikowska, Joanna Huk, Kacper Kazimierczuk, Julia Rarok, Jakub Sadowski NEW PERSPECTIVES IN THE DIAGNOSIS AND TREATMENT OF ALZHEIMER'S DISEASE	31
Michał Pelczarski, Michał Sikorski, Jakub Sadowski, Tomasz Klaudel CURRENT STATE OF KNOWLEDGE ABOUT DEVIC'S DISEASE, LITERATURE REVIEW	32
Julia Rarok, Kacper Kazimierczuk, Joanna Huk, Martyna Mydlikowska, Jakub Sadowski CURRENT STATE OF KNOWLEDGE ABOUT TERSON SYNDROME	33
Jakub Sadowski, Tomasz Klaudel, Michał Sikorski, Michał Pelczarski COVID-19-RELATED ENCEPHALOPATHY: PATHOPHYSIOLOGY, SYMPTOMS, AND THERAPEUTIC CHALLENGES	34
Michał Sikorski, Michał Pelczarski, Tomasz Klaudel, Jakub Sadowski TREATMENT METHODS FOR TETRALOGY OF FALLOT	35
Dominik Sroka HIDDEN TREASURES OF NATURE: SELECTED EXAMPLES OF NATURAL SUBSTANCES THAT HAVE PROVEN TO BE CRUCIAL FOR MODERN MEDICINE	36
Wojciech Strzalek PRECISION MEDICINE: HOW KNOWLEDGE OF GENES IS CHANGING THE WAY WE TREAT DISEASES	37
Wiktor Trojanowski THE IMPACT OF POPULAR DIETARY SUPPLEMENTS IN STRENGHT TRAINING ON HUMAN PHYSIOLOGY	38
Szymon Zakrzewski, Radosław Kiedrowicz THE ROLE OF EPICARDIAL AND ENDOCARDIAL ABLATION IN MANAGING ELECTRICAL STORM IN PATIENTS WITH VENTRICULAR TACHYCARDIA – A CLINICAL CASE	39



MEDICAL SCIENCES POSTERS

Natalia Kubryń, Adrianna Witczyńska, Alicja Nowaczyk, Łukasz Fijałkowski A NEW THERAPEUTIC APPROACH UTILIZING PROTAC: A STUDY ON THE BLOOD-BRAIN BARRIER PENETRATION OF ATORVASTATIN, LOVASTATIN, AND PRAVASTATIN	41
Eryk Prajwos NON-SURGICAL METHODS OF ACCELERATING TOOTH MOVEMENT	42
Zuzanna Rogacz, Wiktoria Pacula, Kacper Kalarus, Ilona Nowak, Barbara Strzałka-Mrozik THE ROLE OF WNT/B-CATENIN SIGNALING PATHWAY IN COLORECTAL CANCER	43
Natalia Szarek COMPARISON OF TOTAL HEMISPHERICAL REFLECTANCE AND EMISSIVITY OF TABLETS CONTAINING DIHYDROXY ALUMINUM SODIUM CARBONATE DEPENDING ON THE TIME OF STORAGE IN AMBIENT AND STRESS CONDITIONS	44
Adrianna Witczyńska, Kamila Blecharz-Klin, Katarzyna Ziętał, Justyna Pyrzanowska, Agnieszka Piechal, Dagmara Mirowska-Guziel, Łukasz Fijałkowski, Natalia Kubryń, Alicja Nowaczyk EFFECTS OF PRORPANOLOL IN ALLEVIATING SITUATIONAL ANXIETY – IN SILICO AND IN VIVO STUDIES	45

TECHNICAL AND NATURAL SCIENCES PRESENTATIONS

Katarzyna Hoffa, Artur Jędrzak, Maria Kuznowicz, Teofil Jesionowski INNOVATIVE CORE-SHELL HYBRID MATERIAL AS A PLATFORM FOR THE CONSTRUCTION OF ENZYMIC BIOSENSOR SYSTEM FOR METABOLITE DETECTION	47
Adam Piech, Krzysztof Kanawka A CONCEPT FOR HYBRID GNSS/UWB NAVIGATION SYSTEM FOR AIRCRAFT GROUND HANDLING ASSETS TRACKING	48
Krzysztof Kanawka, Adam Piech USE OF LATTICE STRUCTURES FOR VARIOUS COMPONENTS OF SATELLITES	49
Daniel Kapuściński, Agnieszka Łapczuk THE REACTION OF CYCLOPENTADIENE DERIVATIVES IN THE LIGHT OF QUANTUM-CHEMICAL CALCULATIONS BASED ON DENSITY FUNCTIONAL THEORY	50
Kamila Kuśmierczyk GEOSMIN: THE SMELL OF RAIN AND THE TASTE OF CHRISTMAS CARP	51
Kamila Kuśmierczyk THE IMPACT OF PET OWNERSHIP ON GUT MICROBIOTA AND HUMAN HEALTH	52
Vitalii Morskyi AI-POWERED TRIP DISCOVERY: BALANCING CONSTRAINTS AND ATTRACTIVENESS	53
Jerzy Sobkowski, Szymon Mieloch, Danuta Stefańska, Przemysław Głowacki, Gustaw Szawiola COST-EFFICIENT ODMR EXPERIMENTAL SETUP WITH TEMPERATURE CONTROL OF A SAMPLE IN RANGE OF MAMMALS' INTERNAL TEMPERATURES	54
Klaudia Sowińska REGENERATIVE AGRICULTURE	55



National Scientific Conference Knowledge - Key to Success

9th edition

Oleksandra Yakovlieva, Grzegorz Wagner, Mirosław Zagaja, Ewa Pietrykowska-Tudruj, Bernard Staniec, Agnieszka Kaczmarczyk-Ziemba PRELIMINARY EVALUATION OF THE GENETIC DIVERSITY OF ENDOSYMBIOTIC BACTERIA WOLBACHIA INFECTING MYRMECOPHILOUS BEETLES MONOTOMA ANGUSTICOLLIS AND M. CONICICOLLIS (INSECTA: COLEOPTERA)	56
Julia Zabiegaj, Przemysław Zaręba SYNTHESIS OF NEW BIOLOGICALLY ACTIVE N-{4-[(4-METHYL-3,4-DIHYDROQUINAZOLIN-2-YL)AMINO]BUTYL}ARYLSULFONAMIDES	57
Dominika Krzysztofik, Seweryn Żubrowski, Szymon Buda FROM REACTION TO APPLICATION: THE SYNTHESIS OF CHALCONES AND THEIR APPLICATIONS	58
Bogdan Marczak, Aleksandra Bocian, Andrzej Łyskowski ANALYSIS OF THE ANTIMICROBIAL PEPTIDE AMP DATABASES	59
Piotr Michałowski, Dorota Jakubczyk, Katarzyna Bielicka – Daszkiewicz FUNGAL PROPERTIES OF RUBELLIN-TYPE SECONDARY METABOLITES CHARACTERISED BY CHEMOINFORMATICS TOOLS	60
Miłosz MocarSKI SYNTHESIS OF COVALENT PD-L1 PROTEIN INHIBITORS TARGETING THE LYSINE RESIDUE	61
Katarzyna Stach ASSESSMENT OF THE POSSIBILITY OF USING RAMAN SPECTROSCOPY IN FINGERPRINT ANALYSIS	62
TECHNICAL AND NATURAL SCIENCES POSTERS	
Zuzanna Borchert, Tomasz Klimczuk MAGNETIC, THERMAL AND TRANSPORT PROPERTIES OF C14 LAVES COMPOUND SMRU ₂	64
Patrycja Leśniak HIDDEN DANGERS OF THE CITY: PARASITES IN URBAN SPACES AND THEIR IMPACT ON DOGS ..	65
Kacper Lewikowski, Kacper Siwiak, Alicja Szot TELEMEDICINE IN VETERINARY PRACTICE THE FUTURE OF ANIMAL CARE IN THE DIGITAL AGE	66
Kacper Lewikowski, Alicja Szot, Kacper Siwiak THE IMPACT OF CLIMATE CHANGE ON THE SPREAD OF INFECTIOUS DISEASES IN ANIMALS	67
Piotr Michałowski, Dorota Jakubczyk, Katarzyna Bielicka – Daszkiewicz CHEMOINFORMATICS SIMULATION OF LIGAND-PROTEIN INTERACTIONS USING SECONDARY METABOLITES OF THE FUNGUS RAMULARIA COLLO-CYGNI AS A MODEL	68
Kacper Siwiak, Alicja Szot, Kacper Lewikowski IMPACT OF MICROPLASTICS ON THE HEALTH OF AQUATIC AND TERRESTRIAL ANIMALS	69
Kacper Siwiak, Kacper Lewikowski, Alicja Szot ANTIBIOTIC RESISTANCE IN VETERINARY MEDICINE: CHALLENGES AND STRATEGIES TO COMBAT A GLOBAL ISSUE	70
Alicja Szot, Kacper Lewikowski, Kacper Siwiak EXPLORING THE MICROBIOME: IMPLICATIONS FOR HEALTH AND DISEASE	71
Alicja Szot, Kacper Siwiak, Kacper Lewikowski THE ROLE OF KNOWLEDGE IN OVERCOMING GLOBAL CHALLENGES	72

ABSTRACTS OF
PRESENTATIONS



**HUMANITIES
SCIENCES**



THE HISTORY AND DEVELOPMENT OF THE SLOVAK ASSOCIATION IN POLAND

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Based in Poland, holds a master's degree in Ethnology from the University of Ss. Cyril and Methodius in Trnava. He is dedicated to preserving Slovak culture and pursuing a PhD on the Slovak minority in Poland, while also working as an educator.

Abstract:

The Slovak Association in Poland (Towarzystwo Słowaków w Polsce) represents a critical institution for preserving the cultural, linguistic, and national identity of the Slovak minority in Poland. This abstract outlines the association's historical development, objectives, and evolving role in socio-cultural integration. The association emerged as a response to the sociopolitical challenges faced by the Slovak community post-World War II. Its primary goals included the preservation of Slovak traditions, support for Slovak-language education, and fostering cross-border connections with Slovakia.

Over the decades, the association adapted to changing political climates, from the constraints of the socialist era to the opportunities presented by Poland's integration into the European Union. Key initiatives have included the organization of cultural festivals, publishing Slovak-language materials, and advocating for minority rights. However, the association has also faced challenges, such as demographic shifts, linguistic assimilation, and maintaining relevance among younger generations.

This analysis provides an overview of the Slovak Association's contributions to fostering cultural heritage while highlighting its strategies for addressing contemporary challenges. The study emphasizes the importance of institutional efforts in safeguarding the cultural diversity and promoting the integration of ethnic minorities in modern Europe.

Keywords:

Slovak Association in Poland, national identity, Slovak minority, cultural preservation, modern Europe



MANAGING DECISION INERTIA IN CONTEMPORARY VIDEO GAMES: A CLASSIFICATION

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A few words about the author(s):

Krzysztof is Research & Teaching Assistant of Game Design at Kazimierz Wielki University in Bydgoszcz, Poland. His research interests involved gaming technologies, game design studies, and AI in games.

Abstract:

The concept of "inertia," defined as the temporal gap between a player's decision and the delivery of final in-game feedback, is well established in academic literature. However, research on design patterns for managing player inertia in contemporary video games remains limited. This study presents preliminary findings from ongoing research that introduces a novel approach to managing gameplay inertia within quest design.

Through a comprehensive literature review and an analysis of quest structures and gameplay in over 110 contemporary single-player video games published between 2004 and 2024, four primary tools for managing inertia are identified: optional sidequests, cinematics (including cutscenes), meta-game messages, and environmental storytelling. These techniques are subsequently associated with their predominant game genres and examined through the lens of design patterns.

The analysis explores how these tools function as inertia management strategies, with particular attention to their application and interrelation within single-player experiences. The study concludes with a projection of future developments in the use of these techniques, as well as their potential patterns of integration in the evolving landscape of single-player video game design.

Keywords:

game design, game design studies, game studies, quest design, inertia



THE IMPACT OF INFLATION AND GDP PER CAPITA ON THE FOREIGN DIRECT INVESTMENT IN LIBYA

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Libyan Citizen. Currently PHD study at University of GDAŃSK, Faculty of Economics and Finance. Last three years a senior fund accountant at State Street Co, Gdansk. BNP Bank Co, Warsaw. BNY Mellon Co, Wroclaw, Poland.

Abstract:

The main aim of this paper is to examine the impact of macroeconomic factors such as inflation rate and GDP per capita on the foreign direct investment (FDI) inflow in Libya. By collecting data from the United Nations Trade and Development (UNCTAD) Report for the Period (1990-2021). The model applied in this research is a multiple linear regression model using the Autoregressive Distributed Lag (ARDL). This method was established by Resaran in 2001. The Augmented Dickey-Fuller (ADF) unit root test was used to find the stationary time series for the data. The cointegration approach uses the Bounds test to analyze the relationship between variables.

Keywords:

economic growth, foreign direct investment, GDP per capita, inflation rate, openness trade



FOOD PACKAGING AS A COMMUNICATION VEHICLE: A PRAGMALINGUISTIC AND SOCIOLINGUISTIC ANALYSIS

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A few words about the author(s):

My name is Sylwia Kałuża. I am a graduate of Swedish philology and German philology and am currently continuing my studies for a master's degree in German philology. I am interested in linguistics and sociology.

Abstract:

Food packaging not only has a protective function, but is also an important element of communication between producers and consumers.

The subject of the article's research is food packaging of gluten-free products, vegan products and sweets of well-known companies. An attempt will be made to analyse food packaging in the context of pragmalinguistics and sociolinguistics, with a particular focus on the communicative function. From the pragmalinguistic point of view, the role of food packaging is not only to convey information about the product, the ingredients and the target group, but also to shape the interaction between the producer and the consumer. This is possible through the use of various linguistic and persuasive means.

In sociolinguistic terms, food packaging is a space where different cultural, social and linguistic codes clash, reflecting the demographic diversity of consumers. The article undertakes an analysis of the use of specific linguistic strategies, such as metaphors, emotive language, or persuasion, depending on the target group. Differences in the way information is communicated on packaging depending on culture will also be explored, as well as how these differences may affect consumers' perceptions of the product. The aim of the article is to show packaging as dynamic communicative texts that combine informational functions with socio-cultural elements, constituting an important area of research in pragmalinguistics and sociolinguistics.

Keywords:

food packaging, food, sociolinguistic, pragmalinguistic



ARTIFICIAL INTELLIGENCE AS A KEY COMPETENCE OF THE FUTURE EMPLOYEE – HOW AI IS CHANGING LABOR MARKET REQUIREMENTS

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A few words about the author(s):

Karina Adamkiewicz – a master's student in Management at the Military University of Technology. She is passionate about modern work models and technologies supporting management in dynamic environments, actively engaging in scientific and research projects.

Abstract:

Artificial Intelligence (AI) is a groundbreaking technology significantly influencing the labor market by redefining required competencies in various professions. AI offers opportunities to enhance efficiency and innovation but also raises concerns about job losses, particularly in sectors vulnerable to automation, such as sales and administration. This paper examines the role of AI as a key competence of future employees, analyzing its impact on the development of professional skills, the emergence of new occupations, and social inequalities. It also highlights the importance of integrating technical and soft skills and the need for responsible AI implementation to mitigate potential inequalities.

Keywords:

artificial intelligence, labor market, automation, professional competencies, social inequalities



CIVIL LAW CONTRACTS DIFFERENCES FROM THE EMPLOYMENT CONTRACTS AND SELF EMPLOYMENT

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A few words about the author(s):

I am a 2nd year student of Economics in Sanok. I like new religions, I take part in various competitions.

Abstract:

My presentation shows what civil law contracts, contracts of mandate, employment contracts are. Ways of terminating the contract depending on its type. It suggests when and what form of employment to choose. It shows the key differences between the forms of employment.

Keywords:

contract, employer, employee, work, contribution



FEATURES OF CONTEMPORARY MOTHERHOOD IN THE WOMEN-MOTHERS NARRATIVES

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Joanna Gregorczuk-Prosicka – research assistant at the Faculty of Education, University of Białystok. Since 2017, an employee of the Department of Sociology of Education and Social Gerontology. A social worker and educator by profession.

Abstract:

The presentation entitled "Features of contemporary motherhood in the women-mothers narratives" will be devoted to a review of Polish scientific literature on the subject of motherhood and to presenting some of the results of my own research conducted among mothers of small children. The first part of the presentation concerns motherhood as a fundamental social role of women, features of contemporary motherhood and theory. The author writes, among others, that according to Małgorzata Sikorska (2009), the features of contemporary motherhood are: uncertainty, loneliness and excessive focus on expert advice. The second part of the presentation is an empirical part. The presentation cites the results of my own research conducted among mothers of small children (0-3 y.o.). The research was conducted using the qualitative method and in-depth individual interviews. A fragment of the presented research results is an attempt to compare what the surveyed women said about motherhood and what the Polish scientific literature says.

Keywords:

motherhood, women, mothers, narratives



COSTS OF OBTAINING INCOME, AND COSTS THAT ARE NOT TAX DEDUCTIBLE COSTS

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A few words about the author(s):

I am a 2nd year economics student in Sanok. He is often involved in various university projects. I am interested in sports and I really like music. I strive to develop my skills by participating in conferences.

Abstract:

My presentation shows what tax-deductible costs are and what is not tax-deductible. I showed the types of costs and the characteristics of fixed and variable costs. The differences between costs and expenses are described. I also included examples of expenses that employees can include in tax-deductible costs. I explained the concept of the meaning of NKUP and the catalog of expenses included in NKUP. Costs that are not tax-deductible include representation, fines and monetary penalties. I wrote about expenses related to contractual penalties and compensation, as well as cash payments above PLN 15,000. I compared the main differences between NKUP and tax deductible costs. In the summary, I included the above terms that I included in my work.

Keywords:

expense, NKUP, representation, remuneration, energy



THE FORM OF A WILL IN POLISH INHERITANCE LAW – STAGNATION OR MODERNIZATION?

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A few words about the author(s):

The author is a PhD student at the Doctoral School of the University of Białystok.

Abstract:

The legally guaranteed possibility of making a will opens up a wide range of possibilities for testators, expressed primarily in the subjectivization of the order of inheritance by taking into account both factual circumstances and interpersonal relations. Although the legal provisions regulating the form of a will are extremely important from the perspective of society, the legislator decided to introduce minor changes within the aforementioned regulations. It should be emphasized that all changes focused on the allographic will. Over the period of the Civil Code, significant technological progress and social changes can be observed. In view of the above, it is worth considering what attitude the legislator should adopt towards the regulations regarding the form of a will. To be more precise, taking into account the expectations of society and the current development of technology, modernization or stagnation of the provisions of inheritance law under consideration would be justified.

Keywords:

inheritance law, will, amendment



GENERATIONAL DIFFERENCES IN PERCEPTION AND USE OF TECHNOLOGY AT WORK

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A few words about the author(s):

Master's student in psychology in management at the Jagiellonian University in Krakow. Interested in the issue of management in remote and hybrid working, as well as in generational diversity from various aspects.

Abstract:

This article explores the differences in how generations X, Y and Z perceive and use technology in the workplace. The use of interviews enabled an in-depth exploration of the preferences, advantages and obstacles of using technology at work. The results reveal that Generation X relies on reliable and proven solutions, while Generation Y leans towards technologies that improve teamwork and project management. Generation Z, on the other hand, is characterised by its willingness to embrace innovation and quickly adopt new tools. Each generation faces unique barriers, from insufficient training to inadequate technical support. The article highlights the need to adapt technology deployment strategies to meet the differing needs of these generations and to foster collaboration between them in order to successfully navigate multi-generational working environments.

Keywords:

generation X, generation Y, generation Z, multigenerational management, technology preferences



**THE EXTENT OF THE IMPACT OF VARIOUS INDICATORS
ON THE IMPLEMENTATION OF RENEWABLE SOURCES
AS GRASPED BY THE STUDY OF THE PODKARPACZKIE PROVINCE**

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A few words about the author(s):

I am a graduate of the Faculty of Electrical Engineering and Faculty of Management at the University of Warsaw. My scientific interests apply to issues connected with managing the energy sector, to be precise renewable energy sources market.

Abstract:

The purpose of the article is to identify and discuss indicators affecting the implementation of renewable energy sources in the perspective of the Podkarpackie province. To achieve the goal, a qualitative and quantitative study was designed, which employed the following research methods and techniques: analysis of foundational data, a follow-up survey in the form of interviews with authorities and community organizations plus qualitative individual in-depth interviews by telephone (TDI) with residents in the form of a questionnaire using the CAWI technique. The article identifies selected indicators, a form of differentiation of phenomena by objective, measurable factors and various impacts of RES implementation. The following instruments were studied: subsidies, support programs, loan concessions and their impact on indicators: socio-cultural, knowledge and environmental awareness, social acceptance of photovoltaics or even traditions and cultural values in addition to attitudes towards innovation and technological solutions. The article is a valuable starting point for further RES research.

Keywords:

renewable energy sources, photovoltaics, RES implementation indicators, qualitative and quantitative research.

ABSTRACTS OF
PRESENTATIONS



**MEDICAL
SCIENCES**



POPULARIZATION OF ALTERNATIVE TREATMENT METHODS AMONG THE AMAZONS FROM THE PODKARPACIE REGION

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Klaudia Babiak and Natalia Gembarowska are Dietetics students at the University of Rzeszów. They create educational materials and social media content to promote health. Dr. Ewelina Polak-Szczybyło is an author of publications, dietitian and lecturer.

Abstract:

According to the National Cancer Registry, 1.17 million people in Poland struggle with cancer. Awareness of the threat often leads patients to make emotional decisions about treatment, lacking critical assessment. Alternative treatments like bioresonance, live blood drop, homeopathy, bioenergy therapy, acupuncture, and phytotherapy can worsen health or even cause death.

An anonymous survey of 32 Amazons showed 65.6% were in remission, while 34.4% were still undergoing treatment. Over half (56.3%) knew about alternative methods. Opinions on their effectiveness varied: 37.5% found them ineffective, 12.5% effective, and 50% had no opinion. Knowledge sources included family, friends, and the Internet. The most popular methods were homeopathy, acupuncture, and phytotherapy (38.9% each), used by 6 women (18.8%). Among them, 3 used phytotherapy and 2 used homeopathy, but none observed benefits.

For most, alternative treatments were complementary and usually consulted with a doctor (83.3%). Factors like age, place of residence, and disease duration did not significantly affect knowledge ($p>0.05$). However, women with higher education showed greater interest ($p=0.024$). While women with cancer explore alternative methods, few actually use them, and most consult their doctor first.

Keywords:

alternative medicine, alternative therapies, oncology, cancer patients, treatment choice



PRESENCE AND INVOLVEMENT OF SPLICING REGULATORS ESRP1 AND ESRP2 IN THE EPITHELIAL-MESENCHYMAL TRANSITION (EMT) PROCESS IN BLADDER CANCER CELLS

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Abstract:

The aim of the project is to investigate whether splicing regulators ESRP1 and ESRP2 are present and involved in the Epithelial to Mesenchymal Transition process (EMT) in bladder cancer cells.

A better understanding of the molecular mechanisms of this cancer, would allow specialists to treat patients more effectively. A process worth studying in detail is EMT, by which epithelial cells can transform into mesenchymal cells under certain physiological or pathophysiological conditions. In our study, we checked for the EMT profile, in four commercially available cell lines from invasive (T-24 and UM-UC-3) and non-invasive (RT-4 and 5637) bladder cancer. We analyzed the expression of SNAIL, SLUG, TWIST and ZEB1 genes, as well as EMT markers E-cad and Vim by RT-qPCR. At the same time, we checked if and what the expression levels of ESRP1 and ESRP2 were in these lines. Previous studies have documented the role of ESRP1 in the EMT process in breast, lung, pancreatic cancer cells, while there are no reports yet on the mechanisms of the epithelial-mesenchymal process in bladder cancer cells involving these regulatory proteins. Understanding the mechanism of ESRP1/2 action in the EMT process in bladder cancer is a crucial element in understanding the progression of this cancer, may help in developing therapeutic strategies that inhibit the development of treatment-resistant bladder cancers and provide additional prognostic information.

Keywords:

bladder cancer, EMT, ESRP1, ESRP2



THE USE OF BIOFEEDBACK IN SENSORY INTEGRATION THERAPY FOR CHILDREN WITH SENSORY PROCESSING DISORDERS – A CASE STUDY

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Aleksandra Kiper is PhD student at the Doctoral School of the University of Rzeszów.

Abstract:

Sensory Processing Disorder (SPD) affects how the nervous system receives and processes sensory stimuli, leading to abnormal motor and behavioral responses. The integration of biofeedback methods with Sensory Integration Therapy (SI) may provide an innovative approach in the treatment of children with SPD. This study describes the case of a 10-year-old boy with SPD who underwent a comprehensive sensory-motor assessment using standardized SI tests, as well as the Rey Auditory Verbal Learning Test (AVLT) and the Bourdon–Wiersma Test. The therapeutic plan involved combining SI techniques with bilateral and coordination exercises, as well as concentration and attention training, enriched by biofeedback using the Orthoptic Snail application. Assessments were conducted at the beginning of therapy, after one year, and after two years of regular sessions. The results showed significant improvement in sensory processing, motor skills, sensory modulation, and praxis, along with increased concentration abilities and a reduction in behavioral problems. This case study highlights the potential of a combined therapeutic approach, indicating the high effectiveness of biofeedback as an adjunct to SI therapy in working with children with SPD.

Keywords:

Sensory Processing Disorder, Sensory Integration Therapy, rehabilitation, biofeedback



PHYSIOTHERAPY AS AN AID IN THE FUTURE FUNCTIONING OF A PATIENT WITH DEMENTIA

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A few words about the author(s):

I am Janina Rzeszot, a physiotherapist.

Abstract:

Dementia is best characterized as a syndrome rather than one specific disease. Many diseases contribute to the development of dementia in one patient. According to the literature, physical activity helps stabilize and improve cognitive functions, as well as reduce and delay the onset of serious neuropsychiatric symptoms such as depression, confusion, apathy, etc. Physiotherapy has several motor-supporting benefits reported in the literature. The following interventions were used for dementia: aerobic training, balance training and stretching. The PDSAFE program includes balance exercises, muscle strengthening and techniques to improve walking, freezing (inability to move), stability and avoiding falls. It is carried out by physiotherapists in patients' homes over a period of six months. People in the control group receive a DVD with instructions for the stretching and relaxation program. This information will be used to further develop treatments and improve clinical services.

Keywords:

dementia, physiotherapy, exercises



NUTRITION IN HYPERTENSION: SUPPORTING CARDIOVASCULAR HEALTH THROUGH AN APPROPRIATE DIET

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A few words about the author(s):

I am a dietetics student passionate about demonstrating how simple it can be to care for your health through proper nutrition. My goal is to help people make informed food choices to improve their well-being and quality of life.

Abstract:

Hypertension is one of the most significant global health challenges, as it significantly increases the risk of cardiovascular diseases. My presentation explores how diet can help manage blood pressure and improve heart health. It focuses on practical dietary strategies, such as the DASH (Dietary Approaches to Stop Hypertension) diet, which emphasizes the consumption of whole grains, fruits, vegetables, and low-fat dairy products. Additionally, it discusses strategies to minimize the consumption of processed foods and emphasizes the importance of raising awareness about healthy eating habits. The goal of this presentation is to provide dietitians and health professionals with simple and useful tips to help people make lasting dietary changes for better heart health.

Keywords:

hypertension, nutrition, DASH diet



THE IMPACT OF MYOCARDIAL INFARCTION ON THE QUALITY OF LIFE, ACCEPTANCE OF THE DISEASE AND HEALTH BEHAVIORS OF PATIENTS TREATED INTERVENTIONALLY

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Abstract:

Cardiovascular diseases, particularly myocardial infarction (MI), significantly impact patients' lives, causing stress and prompting varied responses to illness. While some patients struggle with acceptance and face emotional distress, others who accept their condition are more likely to engage in treatment and lifestyle changes, leading to improved health-related quality of life (HRQoL) through comprehensive medical, psychological, and social support. Following an MI, patients often experience depression, anxiety and stress, which complicates their acceptance of the illness. Comorbid risk factors, such as hypertension, diabetes, and smoking, play a significant role in influencing HRQoL. HRQoL evaluates how a patient's health impacts their incorporating physical, mental, and social dimensions. Accurate assessment of HRQoL, using both general and disease-specific questionnaires, is crucial for tailoring effective treatments and support strategies to enhance patient outcomes and needs identify those most at risk of developing post-MI depression or anxiety. Effective physician-patient, nurse-patient communication and support from the family are crucial in the recovery post-MI. Cardiac rehabilitation, including using AI, improves patients' outcomes and HRQoL. This study underscores the importance of integrating psychological support with optimal medical care to improve patient prognosis and enhance the HRQoL of individuals recovering from MI.

Keywords:

myocardial infarction, acceptance of illness



THE PURPOSE AND UTILITY OF LI-RADS IN LIVER LESION DIAGNOSIS

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A few words about the author(s):

My name is Katarzyna Bazylewicz-Zakrzewska. Currently pursuing specialization training in Radiology at the Department of Imaging Diagnostics and Interventional Radiology.

Abstract:

The Liver Imaging Reporting and Data System (LI-RADS) provides a comprehensive framework for the standardized interpretation, nomenclature, and reporting of liver lesions, particularly in patients with cirrhosis or at high risk for hepatocellular carcinoma (HCC). This system aims to enhance diagnostic consistency in imaging modalities such as CT, MRI, and contrast-enhanced ultrasound. In this presentation, we explore the core diagnostic criteria used to identify liver lesions, including key features like hyperenhancement, washout, and capsule appearance. Additionally, we discuss auxiliary findings and criteria supporting the differentiation of benign from malignant lesions. LI-RADS also offers a structured approach to categorizing lesions, from benign entities (LR-1) to definite HCC (LR-5), including less specific or indeterminate categories. By applying LI-RADS, radiologists can provide more accurate and consistent reports, improving patient outcomes through better decision-making in the management of liver diseases.

Keywords:

LI-RADS, HCC, liver lesions, cirrhosis



CERVICAL AND LUMBAR SPINE PAIN AMONG PEOPLE WORKING REMOTELY – HOW TO MANAGE IT?

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A few words about the author(s):

2nd year physiotherapy student. Enthusiast of human anatomy.

Abstract:

Prolonged sedentary positions, common among remote workers using computers, place significant strain on the spine, particularly the cervical and lumbar regions. This often leads to increasing pain, which may progress into chronic conditions. Studies indicate that 72% of sedentary individuals experience lower back pain, while 51% report upper back pain. A sedentary lifestyle, combined with insufficient physical activity and poorly organized workstations, can result in muscle tension, joint stiffness, and other health issues.

This paper reviews scientific articles from databases such as PubMed, NCBI, PMC, and ScienceDirect. Its goal is to present simple, effective exercises that can be incorporated into daily routines at home or work to alleviate spinal pressure, improve mobility, and reduce cervical and lumbar pain. Additionally, it highlights ergonomic improvements and muscle tension reduction techniques to enhance the quality of life for remote workers and prevent musculoskeletal problems.

Keywords:

back pain complaints, sedentary work, sedentary lifestyle



APPLICATION OF ARTIFICIAL INTELLIGENCE IN RADIOLOGY

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Abstract:

Artificial intelligence has been increasingly applied in medicine in recent years, particularly in radiology. This paper analyzes the potential, benefits, and challenges of implementing artificial intelligence in diagnostic imaging, considering its impact on the quality and precision of medical image analysis. The study covers key applications such as automated image analysis and diagnostic decision support, comparing them with traditional methods. The article specifically focuses on the limitations associated with the application of artificial intelligence, including quality issues. The final section summarizes and discusses potential directions for the development of artificial intelligence.

Keywords:

Artificial Intelligence, radiology, machine learning



EFFECTS OF CANNABINOIDS ON THE FUNCTIONING OF THE CENTRAL NERVOUS SYSTEM

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Abstract:

The use of cannabis in medicine has been known to humanity for thousands of years. The use of cannabinoid preparations in medicine has become significantly popular in recent years in Poland as well as around the world. This article focuses on the analysis of the positive effects of the use of cannabis in the treatment of diseases of the central nervous system, and also analyzes the negative effects on people who regularly use cannabinoids. The article specifically focuses on the benefits of increasing the use of cannabis and its components in medicine, as well as the problems arising from its long-term use. Focusing on the characteristics of the materials and methods used, as well as the results obtained and the conclusions contained in each article, a systematic literature review was conducted using databases: PubMed, Elsevier, Embase and Google Scholar.

Keywords:

Cannabis, cannabinoids, central nervous system



CURRENT STATE OF KNOWLEDGE ABOUT GITELMAN SYNDROME

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Tomasz Klaudel, Jakub Sadowski, Michał Pelczarski and Michał Sikorski are students of scientific society at Institute of Medical Sciences.

Abstract:

The aim of this study is to summarize the current state of knowledge about Gitelman's syndrome (GS), the most common hereditary salt-wasting tubulopathy. 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 and Google Scholar. The work particularly focuses on the etiology and pathogenesis of the above phenomenon, taking into account diagnosis, etiology, differential diagnosis, and therapeutic procedures depending on the clinical course.

Keywords:

Gitelman syndrome, salt-losing tubulopathy, hypokalemia, hypomagnesemia, SLC12A3



NEW PERSPECTIVES IN THE DIAGNOSIS AND TREATMENT OF ALZHEIMER'S DISEASE

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Abstract:

Alzheimer's disease is one of the most prevalent neurodegenerative disorders, posing a significant challenge to modern medicine. In recent years, advances in technology and biomedical sciences have opened new avenues in the diagnosis and treatment of this condition. This study focuses on the analysis of modern diagnostic methods, such as the use of biomarkers, neuroimaging techniques, and genetic testing. Innovative therapeutic approaches, including the development of targeted drugs, immunotherapy, and the potential of gene therapy, were also examined. The study addresses the role of lifestyle in disease prevention and the challenges associated with caregiving for patients in advanced stages. A systematic review of the literature was conducted using databases such as PubMed, Elsevier, Embase, and Google Scholar, with a focus on research findings and their practical applications for improving patient quality of life.

Keywords:

Alzheimer's disease, neurodegenerative disorders, biomarkers, neuroimaging, genetic testing



CURRENT STATE OF KNOWLEDGE ABOUT DEVIC'S DISEASE, LITERATURE REVIEW

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Abstract:

Devic's disease, also known as neuromyelitis optica spectrum disorder (NMOSD), is a rare autoimmune condition of the central nervous system that presents significant diagnostic and therapeutic challenges. Recent advances in understanding its pathogenesis, including the identification of aquaporin-4 antibodies (AQP4-IgG), have greatly improved diagnostic capabilities. This paper reviews contemporary diagnostic methods, including serological tests, MRI imaging, and clinical criteria. It also discusses available treatment options such as immunosuppressive therapies, biological treatments, and plasmapheresis. Additionally, the study highlights the latest guidelines for patient management and challenges associated with long-term treatment. Based on a review of the literature from databases such as PubMed, Embase, and Google Scholar, the article presents the latest research findings and their practical implications for improving the diagnosis and treatment of Devic's disease.

Keywords:

Devic's disease, Neuromyelitis Optica Spectrum Disorder, autoimmune disorders, central nervous system



CURRENT STATE OF KNOWLEDGE ABOUT TERSON SYNDROME

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Abstract:

The aim of this study is to summarize the current state of knowledge about Terson Syndrome. Focusing on the characteristics of the materials and methods used and the results and conclusions contained in each article, a systematic review of the literature was conducted using the databases: PubMed and Google Scholar. The work focuses in particular on the pathogenesis, clinical picture, diagnostics and therapeutic procedures characteristic of the above syndrome.

Keywords:

Terson Syndrome, vitreous hemorrhage, subarachnoid hemorrhage



COVID-19-RELATED ENCEPHALOPATHY: PATHOPHYSIOLOGY, SYMPTOMS, AND THERAPEUTIC CHALLENGES

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Abstract:

COVID-19-related encephalopathy is one of the most serious neurological complications observed in patients infected with SARS-CoV-2. This condition includes a wide spectrum of symptoms, such as cognitive impairment, changes in consciousness, seizures, and neuropsychiatric symptoms. The pathophysiology of COVID-19 encephalopathy is complex and multifactorial. Mechanisms include direct infection of the central nervous system, cerebral hypoxia, cytokine storm, and cerebrovascular damage leading to microemboli and local ischemia. Diagnosis is based on clinical history, neuroimaging studies, cerebrospinal fluid analysis, and EEG. Treatment focuses on symptom relief with steroids, immunotherapy, and respiratory support, as well as neurological rehabilitation to restore cognitive function. Although long-term data are limited, permanent sequelae of encephalopathy are observed, such as impaired memory, concentration, and increased risk of neurodegenerative diseases. Understanding these mechanisms and developing effective therapeutic strategies remains a key research challenge. This article provides an overview of current research on COVID-19 encephalopathy, with a focus on mechanisms, clinical manifestations, and therapeutic options.

Keywords:

COVID-19, Encephalopathy, neurological complications, Cytokine storm, Cerebral hypoxia



TREATMENT METHODS FOR TETRALOGY OF FALLOT

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Abstract:

Tetralogy of Fallot (TOF) is a congenital heart defect requiring timely intervention to improve outcomes. Standard treatment involves complete surgical repair in infancy, addressing ventricular septal defect and right ventricular outflow obstruction. Advances in techniques and postoperative care have significantly improved survival. Palliative procedures, like the Blalock-Taussig shunt, remain useful when immediate repair is not feasible. Emerging approaches, including hybrid procedures and catheter-based interventions, offer less invasive alternatives.

This presentation reviews current and innovative treatment methods for TOF, emphasizing the importance of lifelong follow-up to manage residual defects and complications, while exploring future directions in care.

Keywords:

Tetralogy of Fallot, Congenital heart defect, Blalock-Taussig shunt



HIDDEN TREASURES OF NATURE: SELECTED EXAMPLES OF NATURAL SUBSTANCES THAT HAVE PROVEN TO BE CRUCIAL FOR MODERN MEDICINE

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A few words about the author(s):

Student of Medical Biotechnology, in the course of Master's Studies.

Abstract:

In the face of growing challenges in modern medicine, such as antibiotic resistance and increasing numbers of oncological patients, nature continues to serve as a reservoir of solutions in the form of new active substances. Inconspicuous organisms - from soil bacteria to marine invertebrates – provide us with substances that have unique mechanisms of action and therapeutic efficacy often surpassing previously known alternatives. Paclitaxel, isolated from the bark of the Pacific yew, revolutionized cancer therapy through its unique action on cellular microtubules. Trabectedin, obtained from the marine tunicate, shows exceptional effectiveness in treating soft tissue sarcomas through an innovative mechanism of action on DNA. Teixobactin, discovered in soil bacteria, represents a new class of antibiotics, offering hope in the fight against resistant bacterial strains. These are just a few examples demonstrating the potential of already-made solutions present in the world around us.

Keywords:

biodiversity, natural medicines, cancer, antibiotics



PRECISION MEDICINE: HOW KNOWLEDGE OF GENES IS CHANGING THE WAY WE TREAT DISEASES

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A few words about the author(s):

Wojciech Strzałek is a master's student in Medical Biotechnology. His research interests focus on bioinformatics, genomics, and precision medicine, with a particular emphasis on using genetic data to develop personalized therapies.

Abstract:

Modern medicine is changing the way we think about diagnosing and treating diseases. Precision medicine is a new approach that uses detailed genetic information, biomarkers, and other personal characteristics of patients to create treatments that work better and are safer than traditional methods. Genomics is a big part of this, as it helps identify genetic mutations that cause diseases and makes it possible to adjust treatments to fit each patient.

In this presentation, I will explain the basics of precision medicine, including how genetic analysis works, what biomarkers are, and how targeted therapies function. I will also show examples of how this is used in real life, like in cancer treatments, pharmacogenomics, and rare disease therapies. I'll talk about the benefits, like better treatment results and fewer side effects, but also the problems, like high costs and ethical questions, that come with new technologies.

In the end, I will discuss how precision medicine could change healthcare in the future and why working together and sharing knowledge is so important for progress in medicine.

Keywords:

precision medicine, genomics, biomarkers, pharmacogenomics, targeted therapies



THE IMPACT OF POPULAR DIETARY SUPPLEMENTS IN STRENGTH TRAINING ON HUMAN PHYSIOLOGY

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A few words about the author(s):

Engineer Wiktor Trojanowski is a student at the University of Rzeszów studying Physics and Materials Engineering. In the future, he would like to continue his research on advanced materials.

Abstract:

The aim of this study is to review the literature on the effects of popular dietary supplements used in strength training on the human body. Supplements such as whey protein, creatine, branched-chain amino acids (BCAAs), and pre-workout formulas are becoming increasingly popular among physically active individuals. They play a significant role in recovery processes, muscle mass development, and physical performance improvement, often driven by the desire to accelerate athletic progress. This study explores the mechanisms of action of these supplements and their effects on various bodily systems, emphasizing their potential benefits, such as enhanced strength, faster recovery, and improved endurance. Additionally, attention will be given to the possible side effects and risks associated with excessive or improper use, which can lead to metabolic imbalances or strain on physiological systems. By analyzing the existing research, this study aims to provide a balanced understanding of how these supplements can be used effectively and safely in the context of strength training.

Keywords:

dietary supplements, whey protein, creatine, strength training



THE ROLE OF EPICARDIAL AND ENDOCARDIAL ABLATION IN MANAGING ELECTRICAL STORM IN PATIENTS WITH VENTRICULAR TACHYCARDIA – A CLINICAL CASE

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Abstract:

Ventricular tachycardia (VT) is a life-threatening arrhythmia often associated with structural heart diseases such as arrhythmogenic right ventricular cardiomyopathy (ARVC). In patients with recurrent or refractory VT, catheter ablation has emerged as a cornerstone therapy, offering the potential to eliminate arrhythmogenic substrates and reduce the burden of arrhythmic episodes. While endocardial ablation is the first-line approach, epicardial access may be required in cases where arrhythmogenic foci are located on the epicardial surface.

We present the case of a 62-year-old male with a history of arrhythmogenic right ventricular cardiomyopathy (ARVC) and ventricular tachycardia (VT), admitted to our department following multiple appropriate discharges of an implantable cardioverter-defibrillator (ICD) implanted for secondary prevention. The patient was diagnosed with an electrical storm and underwent endocardial ablation of the VT substrate. Due to a suboptimal outcome and continued arrhythmia episodes, the decision was made to transition to an epicardial approach for mapping and ablation of the VT substrate from the epicardial side. The procedure was successful, and during follow-up, the patient has remained free from arrhythmic episodes.

Keywords:

ventricular tachycardia catheter ablation

ABSTRACTS OF **POSTERS**



**MEDICAL
SCIENCES**



**A NEW THERAPEUTIC APPROACH UTILIZING PROTAC:
A STUDY ON THE BLOOD-BRAIN BARRIER PENETRATION
OF ATORVASTATIN, LOVASTATIN, AND PRAVASTATIN**

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PhD candidate at the Faculty of Pharmacy, Collegium Medicum UMK in Bydgoszcz.

Abstract:

The aim of this study was to investigate the therapeutic potential of protein-targeting chimera (PROTAC) technology by analyzing the blood-brain barrier (BBB) penetration of various statins. The research utilized three classic drugs—lovastatin, pravastatin, and atorvastatin—as protein-targeting components, combined with AdmetSAR to evaluate the activity of transporters responsible for drug penetration into the central nervous system.

The experimental results indicated significant blood-brain barrier penetration for lovastatin and pravastatin, while atorvastatin demonstrated no substantial ability to cross this barrier. The ability of lovastatin and pravastatin to penetrate brain tissues could open new therapeutic opportunities for treating neurodegenerative diseases, which is particularly relevant in the context of applying PROTAC technology for the targeted degradation of proteins promoting neurodegeneration.

Structural analysis of PROTACs using the aforementioned statins highlights their potential as key components in inhibiting the activity of harmful proteins in the nervous system. Modifications in pharmacokinetic profiles and the well-known properties of lovastatin and pravastatin may serve as a foundation for further research into the development of innovative neuroprotective therapies.

Keywords:

PROTAC, statins



NON-SURGICAL METHODS OF ACCELERATING TOOTH MOVEMENT

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Abstract:

Accelerating tooth movement is a key area of focus in orthodontics, as it not only reduces overall treatment time, but also produces faster results, reduces patient discomfort and ultimately increases patient satisfaction. The duration of orthodontic treatment remains a major challenge for both patients and clinicians, sparking strong interest in innovative methods that can safely and effectively speed up the treatment process. Non-surgical techniques offer promising alternatives to reduce treatment time by stimulating bone remodeling and cellular activity in periodontal tissues. The following presentation discusses various non-surgical approaches, including low-level laser light therapy (LLLT), vibrating devices, pulsed electromagnetic fields (PEMF), pharmacological agents, and mechanical and electrical stimulation. Each method was evaluated in terms of mechanism of action, efficacy, advantages and limitations, providing an overview of current research and potential clinical applications. The various non-surgical methods discussed in this presentation have the potential to significantly impact the field of orthodontics by reducing treatment time, improving patient satisfaction and providing more efficient and effective results.

Keywords:

orthodontics, acceleration, tooth movement, bone remodeling



THE ROLE OF WNT/B-CATENIN SIGNALING PATHWAY IN COLORECTAL CANCER

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Enthusiasts of molecular biology.

Abstract:

Colorectal cancer (CRC) is among the most frequently diagnosed cancers and remains one of the most serious global healthcare challenges. It is the second leading cause of cancer-related deaths worldwide. The development of CRC is closely associated with a series of molecular changes. One of the key signaling pathways implicated in CRC progression is the Wnt/ β -catenin pathway.

The Wnt signaling pathway is a highly conserved cellular signaling system that plays a pivotal role in numerous biological processes. In CRC, mutations in this pathway lead to the accumulation of β -catenin in the cell nucleus, triggering the expression of genes involved in cell proliferation, survival, and differentiation. This dysregulation is a fundamental driver of CRC, contributing to the formation of cancer stem cells (CSCs), which are responsible for tumor growth, metastasis, and resistance to treatment. Additionally, the Wnt/ β -catenin pathway influences key processes such as epithelial-mesenchymal transition, migration, invasion, and metastasis.

Mutations in the APC (adenomatous polyposis coli) gene, present in approximately 90% of colorectal cancers, result in the constitutive activation of the Wnt/ β -catenin pathway. This activation drives tumor cell proliferation, invasion, metastasis, and the maintenance of CSCs, which are closely linked to treatment resistance and tumor relapse. Targeting the Wnt/ β -catenin pathway represents a promising strategy for therapeutic intervention in CRC.

Keywords:

Colorectal cancer, Wnt/ β -catenin pathway, APC mutations



COMPARISON OF TOTAL HEMISPHERICAL REFLECTANCE AND EMISSIVITY OF TABLETS CONTAINING DIHYDROXY ALUMINUM SODIUM CARBONATE DEPENDING ON THE TIME OF STORAGE IN AMBIENT AND STRESS CONDITIONS

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5th year pharmacy student at the Medical University of Silesia in Katowice. Member of PTSF and scientific club from the Department of Basic Biomedical Sciences. Privately, she is interested in volunteer work, travelling and coffee making.

Abstract:

Stability refers to a drug's ability to maintain its integrity during storage. The study aimed to assess the potential of using THR reflectance values and emissivity of chewable tablets, depending on storage conditions and duration.

Chewable tablets containing 340 mg of dihydroxy aluminum sodium carbonate from the following types of preparations were tested: unexpired (expiration: 2027), expired I (expiration: 2023), and expired II (expiration: 2020). Additionally, a random blister of unexpired tablets was stored in the aging chamber for 4 days under UV and 40°C (stressed tablets). Total hemispherical reflectance (THR) was measured within 7 spectral ranges (from 335 to 2500 nm) using a 410-Solar Reflectometer (USA). Emissivity (ϵ) H was measured using ET 100 emissometer (USA).

The THR values for unexpired tablets were significantly the highest within the 335-380 nm range compared to expired I and II and stressed tablets ($p < 0.001$). In the subsequent spectral ranges of visible light (400-540, 480-600, 590-720), THR for unexpired tablets differ from THR for expired tablets I and II ($p < 0.001$ each). The value of HTE emissivity for the expired II tablets was the lowest while for the unexpired tablets the highest ($p = 0.022$).

In conclusion, THR values were lower for expired tablets in all spectral ranges. Tablets stored under stress conditions showed a decrease in THR only in the UVA range. Emissivity was significantly higher for unexpired tablets.

Keywords:

hemispherical directional reflectance, emissivity, drug stability, chewable tablets, drug storage



EFFECTS OF PRORPANOLOL IN ALLEVIATING SITUATIONAL ANXIETY – IN SILICO AND IN VIVO STUDIES

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A few words about the author(s):

Research interests focus on pharmaceutical sciences in the field of molecular modeling. They include predictive modeling of detailed mechanisms of action and pharmacological efficacy of biologically active compounds in safety pharmacology.

Abstract:

Propranolol is a substance belongs to the nonselective β -blocker class and has been investigated and documented extensively. It is mostly used to treat cardiovascular disease. PRO has found application in a range of treatments outside the cardiovascular field due to its capacity to cross the blood-brain barrier and its affinity for several macromolecules. Nevertheless, there is conflicting evidence regarding PRO's exact mode of action on the central nervous system (CNS). The impact of PRO on lowering the physical symptoms linked to anxiety has been demonstrated by earlier research reported in the literature; however, there is insufficient data to support the idea that inhibiting monoamine and GABA reuptake in the central nervous system can improve cognitive and emotional impairment. The objective of this project is to utilize in silico techniques to examine the manner in which PRO interacts with particular monoamine and GABA transporters. Monoamine neurotransmitters such as hNET, hDAT, hSER, and GABA-energetic hGAT1 were used to examine the stability of R/S-PRO complexes in silico. The Open Field Test and Elevated Plus Maze in-vivo assays were used to validate the in-silico trials. According to the in silico experiments, PRO complexes with the studied transporters became less stable in the hNET > hDAT > hSERT sequence. These findings suggest that the relevant neurotransmitters are blocked from being reabsorbed at the synapse.

Keywords:

propranolol, monoamine transporters, in silico trials

ABSTRACTS OF
PRESENTATIONS



**TECHNICAL AND
NATURAL SCIENCES**



INNOVATIVE CORE-SHELL HYBRID MATERIAL AS A PLATFORM FOR THE CONSTRUCTION OF ENZYMATIC BIOSENSOR SYSTEM FOR METABOLITE DETECTION

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A few words about the author(s):

The authors' research interests include biosensors, chemical sensors, enzymatic, catalytic, and non-enzymatic systems, biomimetic materials, as well as the synthesis of hybrid and composite materials.

Abstract:

The increasing number of people suffering from cardiovascular diseases necessitates the development of fast and precise diagnostic tools. In particular, biosensors for detecting metabolites like cholesterol, whose abnormal levels are a key factor in these conditions, are becoming increasingly important [1, 2].

The aim of our research was to develop an innovative core-shell nanomaterial with a metallic core and a biomimetic shell designed to support enzyme immobilization. Magnetite nanoparticles were synthesized by co-precipitation and then coated with norepinephrine hydrochloride through self-assembling polymerization. Physicochemical analyses confirmed the high applicability of this material for enzyme immobilization. Next, cholesterol oxidase was immobilized onto the carrier, and the system was coated with a Nafion® layer. Electrochemical studies of the cholesterol detection biosensor aimed to determine its operational effectiveness.

The results showed that the biosensor has high sensitivity, selectivity, stability, and linearity, making it a promising tool for precise cholesterol measurement in biological fluids. Its diagnostic potential could support the monitoring, early detection, and treatment of cardiovascular diseases [2].

The research work was financed and prepared as part of the Poznan University of Technology research project no. 0912/SBAD/2306.

Literature:

- [1] Wang X., Hu L. *J Electrochem Soc.* 2020;167(3):037535.
- [2] Narwal V., et al. *Steroids.* 2019;143:6-17.

Keywords:

cholesterol biosensor, electrochemical biosensor, polynorepinephrine



A CONCEPT FOR HYBRID GNSS/UWB NAVIGATION SYSTEM FOR AIRCRAFT GROUND HANDLING ASSETS TRACKING

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A few words about the author(s):

Mr Adam Piech – CTO of the Blue Dot Solutions company, responsible for definition and coordination of technological projects. Dr Krzysztof Kanawka – CEO of the Blue Dot Solutions company, responsible for project management and definition.

Abstract:

The tracking of ground handling assets such as pushbacks, buses, tractors etc. is becoming a necessity in the modern concepts of the logistical systems used for asset monitoring and tracking. However, the problem persists when the assets in question operate in two completely different environments such as open field, which typically include aircraft servicing zones and places in the immediate vicinity of a building as well as inside them. Some devices also require support for a very long periods of operation. Based on the series of tests for active devices that took place at the Gdansk Airport and concurrent testing of the additional non-GNSS technology, a concept for a hybrid solution has been evaluated. This concept combines GNSS data with supplementary non-GNSS solution in a simulated environment. This new concept utilises proven GNSS units as a backbone for externally used systems but also integrates a secondary navigational platform based on UWB/BT technology that supports positioning of non-active assets via two way ranging or time difference of arrival positioning methods. The simulation results indicate that such a hybrid system allows for closing the existing gap while transitioning indoors and can further be used to mitigate potential problems with the GNSS availability.

Keywords:

GNSS, LTE, UWB, airport, tracking



USE OF LATTICE STRUCTURES FOR VARIOUS COMPONENTS OF SATELLITES

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A few words about the author(s):

Dr Krzysztof Kanawka – CEO of the Blue Dot Solutions company, responsible for technological project definition and management. Mr Adam Piech – CTO of the Blue Dot Solutions company, responsible for technological aspects of projects.

Abstract:

Every satellite requires a structural component, capable of installing different subsystems and sensors either inside or outside the spacecraft. One of the most important limitation is the budget mass, which directly impact satellite capabilities. Also, a rising threat from space debris may require introduction of additional shielding to protect most vulnerable components of the satellite. This in turn may limit capabilities of the satellite, as the mass budget would shift more into the inert mass required for structures.

In this project our team developed novel 3D printed lattice structures, which are lighter than traditional "solid" counterparts and at the same time can perform additional functions. The novelty is to use small cells as "building bricks" and capability to design structures with additional functions, such as thermal channels or electrical connectors. In result, the mass of the satellite structure can be lowered, which would increase the overall performance of a spacecraft.

Project realised under the POIR.01.01.01-00-0581/17 contract with the Polish National Research and Development Center.

Keywords:

3D printing, lattice structures, satellites



THE REACTION OF CYCLOPENTADIENE DERIVATIVES IN THE LIGHT OF QUANTUM-CHEMICAL CALCULATIONS BASED ON DENSITY FUNCTIONAL THEORY

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A few words about the author(s):

I am student at 4th year of Chemical Technology at Cracow University of Technology and my research is based on cycloaddition [4+2] of cyclopentadienes and substituted alkenes.

Abstract:

Cyclopentadienes and their derivatives react with alkenes to form norbornenes [1]. The cycloaddition reaction with alkenes can proceed via several pathways, leading to different products [2]. Studies have been conducted on the reaction of nitroethene with a cyclopentadiene derivative containing a trimethylsilyl group. Trimethylsilylo-substituted norbornenes already exist and have found applications, for instance in membranes for gas separation [3]. The poster will present the results of quantum-chemical calculations performed within the framework of Molecular Electron Density Theory (MEDT). These studies were partially supported by the PLGrid Infrastructure. All reported calculations were carried out on the "Ares" supercomputer cluster at the CYFRONET computing center.

Grant number: PLG/2024/017635.

Literature:

- [1] Huijun F., Wenquan Z., Meng Z., Ying S., Ping P., Weimin Y. Patent CN104262074A Production technique of norbornene. Published online 27.08.2014.
- [2] Łapczuk-Krygier A., Jasiński R. Patent 413865 Nowe pochodne endo-nitropodstawionych norbornenów i stereoselektywny sposób wytwarzania nowych pochodnych endo-nitropodstawionych norbornenów. Published online 2015.
- [3] Yampolskii Y. Norbornene Polymers as Materials for Membrane Gas Separation. W: Comprehensive Membrane Science and Engineering. T 1. Elsevier; 2010:131–146.

Keywords:

cyclopentadiene, cycloaddition [4+2], DFT, nitroalkene



GEOSMIN: THE SMELL OF RAIN AND THE TASTE OF CHRISTMAS CARP

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A few words about the author(s):

Botechnology student at the University of Warmia and Mazury in Olsztyn. Interested in the genetic and social history of domesticated animals, especially dogs, from a genetic and social perspective.

Abstract:

Petrichor is a characteristic odor of moisture or aroma caused by rain when it falls on dry soils. The smell of petrichor is a sweet, fresh, and pleasant scent that has a complex composition and is dominated by geosmin and a set of aromatic oils released by many plants. These oils, which delay the germination of seeds, are released by plants during periods of drought to protect the seeds, preventing them from germinating. Geosmin is main constituent of the smell of petrichor that we perceive when it starts to rain. It is produced by microbes, especially actinobacteria such as *Streptomyces*. The aerosols caused by the falling raindrops contain millions of geosmin-producing bacteria, which are transported by the air, spreading the aroma of recent rain.

The human nose is extremely sensitive to geosmin—we can smell it in concentrations as low as 0.006 to 0.01 micrograms per liter, which is similar to a shark's ability to smell blood in the water. It is proposed that this extreme sensitivity to geosmin evolved in humans or their ancestors to aid them in their search for scarce water. An example of the ability to sense water is that camels in the Gobi Desert can smell geosmin from 80 kilometers away.

Is the smell of rain just a chemical or an evolutionary key to survival?

Keywords:

geosmin, rain, petrichor



THE IMPACT OF PET OWNERSHIP ON GUT MICROBIOTA AND HUMAN HEALTH

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Botechnology student at the University of Warmia and Mazury in Olsztyn. Interested in the genetic and social history of domesticated animals, especially dogs, from a genetic and social perspective.

Abstract:

Owning pets, such as dogs and cats, affects not only our emotional well-being but also our physical health by modulating gut microbiota. Scientific analyses show that pet owners exhibit greater microbial diversity, which is associated with improved immune function, reduced inflammation, and enhanced metabolic profiles. Dog owners, particularly elderly individuals, benefit from the presence of beneficial bacteria that produce short-chain fatty acids (SCFA). Similarly, cat owners show higher levels of bacteria linked to improved fat and glucose metabolism.

The mechanisms of microbiota exchange between humans and animals and the potential applications of this knowledge in preventing metabolic disorders and promoting overall health will be discussed. It is also important to note the limitations of current studies, such as small sample sizes and the lack of long-term observations, and suggest directions for future research. However, the role of pets as invaluable companions who support human health through microbiotic interactions must be pointed out.

Keywords:

microbiota, pets, immune system



AI-POWERED TRIP DISCOVERY: BALANCING CONSTRAINTS AND ATTRACTIVENESS

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A few words about the author(s):

Vitalii Morskyi specializes in large language models and cloud-based automation. His interests include mathematics, artificial intelligence, and data analysis, with hobbies in movie directing and editing.

Abstract:

In this presentation, we introduce a specialized solution designed to streamline trip planning by combining AI-based techniques, real-time data integration, and advanced computational frameworks. By leveraging large language models for semantic analysis and graph-based algorithms to evaluate connectivity and feasibility, our system effectively matches user constraints (such as budget, time, and preferences) with compelling travel opportunities. We will highlight key technological components, including the use of AWS cloud for serverless deployments, ensuring both scalability and reduced operational costs.

Additionally, a microservices architecture processes data from multiple APIs to generate actionable insights, while machine learning models dynamically refine trip recommendations. This integrated approach enhances the planning process by reducing manual effort and delivering more accurate, personalized suggestions. In doing so, we showcase how AI-driven methodologies can revolutionize the discovery of enjoyable and constraints-aware travel experiences at scale.

Keywords:

large language models, constraint-based planning, real-time data integration, serverless cloud operations



COST-EFFICIENT ODMR EXPERIMENTAL SETUP WITH TEMPERATURE CONTROL OF A SAMPLE IN RANGE OF MAMMALS' INTERNAL TEMPERATURES

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A few words about the author(s):

Research group of the Poznan University of Technology with expertise in the field of quantum engineering and metrology with specialization in laser spectroscopy. Currently conducted research includes ODMR technique.

Abstract:

Optically Detected Magnetic Resonance (ODMR) is a research technique that is used to detect magnetic resonance by measuring changes in fluorescence intensity. This technique enables measurement of ground-state splitting of the nitrogen vacancy (NV-) color centers in microdiamond samples. An important characteristic of ODMR signal is its dependence on temperature – it is possible to calculate the temperature of a sample using measurements of resonant frequency of ODMR signal [1]. These findings are the basis for the potential application as a precise thermometer.

ODMR signal measurements were performed using home-made experimental setup, comprising of a confocal microscope, a microwave synthesizer and a 520nm diode laser. For controlled, precise temperature manipulation a simple heater device was used. Our research consists of measurement of ODMR signal in range of temperature corresponding to the internal body temperatures of mammals.

Literature:

[1] Acosta V. M., et al. Temperature dependence of the nitrogen-vacancy magnetic resonance in diamond. *Physical review letters* 104.7 (2010): 070801.

Keywords:

optically detected magnetic resonance, nitrogen vacancies, microdiamonds, thermometry, mammals' internal temperature



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REGENERATIVE AGRICULTURE

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A few words about the author(s):

I am a 3rd year agriculture student at the University of Warmia and Mazury in Olsztyn. I have a strong passion for animals, which has been a driving force behind my academic and personal interests.

Abstract:

Regenerative agriculture is a system of principles and practices aimed at soil regeneration, increasing biodiversity, and reducing greenhouse gas emissions. The presentation explains what regenerative agriculture is, the benefits it brings to the environment, and how it contributes to the preservation of natural resources. Key goals of this approach are highlighted, including improving soil health, increasing crop yields while maintaining ecological balance, and effectively combating climate change. Special attention is given to the 5C Code, which provides a comprehensive set of principles for proper soil management. Through this approach, regenerative agriculture demonstrates its role as a tool for sustainable development and building an environmentally friendly future.

Keywords:

agriculture, environmental protection



**PRELIMINARY EVALUATION OF THE GENETIC DIVERSITY
OF ENDOSYMBIOTIC BACTERIA WOLBACHIA INFECTING
MYRMECOPHILOUS BEETLES MONOTOMA ANGUSTICOLLIS
AND M. CONICICOLLIS (INSECTA: COLEOPTERA)**

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A few words about the author(s):

Members of the research team are involved in the implementation of integrative studies on the tripartite host-mymecophile-endosymbiont relationship in species communities associated with ants commonly occurring in Poland.

Abstract:

One of the best-known endosymbionts belong to the genus *Wolbachia*, the Gram-negative bacteria representing the class Alphaproteobacteria. These bacteria infect invertebrates, primarily insects. *Wolbachia* is an extremely diverse genus. At least 16 supergroups are distinguished within the strains that infect invertebrates. *Wolbachia* can be transmitted to subsequent hosts via vertical transfer (primarily through the maternal line) as well as horizontal transfer, i.e. between organisms of different species. The relationship between ants and myrmecophilous species can facilitate interspecies transfer of *Wolbachia*.

Myrmecophiles are organisms whose life cycle, at least partially, depends on ants. Myrmecophily has evolved independently in many taxonomic groups. The most diverse group of myrmecophiles are the mites (Acari) and beetles from the Staphylinidae family.

In this study, a single nest of *Formica polyctena* (Foerster, 1850) located in Polesie National Park was selected for further analyses. The presence of *Wolbachia* in the host and associated myrmecophiles was examined by amplification of a marker *wsp* gene fragment. Preliminary results showed the occurrence of the symbiont in both the ant *Formica polyctena* and two species of beetles: *Monotoma conicicollis* (Chevrolat, 1837) and *M. angusticollis* (Gyllenhal, 1827), respectively. Variability of *Wolbachia* was observed in both the host and selected myrmecophiles, as well as within the two species of myrmecophiles.

Keywords:

Wolbachia, *Formica polyctena*, myrmecophiles



SYNTHESIS OF NEW BIOLOGICALLY ACTIVE N-{4-[(4-METHYL-3,4-DIHYDROQUINAZOLIN-2-YL)AMINO]BUTYL}ARYLSULFONAMIDES

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A few words about the author(s):

Final-year Chemical Engineering student focusing on anticancer drug development, particularly for glioma. Research involves synthesizing and applying dihydroquinazoline derivatives for potential therapeutic applications.

Abstract:

Serotonin, a neurotransmitter, influences neuronal activity and is implicated in various neuropsychological factors [1]. It acts via 15 different receptor subtypes, including 5-HT_{5A}, which is linked to psychiatric disorders. 5-HT_{5A} receptors are also expressed in human cancer cells [2]. 3,4-dihydroquinazolino-2-amines are a class of compounds with promising affinity for the 5-HT_{5A} receptor [3]. This research focused on synthesizing novel N-{4-[(4-methyl-3,4-dihydroquinazolin-2-yl)amino]butyl}arylsulfonamides and their N-methylated derivatives. These compounds were obtained by reacting N-(4-aminobutyl)arylsulfonamide with 4-methyl-2-methylsulfanylo-3,4-dihydroquinazoline. The synthesized compounds were characterized using LC-MS, ¹H NMR, and ¹³C NMR, and their affinity for the 5-HT_{5A} receptor was evaluated in a radiolabeled assay.

Literature:

- [1] Imamdin A., van der Vorst E.P.C. Exploring the Role of Serotonin as an Immune Modulatory Component in Cardiovascular Diseases, *Int. J. Mol. Sci.* 24 (2023) 1549.
- [2] Sarrouilhe D., Mesnil M. Serotonin and human cancer: A critical view, *Biochimie* 161 (2019) 46–50.
- [3] Peters J.U., Lübbers T., Alanine A., Kolczewski S., Blasco F., Steward L. Cyclic guanidines as dual 5-HT_{5A}/5-HT₇ receptor ligands: Structure-activity relationship elucidation, *Bioorganic Med. Chem. Lett.* 18 (2008) 256–261.

Keywords:

serotonin, 5-HT, dihydroquinozaline, synthesis



FROM REACTION TO APPLICATION: THE SYNTHESIS OF CHALCONES AND THEIR APPLICATIONS

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A few words about the author(s):

I am a medicinal chemistry student at the Jagiellonian University. I completed my bachelor's thesis in collaboration with MSc Seweryn Żubrowski and under the supervision of Dr Szymon Buda. In this presentation I will present the results of our work.

Abstract:

Chalcones are aromatic chemical compounds that exhibit a variety of biological activities, including antioxidant, antiviral, antimicrobial and anticancer properties. Their characteristic α,β -unsaturated ketone system is a structural element of many compounds with high therapeutic potential.

The aim of the present study was to synthesize substituted chalcones based on the salicyl aldehyde backbone. Two key synthetic methods were used in the study: the Wittig reaction and the oxa-Michael addition reaction. Eight Wittig reaction products and eighteen Michael reaction products were obtained. The reaction conditions developed and their yields are presented.

Keywords:

Chalcone, salicyl aldehyde, Wittig reaction, oxa-Michael addition



ANALYSIS OF THE ANTIMICROBIAL PEPTIDE AMP DATABASES

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A few words about the author(s):

Bogdan Marczak, a 2nd year master's student in biotechnology at Rzeszów University of Technology. Supervisors: dr hab. Aleksandra Bocian and dr Andrzej Łyskowski.

Abstract:

The presentation focuses on a detailed analysis of antimicrobial peptide (AMP) databases, with an emphasis on evaluating their content, uniqueness, and sequence repeatability. The objective of the study was to assess the data quality and repeatability levels in selected AMP databases, including dbAMP, BaAMPs, CAMP, CancerPPD, CyBase, DADP, DBAASP, DRAMP, InverPep, ParaPep, and SATPdb. The analysis utilized the diamond tool and the RStudio environment. Comparisons were made with respect to the dbAMP database, which is distinguished by its large peptide collection and regular updates. The results revealed both repeated and unique sequences, and the developed indices, such as the Database Repeatability Index (DRI) and Inter-database Repeatability Index (IDRI), highlight the critical need for increasing data diversity within these databases, which is essential for their scientific quality and functionality in the context of further AMP research.

Keywords:

antimicrobial peptides AMP, AMP databases, diamond blast



FUNGAL PROPERTIES OF RUBELLIN-TYPE SECONDARY METABOLITES CHARACTERISED BY CHEMOINFORMATICS TOOLS

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A few words about the author(s):

Piotr Michałowski is a doctoral student in the chemical sciences. His interests focus on organic synthesis of programmable prodrugs, fluorescent molecular probes and inclusive polymeric membranes for microextraction of secondary metabolites.

Abstract:

Natural products (NPs) are chemical compounds that are produced by biochemical synthesis by living organisms, such as plants and microorganisms. NP classification is into primary and secondary metabolites. Secondary metabolites are organic molecules that usually have an external function, i.e. they mainly affect other organisms besides their producer. Secondary metabolites are of significant importance in various fields, including pharmaceuticals, defence against pathogens, and as a source of functional biopolymers, biopesticides and nutritional molecules. Notably, more than half of anticancer drugs and nearly two-thirds of clinically used antibiotics are classified as NPs.

An illustration of the fungal secondary metabolites produced by the fungus *Ramularia collo-cygni* is provided by the Rubellins. These have photodynamic capabilities, particularly in the formation of reactive superoxide radicals. Consequently, Rubellins demonstrate cytotoxic, antiproliferative, and antimicrobial properties, in addition to the inhibition of tau protein bioaggregation.

Despite the complex bioactive potential exhibited by Rubellins, which exist in the form of more than a dozen derivatives, there has been no characterisation of their physicochemical, pharmacokinetic and pharmacodynamic properties. Consequently, to enhance comprehension, a suite of chemoinformatics tools was employed to simulate and evaluate the properties, thereby establishing a foundation for subsequent screening studies.

Keywords:

Rubellins, secondary metabolites, chemoinformatics tools, fungal metabolites



SYNTHESIS OF COVALENT PD-L1 PROTEIN INHIBITORS TARGETING THE LYSINE RESIDUE

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A few words about the author(s):

My main areas of interest focus on organic synthesis and the use of in silico methods in designing biologically active compounds.

Abstract:

Cancer immunotherapy is an effective alternative to previously used cancer treatments. The primary targets of this therapy are the so-called immune checkpoints with their ligands, which allow cancer cells to escape from the control of the immune system. One of the most important immune checkpoints is the PD-1 protein, whose ligand is the PD-L1 protein. Anti-PD-1 and anti-PD-L1 monoclonal antibodies used in clinical practice show the ability to inhibit the PD-1/PD-L1 pathway, but their large molecular weights prevent full tumor penetration and oral administration. Small-molecule compounds may be a convenient alternative to antibodies. In recent years, many inhibitors of the PD-1/PD-L1 interaction have been discovered. All compounds discovered so far contain a biphenyl structural motif. Of these, Compound A shows the greatest activity. Taking advantage of the structure of Compound A, the present study designed and obtained the first covalent inhibitors of the PD-1/PD-L1 pathway capable of forming a stable PD-L1 homodimer. Of the compounds that were successfully obtained in pure form, MiM9 showed the ability to inhibit PD-1/PD-L1 interaction in vitro. The compound proved to be a weak covalent inhibitor.

Keywords:

Malignancies, immunotherapy, PD-L1, PD-1, Compound A, covalent inhibitors



ASSESSMENT OF THE POSSIBILITY OF USING RAMAN SPECTROSCOPY IN FINGERPRINT ANALYSIS

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A few words about the author(s):

The author graduated from the AGH University of Science and Technology with a degree in Modern Technology in Forensic Science in selected specialization of forensic analytics.

Abstract:

Vibrational spectroscopy is a science based on the study of matter and its interaction with radiation. One branch of this discipline is Raman spectroscopy based on the effect occurring in the presence of monochromatic light. Improved technologies used in spectrometers allow for complex analyses needed in many areas. An example of such a sector is the field of forensic science and dactyloscopy - one of the most important identification techniques.

The present study attempted to create a simulation of fingerprint detection and collection from a non-porous surface using dactyloscopic powders and foils. Another aspect was to attempt determining whether a person had been in contact with active substances present in the most common drugs. In order to meet the objectives of the topic, different types of fingerprint powders, foils and drugs were selected for the study. It was decided to examine samples of each of the possible combinations, starting with an imprint with sebum alone, and ending with an imprint contaminated with the drug, detected with the powder, and protected with the foil. The top layer of the foil appeared to obscure the substances in the imprint. Nevertheless, it was possible to examine the particles between the layers of foil. In addition, the drug with which the sample not yet protected by the foil was contaminated was identified. Raman spectroscopy can be used for analysis directly at the scene and it is a promising analytical method in forensic investigations.

Keywords:

spectroscopy, fingerprints, forensics, drugs

ABSTRACTS OF **POSTERS**



**TECHNICAL AND
NATURAL SCIENCES**



MAGNETIC, THERMAL AND TRANSPORT PROPERTIES OF C14 LAVES COMPOUND SmRu_2

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Abstract:

The Laves phases, characterised by the general formula AB_2 , represent a class of intermetallic compounds with optimal space filling and maximum number of atoms bound to the central atom. Among them, SmRu_2 has attracted interest due to its polymorphic nature and magnetic properties.

This work presents a comprehensive characterisation of the physical properties of the intermetallic compound SmRu_2 , obtained by the solid-state synthesis method. Structural studies using powder X-ray diffraction indicate that the resulting material forms in the hexagonal variant (MgZn_2) of the Laves phase, which is an unreported variant of SmRu_2 . Magnetic property studies reveal the ferromagnetic ground state of SmRu_2 with a Curie temperature T_C of approximately 38 K. Complementary specific heat and resistivity studies further confirm the presence of the para-ferromagnetic phase transition. These results provide a valuable understanding of the behaviour of SmRu_2 and contribute to the wider exploration of Laves phase compounds.

Keywords:

Laves phase, ferromagnetism, magnetic properties, heat capacity, resistivity



HIDDEN DANGERS OF THE CITY: PARASITES IN URBAN SPACES AND THEIR IMPACT ON DOGS

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A few words about the author(s):

Patrycja Leśniak is a master's student in Ethology and Animal Psychology at the University of Agriculture in Krakow. Her research focuses on parasites in urban spaces, analyzing their impact on the animals health.

Abstract:

Urban areas such as Krakow can serve as a source of parasite infections in dogs, affecting their health and behavior. Parasites can be transmitted both through animals and contaminated soil, making urban spaces particularly susceptible to their presence. It is worth noting that behavioral changes caused by parasites can also impact public health, as some of these organisms are zoonotic.

A total of 100 environmental samples were collected and analyzed: 50 from dog parks and 50 from green areas. The samples were examined using the Dada method, which involves the flotation of parasite eggs, enabling precise identification. This study aimed to assess the presence of parasites in urban spaces, particularly in dog runs and green areas, and to understand their potential impact on pets.

Out of the 100 samples collected, 34 tested positive for the presence of parasites. Among the samples from dog parks, 28 were positive (22 negative), while the green area samples yielded 6 positive results (44 negative). Parasites such as *Toxocara canis*, *Capillaria aerophila*, and *Ancylostoma caninum* were identified, all of which are known to potentially affect animal behavior.

The results indicate that urban recreational spaces, particularly dog parks, can be significant sources of parasite infections. These findings highlight the need for monitoring and implementing preventive measures to reduce the risk of pathogen transmission in urban environments.

Keywords:

parasites, behavioral changes, dog park, green areas



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TELEMEDICINE IN VETERINARY PRACTICE THE FUTURE OF ANIMAL CARE IN THE DIGITAL AGE

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A few words about the author(s):

Members of Students' Scientific Circle of Forensic Veterinary Medicine – researching all aspects of animals' care.

Abstract:

The rapid advancements in digital technology have paved the way for telemedicine to become an integral component of veterinary practice. Telemedicine enables remote consultations, diagnostics, and even treatment plans, reducing barriers to veterinary care for animals in underserved regions. This poster explores the benefits and challenges of integrating telemedicine into routine veterinary services. Benefits include increased accessibility, cost-effectiveness, and real-time monitoring of chronic conditions. However, limitations such as legal restrictions, potential misdiagnoses, and the need for technological infrastructure pose challenges. Case studies of successful telemedicine applications will be highlighted, alongside ethical considerations and future trends. This research underscores the potential of telemedicine to revolutionize animal care, making it more efficient and inclusive in the digital era.

Keywords:

telemedicine, veterinary practice



THE IMPACT OF CLIMATE CHANGE ON THE SPREAD OF INFECTIOUS DISEASES IN ANIMALS

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Abstract:

Climate change profoundly influences the emergence and spread of infectious diseases among animals. Rising global temperatures, altered precipitation patterns, and habitat shifts disrupt ecosystems, enabling vectors such as mosquitoes and ticks to invade new territories. These changes increase the prevalence of vector-borne diseases, including zoonotic infections that threaten animal and human health. Wildlife migration, forced by habitat loss, further amplifies the risk of disease transmission across species. This poster examines the mechanisms linking climate change to disease dynamics, highlighting case studies of specific diseases, their ecological impacts, and strategies to mitigate these threats. Understanding these connections is critical to developing effective One Health approaches to safeguard both animal and ecosystem health.

Keywords:

climate change, infectious diseases



CHEMOINFORMATICS SIMULATION OF LIGAND-PROTEIN INTERACTIONS USING SECONDARY METABOLITES OF THE FUNGUS RAMULARIA COLLO-CYGNI AS A MODEL

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A few words about the author(s):

Piotr Michałowski is a doctoral student in the chemical sciences. His interests focus on organic synthesis of programmable prodrugs, fluorescent molecular probes and inclusive polymeric membranes for microextraction of secondary metabolites.

Abstract:

The discovery of natural products since the mid-20th century has been based on phenotypic studies through the analysis of selected biological materials of plant and microbial origin. This approach has enabled the categorisation of secondary metabolites into various classes, with a focus on compounds exhibiting antibacterial, antioxidant, and/or anticancer properties.

Among the more promising candidates in terms of bioactivity are secondary metabolites of the fungus *Ramularia collo-cygni*, called Rubellins. Rubellins exhibit a range of biological activities, including cytotoxic and antimicrobial properties, as well as the ability to inhibit the bioaggregation of the tau protein. The tau protein, which is responsible for pathologies and deformities of the nervous system, undergoes hyperphosphorylation, resulting in the formation of insoluble aggregates called neurofibrillary tangles. An increase in tau protein has been shown to inhibit free neural transmission which enhances the development of neurodegenerative diseases, including Alzheimer's and Parkinson's disease.

In order to ascertain the nature of the Rubellin-tau protein interaction, a range of chemoinformatic docking tools were applied. These tools took into consideration all natural and synthetic Rubellin derivatives, with the aim of identifying those structures that were most effective and stable in terms of potential protein inhibition.

Keywords:

Rubellins, tau protein, chemoinformatics tools, ligand-protein docking



IMPACT OF MICROPLASTICS ON THE HEALTH OF AQUATIC AND TERRESTRIAL ANIMALS

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A few words about the author(s):

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Abstract:

Microplastics, small plastic particles less than 5 mm in size, have become pervasive pollutants in both aquatic and terrestrial environments. These particles are ingested by animals across various ecosystems, leading to bioaccumulation and potential health risks. In aquatic species, microplastics have been linked to physical injuries, gastrointestinal blockages, and decreased reproductive success. Terrestrial animals are similarly affected, particularly those consuming contaminated water or plants. Moreover, microplastics serve as carriers for toxic chemicals and pathogens, exacerbating their harmful effects. This poster will explore the pathways through which microplastics enter animal systems, the physiological and ecological impacts observed, and potential mitigation strategies. By addressing the consequences of microplastic pollution, this research underscores the urgent need for reducing plastic waste to protect animal health and ecosystem integrity.

Keywords:

veterinary, veterinary students, microplastics



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ANTIBIOTIC RESISTANCE IN VETERINARY MEDICINE: CHALLENGES AND STRATEGIES TO COMBAT A GLOBAL ISSUE

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A few words about the author(s):

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Abstract:

Antibiotic resistance (AMR) is a growing global health concern that threatens the effectiveness of treatments for both humans and animals. In veterinary medicine, the use of antibiotics in disease management and livestock production contributes to the emergence of resistant bacterial strains. These resistant pathogens can be transmitted to humans through direct contact, the environment, or the food chain, creating a One Health challenge. This poster examines the mechanisms driving AMR in veterinary settings, including inappropriate antibiotic use, and explores strategies to mitigate this crisis. Emphasis is placed on the implementation of antimicrobial stewardship programs, alternative therapies, and public awareness campaigns. By highlighting the interconnectedness of human, animal, and environmental health, this research advocates for collaborative, cross-disciplinary approaches to address AMR effectively.

Keywords:

veterinary, veterinary students, antibiotic resistance, AMR



EXPLORING THE MICROBIOME: IMPLICATIONS FOR HEALTH AND DISEASE

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A few words about the author(s):

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Abstract:

The human microbiome, composed of trillions of microorganisms inhabiting our bodies, plays a critical role in maintaining health and influencing disease. Research has revealed that the microbiome impacts key functions such as digestion, immune regulation, metabolism, and mental health. Dysbiosis, or imbalances in the microbiome, is associated with numerous health conditions, including gastrointestinal disorders, obesity, diabetes, cardiovascular diseases, and even mental health conditions like anxiety and depression. The gut-brain axis highlights the connection between the microbiome and cognitive function, further emphasizing its importance. Understanding the microbiome opens new avenues for personalized medicine, with potential treatments including probiotics, prebiotics, and microbiome-based therapies. As research advances, microbiome manipulation could become central to preventing and treating a wide range of diseases, offering a transformative approach to healthcare. Continued exploration of this complex ecosystem promises to reshape our understanding of health and disease management.

Keywords:

microbiome, health, disease



THE ROLE OF KNOWLEDGE IN OVERCOMING GLOBAL CHALLENGES

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Abstract:

Global challenges such as climate change, health pandemics, inequality, and political instability are more interconnected than ever, requiring multifaceted solutions. Knowledge is central to addressing these issues, providing the foundation for informed decision-making, innovative solutions, and international collaboration. Scientific research and technological advancements drive progress in areas like renewable energy, medical treatments, and environmental conservation, offering the tools to mitigate the effects of climate change and improve public health. Additionally, knowledge of social, economic, and political systems is crucial in crafting policies that reduce poverty and promote equality. Effective responses to global challenges depend not only on technological innovations but also on sharing knowledge across borders, fostering collaboration, and integrating interdisciplinary approaches. The ongoing exchange of knowledge and expertise between nations and sectors is vital for creating sustainable, long-term solutions. In this context, knowledge is not just a resource but a powerful tool for overcoming global challenges and achieving a prosperous future for all.

Keywords:

global challenges, knowledge



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