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**The Book
of Abstracts**

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„Science and Young Researchers”

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ABSTRACTS OF **PRESENTATIONS**



**HUMANITIES
SCIENCES**



THE IMPACT OF COVID-19 ON HUMAN TRAFFICKING

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I am a fifth-year student of criminology at the University of Natural Sciences and Humanities in Siedlce. I am interested in broadly understood topics related to crimes and criminals.

Abstract:

Human trafficking is being a serious crime that violates human rights. Victims of this type of crime suffer harm that accompanies them throughout their lives. Criminals are driven by an unbridled lust for money. On the other hand, the state suffers economic, social and human losses. The COVID-19 pandemic has changed the lives of all countries and their citizens, including the actions and awareness of criminals. The global situation related to the coronavirus has increased the phenomenon of human trafficking. The perpetrators of trafficking in human beings are not discouraged from acting, and the epidemic does not weaken their determined actions. Human traffickers are great at pandemic situations and take advantage of vulnerable citizens. Profiting from the fact that they are focused on coronavirus-related matters. Among other things, because of travel restrictions, they spread disinformation and try to convince people to use their services. Trafficking in human beings is a multi-faceted crime and the exploitation of victims of human trafficking occurs in different ways. Among other things, victims of this crime are exploited at work, forced to beg, but also human trafficking includes the sale of children, organ removal and illegal adoption. Trafficking in human beings is a widely understood problem that is difficult to detect. The current situation is that the offenses in question are even further from being revealed. More victims are more likely to become victims than ever.

Keywords:

human trafficking, COVID-19, crime



INFLUENCE OF GENERAL INTELLIGENCE ON THE EFFECTS OF EVALUATIVE CONDITIONING

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I am a first year psychology student of The University of Warsaw. I'm interested in implicit social cognition, especially in the field of evaluative conditioning.

Abstract:

Evaluative conditioning (EC) is defined as the change in the evaluation of a conditioned stimulus (CS) due to its pairing with a valenced unconditioned stimulus (US). Balas, Gawronski and Hu conducted a series of experiments concerning role of relational information on EC effects. They found that explicit evaluations reflect relational information, whereas implicit attitudes are compatible with co-occurrence of stimuli. Authors suppose that discrepancy between evaluations may be due to problems with integration of relational information. To test this hypothesis, I designed an experiment investigating whether intelligence level has an impact on EC results. To measure general intelligence (G factor) proposed by Spearman, I use Raven's Matrices. If the hypothesis is right, people with higher intelligence level will manage to integrate relational information. Thus, they will develop consistent attitudes on both implicit and explicit level. Contrary, attitudes of respondents with lower capabilities would reflect relational information on explicit level but co-occurrence of stimuli on implicit level.

Keywords:

attitude formation, evaluative conditioning, general intelligence, associative learning, propositional learning



TRANSLATING THE UNTRANSLATABLE – TRANSLATING HUMOROUS ELEMENTS IN TRENTON LEE STEWART’S THE MYSTERIOUS BENEDICT SOCIETY

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Kaja Makowska is a lecturer at the University of Gdańsk and a translator of middle grade, young adult and fantasy novels by authors such as James Ponti, Walter Dean Myers and Elizabeth Lim. In her research, she focuses on YA lit and translation.

Abstract:

Translation scholars have been collecting and describing strategies for translating humor for years. In their work, translators often face seemingly untranslatable excerpts. Witty proper names, word games, cultural references, sarcasm and situational jokes are among the many humorous elements found in Trenton Lee Stewart’s *The Mysterious Benedict Society*. The paper will introduce these humorous elements, then discuss the main translation strategies used to translate them, and finally demonstrate the translation of specific jokes with examples. How to translate a word that consists of numbers? How to translate a character’s name and keep it funny without being too obvious? How to approach a hidden allusion to Shakespeare in the chapter title? You will get to know the answers to these questions – and many more! – during the lecture.

Keywords:

translation, humour, translation strategies, middle grade literature, kid lit



STUDENTS' COOPERATIVES' FORMS OF ACTIVITY IN THE SECONDARY SCHOOLS

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Teacher of early school education in primary school (practitioner), postgraduate student on the University of Szczecin. Main fields of study are students' cooperatives and history of education.

Abstract:

The aim of my presentation is to show the students' cooperatives' forms of activity in the secondary schools in the region of Poland. I have used the qualitative method of texts study – which are the websites of the ten school associations that are the subject of the studies. Students' cooperatives belong to the school organizations that have existed in Polish education since 1900. The analysis shows the three forms of activity such as sales, manufacturing, and services. On its basis I have discovered that such forms of business activity are interesting way of learning-by-doing. They can contribute to improvement, diversification, and support in the achievement of educational objectives in the secondary schools. The common students' cooperatives forms of activity stem from the young people's interests and respond to their needs.

Keywords:

students' cooperatives, secondary schools, students' cooperatives' forms of activity



DEVELOPMENT OF ARTIFICIAL INTELLIGENCE AND THE FUTURE OF MANKIND: THE ANALYSIS OF TWO POSSIBLE SCENARIOS

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A few words about the author(s):

I am studying cognitive science at the Pedagogical University in Cracow. I am fascinated for human brain, its functions and possibilities. After finishing my studies I desire to work in the field of neurobiology.

Abstract:

Scientists are trying to answer the question “does artificial intelligence threaten human kind” in various ways. The most popular are two statements: positive and negative. The positive scenario assumes acquiring by humanity immortality, possibility of transferring ones memories to common server and also positive usage of robots and artificial intelligence in most aspects of human life. Negative scenario, on the other hand, presents the world as a place where people are deprived of any laws and authority. Such vision implies AI exterminating human kind. The presentation will not only discuss both scenarios but also consider which one is more probable.

Keywords:

artificial intelligence, AI, intelligent systems, superintelligence



THE RULE OF PROTECTION OF ACQUIRED RIGHTS - CONCEPTIONS REGARDING THE WAY OF DISTINCTING ACQUIRED RIGHTS AND THE FORMS OF THEIR PROTECTION

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I study law at University of Silesia in Katowice. I am the fifth year student. I am interested in theory and philosophy of law. Next month I am going to receive my MA degree.

Abstract:

Originally the acquired rights used to be opposed to the innate freedoms; in the later period many different concepts were created. The pressure in these theories was put both on the definition of acquisition (the form of acquisition used to be equated with the specific conventional action) and the equitable character of the specific entitlement (the duty of examining ordered to verify the legitimacy of rule at the time of its introduction and from the current perspective). There are two ways of protecting the acquired rights: the stronger and the weaker one. The stronger way amounts to the absolute prohibition of lifting the rights deemed to be equitable acquired. The weaker one allows to deviate from the rule of protection if more important value appears. I have made an analysis of the literature (especially the German one). The research that has been carried out allows to think that both the definition of rights acquired equitably and their security clause are extremely subjective.

Keywords:

acquired words, equity of law



E-EDUCATION AND REMOTE PSYCHOLOGICAL AND PEDAGOGICAL HELP AS A CONTEMPORARY CHALLENGE FOR TEACHERS, PARENTS AND STUDENTS

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My name is Magdalena Słowik. I study at the University of Warmia and Mazury in Olsztyn. I am a Ph.D. student. I study pedagogics. I am a psychologist, sociotherapist and early childhood education teacher.

Abstract:

The current pandemic situation has forced all of us not only to change the way we function or the model of operation, but often also to change attitudes and beliefs, especially regarding new media. Remote education has become a necessity, not a voluntary choice or a tool supporting traditional education.

Therefore, it was necessary to consider whether and how the pandemic influenced the entire education process? Did parents and teachers deal with the change and how? Whether and what difficulties did they encounter? Did the pandemic affect the psychophysical functioning of students, parents and teachers, and how?

The aim of the research was to show the first experiences, conclusions and suggestions – both teachers and parents – in connection with the pandemic situation and the need for remote education. The research was also aimed at obtaining data showing the quality, scope and effectiveness of the remote psychological and pedagogical assistance provided at the school.

In order to achieve the assumed goals - in the period from March 2020 to March 2021, qualitative research was carried out among 36 students and interviews with the parents of these children and their teachers (23 teachers and specialists in total) were conducted.

The qualitative research planned allowed to show the current situation in education at the primary school level, mainly from the perspective of parents and teachers.

Keywords:

e-education, psychological and pedagogical help, parents, children, teachers



MEMORY AND POLITICS IN THE SPANISH EXHUMATION CYCLES

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Social anthropologist with a specialisation in forensic biology. Interested in necropolitics, exhumations and politics of memory. Conducted long-term field research in Spain.

Abstract:

The Francoist victory in the civil war, further dictatorship and finally the democratic transition in Spain in the last century have had a significant influence on forms of remembering and commemorating the victims of the conflict. Bodies of the defeated Republicans were deliberately left underground to exercise symbolical and psychological power and as one of the elements of the historical politics based on oblivion. However, the enforced erasure of those dead from society has not meant that they were completely forgotten. Their unmarked existence has triggered different cycles of exhumation processes. Their characteristics have varied significantly depending on the conditions of the moment. By discussing the differences of each cycle, I intend to unravel political influence on historical narrative and social memory.

Keywords:

exhumations, politics, memory, history, conflict



THE RIGHT TO THE COURT FOR AN ADMINISTRATIVE OFFENSES IN POLAND AND IN GERMANY

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Ph.D. student. During studies, she studied abroad in Germany at Technical University of Dresden – Law Faculty. Recipient of the Polish Ministry of Science and Higher Education Scholarship for outstanding academic achievements.

Abstract:

Right to the court: is the fundamental right of the defendant during a fair trial and the general law principle in the European legal order. This principle also applies in the regime of liability for administrative offenses. Despite the identical assumptions, each country guarantees the right to the court in various ways. In such circumstances, it should be checked whether the right to the court is actually respected or whether it is just an illusion. In this regard, an excellent research environment is the model of liability for administrative offenses in Poland and Germany. To answer the above question, it is necessary to examine even: the nature of the authority deciding the case, nature of the authority controlling the issued decision, the scope of the appellate control, or whether an extraordinary inspection is foreseen. Such researches, named ‘Guarantees of penal responsibility and administrative-offence responsibility’ are carried out at the Kozminski University in Warsaw, over the number 2018/30/E/HS5/00738, funded by the National Science Center in Poland. Comparative researches are necessary for the development of legal science, because foreign law is often a source of inspiration or a form of judicial dialogue, and sometimes even an argument in a specific dispute. The purpose of comparative research is to highlight both the advantages and disadvantages of individual solutions.

Keywords:

right to the court, administrative offenses, Polish and German legal order



WHAT HAPPENS BETWEEN PSYCHOTHERAPIST, MR. YAVIS AND MR. HOUND? PSYCHOTHERAPIST'S EXPECTATIONS TOWARDS PATIENTS

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Integrative psychotherapist, psychologist. Interested in the field of psychotherapy in particular in its gender issues and personality disorder within phenomenological approach.

Abstract:

Some of the already published studies indicate that psychotherapists do have some image of a patient who would be preferred to work with. However, little is known within the field of psychotherapy about the quality of such expectations towards clients. If not reflected it can have an impact on the process of psychotherapy and the quality of treatment relationship. The presentation would depict the image of Mr. YAVIS and Mr. HOUND, so the set of patient's characteristics, which make him/her perceived as preferred or unpreferred. Possible gender differences would be discussed as well as their impact on gender issues in the psychotherapeutic relationship.

Keywords:

psychotherapy, YAVIS, HOUND, gender



I AM IN THE (VIRTUAL) WORLD – BLURRING THE BOUNDARIES BETWEEN THE REAL AND THE VIRTUAL WORLD AS A CHALLENGE FOR THE YOUNG GENERATION

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I graduated from B.A. studies in applied rhetoric and M.A. studies in Theology at the John Paul II Catholic University of Lublin. In 2016, I started the Ph.D. studies in the field of Media Education, also at the same university.

Abstract:

The contemporary temporal context challenges man to determine the relationship between the real and the virtual world. It is more and more difficult to draw a boundary between them, as they begin to interpenetrate. This problem especially affects the young generation who do not know another world; were born and raised in a world where the media have become a part of our everyday life. On the one hand, there are great opportunities, but on the other hand, there are many dangers. Among them, for example, the fact that a man in the virtual world feels comfortable and confident, and he lacks the courage to take bold steps in the real world, in which his life takes place. Therefore, a reflection is needed that proposes possible solutions that could help the young generation find their place on the border of both worlds.

Keywords:

media, social media, education, media literacy



POLISH MARCHLEWSKI AUTONOMOUS ETHNIC REGION IN UKRAINE (1925–1935)

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A few words about the author(s):

Przemysław Mirosław Pazder – research interests: Great Famine in Ukraine, Poles in the USSR in the interwar period.

Abstract:

In the Polish diaspora experiment, the operation of the Polish autonomous region with the capital in Marchlewska played an important role in Soviet policy towards national minorities. According to official data, 476.4 thousand people lived in Ukraine. Poles (including as many as 370,000 in the countryside), which is, after all, a large national minority. That is why the sovietization of the Polish minority was the primary goal of the Bolshevik national policy.

Keywords:

Poland, USSR, Ukraine

POLISH NATIONAL REGION FELIKS DZERZHINSKY

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Abstract:

The establishment of the Feliks Dzerzhinsky Polish National Region on March 15, 1932, with its capital in Dzerzhinsk, is also of great importance for the Polish autonomy in the USSR. The political conditions that accompanied the creation of Dzerzhinsky, i.e. the second Polish national region in the USSR, were different from those when the Polish National Region was formed. Julian Marchlewski. The specificity of Belarus was that despite the presence of 7.5% of the Polish population living there, the population was scattered throughout almost the entire territory of Belarus.

Keywords:

Biellarus, poland, polish minority



NEGATIVE APPROACH IN SOCIAL SCIENCES

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The author has majored in Applied Mathematics at Wrocław University of Technology, he currently works as an operations analyst in the field of finance.

Abstract:

Results presented by modern natural sciences make the empirical approach to studies so much more alluring for researchers. Since decades mathematical models and concepts are used in fields which seem to lack an explicit connection with the realm of formal structures and unambiguous algorithms. Psychology, economy and sociology eagerly welcomed methods which grew from a different, or perhaps even an opposite paradigm to their own. Although mathematics and so called formal sciences are exclusive to neither pole of the academic spectrum, a question of the purpose of their application has to be posed. In this presentation we will examine an agent-based voting model used in social sciences. We will then evaluate its utility as well as reflect on what should actually be meant by this term. Through analysing various simulations we will see whether positive results and predictability increment are indeed the main goals of a model.

Keywords:

social sciences, agent-based modelling, model utility



MEDIATION, OR A METHOD OF RESOLVING ADMINISTRATIVE DISPUTES

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I graduated in law and canon law. I am currently in the third year of doctoral studies at the John Paul II Catholic University of Lublin in Lublin.

Abstract:

Mediation is an increasingly common method of conflict resolution and this possibility is increasingly used by the Polish judiciary, both at the civil, criminal and administrative level. It is a relatively young institution, but more and more authors focus on expanding their knowledge in this subject. The article contains the concept, the genesis of mediation in administrative law, the types of this institution will also be described. Features, goals and rules of conduct will be indicated. The author's aim was to present the subject of mediation in administrative matters and to indicate what are the advantages of this type of procedure. The thesis uses the dogmatic and legal method and it will be of a theoretical and legal nature.

Keywords:

mediation, administrative dispute, conflict resolution



MODERN EUROPE'S MODIFICATIONS OF INTERNATIONAL REFUGEE LAW

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Graduate of Spatial Management at the Faculty of Oceanography and Geography, Main interests are reading, pondering over the genesis of phenomena, searching for answers and possibilities of development of countries and nations.

Abstract:

The study indicates selected significant modifications of contemporary Europe in the field of international refugee law. Based on selected international initiatives, it explains the modifications in the field of refugee law made by the United Nations, the Global Initiative and the European Union. The study indicates the nature of international refugee law, as well as the distinction between a refugee and an asylum seeker. The biggest regulations within the international refugee law were created after the World War II due to the requirement of regulating global refugee phenomena. The following research methods were used during the creation of the study: the observational method after the indication of certain facts and their inclusion in the interrelationships and dependencies, and the method of document research in order to show the assumed international modifications.

Keywords:

refugees law change Europe international



INTERPERSONAL DIFFICULTIES IN PEOPLE WITH CLUSTER B PERSONALITY DISORDERS

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Abstract:

Personality disorders influence not only the well-being of an individual but also the quality of interpersonal relationships. The traits typical of the antisocial, histrionic, borderline and narcissistic personalities can hinder the development of satisfying relations. The study is focused on difficulties in establishing correctly functioning interpersonal relationships by people demonstrating Cluster B personality disorders which are characterized by the dramatic and inconsistent form.

Keywords:

personality disorders, interpersonal relationships



THE IMPORTANCE OF STUDENTS' FINANCIAL LITERACY – COMPARATIVE ANALYSIS OF INTERNATIONAL INDEXES

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I am a Ph.D. Student at Doctoral School of Social Sciences UMCS, discipline Economics and Finance. My scientific interest include small and medium enterprises, innovation, financial literacy, internationalization, entrepreneurship.

Abstract:

In a process of constant changes, modern society faces new challenges in area of finance. Financial literacy has become an inseparable part of professional careers and personal lives while simultaneously has an impact on financial markets and social welfare systems of each economy. Numerous studies indicate the importance of possessing even basic abilities concerning finance which result in more mature saving decisions or influence more efficient household budget management.

Financial literacy among students in current demanding times is especially needed, as it may help approach new millennium opportunities as adults with better preparation. Even though the level of students' financial awareness is constantly growing and increasing number of countries provide financial education in school, still results appear to be relatively low given the challenges and risks that may befall.

The purpose of this paper is to present the importance of students' financial literacy in context of international indexes. Empirical part of this paper based on reports: OECD PISA 2018 "Are students smart about money?", OECD Better Life Index and World Economic Forum "The Global Competitiveness Report 2018".

Keywords:

financial literacy, student, international indexes



PHILOSOPHY AS AN ART OF LIFE

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Student of philosophical consulting and coaching. A Silesian from Zabrze. Passionate about philosophy, politics, psychology and mental health. Member of the student government.

Abstract:

The aim of the work is to review and complete philosophical methods that have therapeutic and developmental potential. The author discusses the positive influence of philosophy for the human psyche, which was known already in antiquity. It begins with the philosophies of the Sophists, Stoics, Socrates and ends with the Buddhist philosophy of the East. The methods of working with another person are presented: coaching, philosophical counseling and philosophical therapy. The last two are compared with each other. This is a review. The author used, inter alia, the articles by: E. Ruschmann “Philosophical Advice”, M. Mrówka “Sources of the ethics of counseling in ancient philosophy”, Epictetus “Encheiridion”, L. Marinoff “In search of happiness: how to solve life problems”, P. Hadot “Spiritual Exercises and Ancient Philosophy”. The result of the work is finding the therapeutic and development potential in the analyzed philosophical trends. Philosophy turns out to be an opportunity to delve into yourself. It is an opportunity for intellectual reflection.

Keywords:

philosophy, mental health, coaching, art of life, therapy



ENERGY TRANSFORMATION IN POLAND AFTER 2020

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Aleksandra Korczyc, Ph.D. student.

Abstract:

Each country uses a specific source of energy. It depends primarily on the economic level, population, climate and other causes; The energy supply of countries varies. Taking into account the expanding catalog of threats and the experience of the last decade, it can be assumed with high probability that most of the EU Member States, including Poland, will not be able to independently guarantee itself in the future a permanent security of supply with all energy carriers for the proper functioning of economies based on advanced technology and modern post-industrial societies. In this context, it seems justified to analyze the formal and practical possibilities of taking action in this area at the Community level. Energy based on conventional, non-renewable sources makes the EU dependent on the import of energy resources, especially oil and gas. That is why it is important to present the positions of Polish local governments participating in building the energy security of the state with regard to supporting the so-called "green energy" and ecological.

Keywords:

renewable energy sources, Poland, green energy, local governments



THE NEW FACE OF MICKIEWICZ. THE LANGUAGE OF THE PARISIAN LECTURES AND "THE PEOPLE'S TRIBUNE"

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A few words about the author(s):

A graduate of legal studies and Polish philology at UAM in Poznan, a doctoral student at the Ph.D. School of Language and Literature. Her scientific interests include in particular: legal and juridical language and literature of Romanticism.

Abstract:

The author in her presentation entitled New face of Mickiewicz. Language of Parisian lectures and "The People's Tribune" indicates this face of the poet, which is not present in current philological studies. She attempts to present Mickiewicz as a publicist and a lawyer, who during his lectures at the College de France and in the pages of the magazine he edited presented his conception of the state and law in a widest sense. The author, however, adopts a linguistic perspective rather than a literary one. She analyzes the poet's selected speeches in terms of their efficiency in the use of legal terminology, rhetorical skills, persuasive abilities and logical argumentation. She does so with reference to the previously outlined definitions of legal language, journalistic language, and artistic (literary) language, which cannot be omitted from consideration. The author, bearing in mind all the difficulties connected with the study of the language of the Parisian lectures and taking into account the fact that the fragments presented in the speech are only a modest part of the vast source material, comes to the conclusion that the language Mickiewicz used to describe the complexities of statehood and law fulfils all the conditions for assuming that the poet in fact knew what he was talking and writing about.

Keywords:

Adam Mickiewicz, conception of state and law, 'The People' s Tribune', Parisian lectures



SOCIAL RELATIONS OF YOUNG ADULTS DURING THE PANDEMIC

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A few words about the author(s):

Martyna Perzan – member of the Psychology Science Club "Faces", student of the 1st year of MA studies in the field of Pedagogy.

Abstract:

The pandemic has changed the way people function in society, forcing them to limit their direct contacts and stop certain activities. The aim of the research was to check what the social relations of young adults look like during a pandemic. Research questions are: Did social relations of young adults change during the pandemic? What is the mood of the respondents due to the limited possibilities of contact? Is it possible to make new friends during a pandemic? The research tool was the author's 14-question questionnaire and the IPIP-BFM-20 (International Personality Item Pool-Big Five Markers-20). The study was conducted online at the turn of February and March 2021. The study involved 100 young adults aged 18-35 (62 women, 38 men). Results showed that In a part of the respondents the relations worsened. The vast majority of respondents lacked direct contact with other people. Most of them admitted that their moods worsened. Almost half of the respondents made a few new friends during the pandemic. Some of the them have online friends who they have never seen. Moreover, people who declared that they maintain contacts are characterized by higher extroversion and agreeableness compared to those who didn't declare such actions. There is a significant relationship between the feeling of loneliness and emotional stability. The data obtained show that the pandemic may have an impact on social relationships and moods of young adults.

Keywords:

social relations, pandemic, young adults



THE ZONE OF PROXIMAL DEVELOPMENT (ZPD). WHAT IS IT? HOW DOES IT WORK? WHY IS IT IMPORTANT?

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A few words about the author(s):

Zuzanna Porębowicz is a Montessori teacher and a student at The Maria Grzegorzewska University in Warsaw.

Abstract:

Lev Vygotsky was a Russian developmental psychologist, who focused not only on the development of children but especially on the learning processes involved with it. According to Vygotsky, learning happens because we interact with the environment. Further, he believed that we do not learn because we have developed, rather than developing because we have learned. However, in order to learn, we must be presented with tasks that are just out of reach of our present abilities. Tasks that are too simple or already within our present abilities do not promote learning. On the other hand, tasks that are too complex become frustrating and no learning occurs. Vygotsky believed that those tasks which are just beyond our present ability, exist in, what he called, the "Zone of Proximal Development." The tasks in the Zone of Proximal Development are the things we can almost do ourselves but need help from others to accomplish. After receiving help from others, we will eventually be able to do them on our own. How does the concept of the Zone of Proximal Development factor into the roles of today's teachers? Students can learn the content, but they need guidance and encouragement from a teacher to do so. As teachers, we must be aware, that every student has a different Zone of Proximal Development. This means "differentiation." Educators must design lesson plans that cater to the Zone of Proximal Development for each of their students to avoid boredom and frustration in the classroom.

Keywords:

education, teaching, psychology, Vygotsky



BORDER MANAGEMENT IN THE CONTEXT OF THE MIGRATION CRISIS IN THE EU

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A few words about the author(s):

Joanna Skraburska is currently a Ph.D. student at the Naval Academy in Gdynia. Her main research interest is the issues of migration in Europe and issues related to the Schengen area.

Abstract:

The widespread increase in the perception of migration through the prism of threats by the European community brought about consequences in the form of new strategies and instruments of migration policy at the international level.

The analysis of the last 20 years of the functioning of the EU migration policy shows that priority is given primarily to the issue of migration management policy, including the development of techniques improving the security and effectiveness of border protection. Especially after the outbreak of the famous migration crisis in 2015 There is a trend towards an increase in the use of control tools to keep migrants out of the EU territory. Due to its scale and course, the migration crisis has placed the issue of borders in the center of attention in all leading countries of the community and made the problem more political than the legal and expert issue previously. She would like to establish whether the reform of the Frontex Agency has so far brought the expected effect and results in increased security at the external borders of the EU, also in crisis cases, such as: sudden, uncontrolled influx of migrants.

Keywords:

migrations, security, European Union, migration crisis, border security



IDENTITY CHANGES AS A RESULT OF LIFE STORY TELLING

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A few words about the author(s):

A third-year doctoral student in psychology. Research interests: identity, narrative identity, adulthood, self-efficacy belief. Professionally involved in psychotherapy of children, adolescents and adults.

Abstract:

By telling the story of his life, a person reaffirms the choices he has made, the decisions he has made, and thus comes to self-confirm his identity. The study involved two groups: an experimental group (telling the life story and completing the questionnaire) and a control group (completing the questionnaire only). Both groups were tested with the EIPQ Ego Identity Process Questionnaire by Balistreri, Bush-Rossnagel, and Geisinger (1995). The experimental group was studied with the McAdams Life History Interview. The formulation of one's life story influences the decrease in performance on the tendency-level dimension of exploration. The interview was a time to explore in one's life experience, to analyze it anew, a certain effort to give renewed meaning to some events, so the scores on the exploration scale in the experimental group decreased in the second study.

Keywords:

narrative identity, identity, exploration, engagement



THE IMPORTANCE OF HOMEWORK IN THE TEACHING PROCESS

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A few words about the author(s):

I am a student of 4th year of the Pedagogy of Early Education at the University of Warmia and Mazury in Olsztyn. In the future, I want to be a teacher in primary school. My passions are travelling and reading a books.

Abstract:

The main goal of the research was to find out the teachers' opinions on the importance of homework in the teaching process.

The respondents were 120 early childhood education teachers from the from the Warmińsko-Mazurskie voivodeship. A questionnaire was used to conduct the research.

The analysis and interpretation of the collected research material showed that teachers use written work as the most common form of homework. The homework verification is based on revision and evaluation. The respondents indicated mathematical education as the area causing most difficulties for the students. As the objective of homework, the respondents pointed out to developing a habit of systematic work and revision of the processed material. The results of the research showed that homework is important in the educational process of students in early school age.

Keywords:

homework, school, teacher, education



AVANT-GARDE TERROR – AN OUTLINE OF THE SITUATION OF COMPOSERS IN THE 1950S AND 1960S

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A few words about the author(s):

He graduated in music composition at the Academy of Music in Poznań and musicology at the Adam Mickiewicz University in Poznań. He is a PhD student at the Faculty of Art Studies and Musicology of Adam Mickiewicz University.

Abstract:

The aim of the presentation is to show the situation of composers in the 1950s and 1960s. The final years of oppression caused by the imposed socialist realist doctrine, then the thaw after the death of Józef Stalin, and finally the first years of Władysław Gomułka's reign and government efforts to create the image of Poland in the international arena as a modern country. Modernity was also to manifest itself at the level of music which stood out from all traditions. Young composers quickly felt the freedom that they could present at the "Warsaw Autumn" International Festival of Contemporary Music. Soon, however, the younger generation of authors began to block access to the presentation of their works of the generation of composers born before the Second World War.

Keywords:

composers, terror, Warsaw, autumn



FAIRY TALES, FABLES, STORIES AS A FORM OF THE STIMULATING CHILDREN’S DEVELOPMENT

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A few words about the author(s):

Student of The Maria Grzegorzewska University, in the field of Special Education, focused on early intervention for child development.

Abstract:

Among the methods and techniques of broadly understood art therapy one can find not only forms of treatment through music or dance, but also through widely understood literature. A significant type of bibliotherapy, the activities of which are based on reading and discussing the reworked fragments of the text, is fairytale therapy, the conduct of which is dedicated to those under the care of middle and late childhood. Fairytale therapy, through its functions – supporting, education and psychotherapy, creates a method of work that enables the stimulation of the youngest’s development.

Keywords:

fairytale therapy, middle and late childhood



MONUMENTS' PROTECTION AS A COMMUNE'S OWN TASK

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A few words about the author(s):

Dominika Zięba – M.A. in political science, currently Ph.D. student in the discipline of political science and public administration; main research area: local government.

Abstract:

Based on legal regulations in Poland, protection of monuments is one of the commune's own task. Apart from the government administration, competences in the field of monuments and cultural heritage protection are assigned to local and regional authorities, including communes, counties and voivodships as well. According to the national statistical research results, there is a large number of communes which do not fulfil their tasks in the area of monument protection. The purpose of the presentation was to show the most important commune's tasks concern monuments and to evaluate how local government fulfils entrusted tasks in this area. The effect of the considerations was also to propose solutions that could improve the local system of monument protection in Poland. The study is based on legal acts regulating the system of monuments and cultural heritage protection in Poland, data provides by individual communes and data collected by Statistics Poland.

Keywords:

local government, commune's own tasks, monuments, cultural heritage

ABSTRACTS OF **POSTERS**



**HUMANITIES
SCIENCES**



FORMS AND METHODS OF WORK IN KINDERGARTEN

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A few words about the author(s):

My name is Katarzyna Chojnacka. I have finished studies education at the APS in Warsaw. Now I am studying special education at APS, specialization: education and rehabilitation of people with intellectual disabilities. I am a teacher in the preschool group.

Abstract:

Pre-school education is the first stage of education for children aged 3-6. It defines social expectations from childhood education. in a lifetime perspective. It is related to the immediate future of a human being. The concept of pre-school education consists primarily of defining the goals, pedagogical and organizational assumptions of institutions educating children in pre-school age. My research will concern ways, methods, working hours, etc. in state and private kindergartens.

Keywords:

kindergartens, teachers, preschool, methods, working hours



DIGITAL MEDIA AND MANAGEMENT IN TIMES OF CRISIS

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A few words about the author(s):

Engineer by education, has knowledge and experience in such areas as: electronics, IT, telecommunications and electronic media. In the field of management, he has a master's degree in HRM with extensive experience in the commercial sector.

Abstract:

Recent events related to the COVID-19 pandemic, which significantly changed the perception of global security, and in particular the threats resulting from the progress of civilization in the form of unrestricted human mobility, which allowed the threat to spread on an unprecedented scale. The tangible effect of the fight against the pandemic is the unprecedented decline in international economic cooperation in recent years. Electronic media played a significant role in shaping the scale of the problem, presenting the scene of covid events in a more or less reliable way, depending on their type. In the public and commercial (licensed) media, the information message was subject to fact-checking, while on the Internet the information in some cases differed significantly from the actual occurrences.

In modern society, digital media performs a variety of functions, especially the newly emerged so-called social media. Social media in crisis situations are of particular importance. Regardless of the size and type of the crisis, it can be assumed that in the present reality without the presence of social media there would not be a major crisis, or at least a small group of society would know about it. It is only when information about the phenomenon is disseminated on a large scale that a crisis situation arises.

Keywords:

pandemic, social media, management, digital



SERVICE-LEARNING AS A KEY TO STRENGTHENING YOUTH CITIZENSHIP COMPETENCES

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A few words about the author(s):

Katarzyna Hamant is a second-year Ph.D. student at the Doctoral School of Sociological Sciences at SWPS University in Warsaw. She researches in the field of informal civic education in the context of lifelong learning.

Abstract:

Conventional civic education favours a passive and normative approach to politics. It emphasises the cognitive domain without sufficiently referring to the skills and attitudes necessary to participate in democracy actively. Learning democracy through experiencing is key to involving young citizens in socio-political life. The poster aims to present the effects of informal civic education utilising the "Youth Vote+" program. The project involved students aged 14–19 in organising youth presidential elections and pro-frequency campaigns. In order to answer the question of the extent to which democracy learning through involvement contributes to strengthening civic competencies, a quantitative research method (pre-test and post-test evaluation questionnaire) was used. Research shows that practice in civic activities has excellent potential to develop the democratic competencies of young people, especially in the behavioural dimension.

Keywords:

civic participation, civic education, non-formal education, service-learning, civic competences



THE COMPARISON OF GLENN DOMAN METHOD AND TEACHING READING AND WRITING WITH MARIA MONTESSORI

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A few words about the author(s):

Katarzyna Krupa – graduate of first cycle studies at The Maria Grzegorzewska University on specialty early school and correctional pedagogy; student of second cycle studies on specialty: pre-school and early school pedagogy.

Abstract:

Reading belongs to the basic skills of modern humans. Reading is essential in learning and it has crucial meaning to understand the world around us. For this reason learning to read is the foundation of early childhood education. Mastering the reading skills is an extremely important factor in the mental development of children. In the process of learning to read methods play an important role. The latest trend show that learning to read should be introduced from an early age of a child's life. The poster compares two contemporary concepts relating to learning to read: Glenn Doman Method and Teaching Reading and Writing with Maria Montessori. Research consists in describing and comparing these two methods.

Keywords:

learning to read

REVALIDATION CLASSES

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A few words about the author(s):

Ph.D. student at the Catholic University of Lublin, John Paul II Catholic University of Lublin, Institute of Pedagogy, Department of General Pedagogy.

Abstract:

The term revalidation comes from Latin words re-again, validus – strong. Means restoring man to fullness efficiency. It is an educational process, with planned goals, taking into account theoretical knowledge and directed action on a disabled person; improvement disturbed developmental functions i intellectual. It is necessary to apply such methods that will lead to a full and the comprehensive development of learners will help become independent, develop cognitive interests and shape the proper social attitude. Objectives of revalidation disabled people rely on adaptation their psychophysical and specific predispositions living conditions to meet the requirements social functioning and personal aspirations despite disability with all its consequences.

Keywords:

method, revalidation, child, disability



PORTRAITS OF DEMONS AND ETERNAL DAMNATION IN BEDE'S ECCLESIASTICAL HISTORY

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A few words about the author(s):

Michał Ludewicz, ThD candidate at the John Paul II Catholic University of Lublin. Interested in relations between Church and society in Late Antiquity and Early Middle Ages.

Abstract:

The aim of this poster was to describe how were demons and eternal damnation portrayed by Bede Venerable (672-735) in his Ecclesiastical History. This goal was achieved by descriptive method. The data collected for the poster gives answer to the following questions: What names did Bede use to label demonic beings? How did the Chronicler portrait them? How did he perceive their influence upon humans? How did Bede depict visions of eternal damnation? As enemies of human salvation Bede mentioned Satan and demons. The place of their existence was called Tartarus or Gehenna. Evil spirits were able to influence human's life by malice suggestions. Eternal damnation was portrayed by Bede as a vision of a place full of darkness with masses of noisome flame, full of human souls. According to Bede visions of demons and eternal damnation should encourage people to abandon their bad way of life and in consequence to struggle for eternal salvation.

Keywords:

Bede, Devil, Satan, demons, hell, damnation



PROBLEMS OF ADULTS WITH DYSLEXIA

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A few words about the author(s):

I am a second-year student of special education. I am interested in the topic of dyslexia and more specifically its existence among adults. I am also currently doing a research about impacts that dyslexia has on students.

Abstract:

It is estimated that one in ten adults is dyslexic. However, most of them have never been diagnosed due to the fact that dyslexia only in recent years has begun to be more and more recognized and tested. Adults suffering from dyslexia have some of the problems that children face, such as reading and writing difficulties. They also have trouble with regards to numbers, that is remembering telephone numbers or doing calculations. The troubles of people with dyslexia, however, do not stop there. There are plenty. This is quite an important issue, and we should aim at drawing more attention to it. So far, we are only providing help to children but dyslexia doesn't disappear with turning 18. It is something that lasts a lifetime.

Keywords:

dyslexia, adult problems with dyslexia



RESEARCH ON THE POLISH VERSION OF BASIC PSYCHOLOGICAL NEED SATISFACTION AND FRUSTRATION SCALE – VALIDATION AND MEANING FOR WELL-BEING AND MENTAL HEALTH DISORDERS.

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A few words about the author(s):

The researchers focus on determinants of the alcohol addiction and its meaning for mental health and the quality of life.

Abstract:

The aim of this research was to explain the meaning of need satisfaction and frustration for mental health and validate Polish adaptation of Basic Psychological Need Satisfaction and Frustration Scale. It measures satisfaction and frustration of three needs: autonomy, competence, relatedness. These needs have an important meaning in the explanation of psychological well-being and risk of disorders. Data was collected from 792 participants and 60 alcohol-addicted patients. We prepared a Polish translation equivalent to the original tool and tested 3 theoretical models by CFA. Reliability was tested using test-retest reliability, item-total correlation, and internal consistency. Criterion validity was tested based on correlation with happiness resources, symptoms of mental health disorders, psychache and risk of alcoholism. CFA confirmed that BPNS&FS measures two independent dimensions: satisfaction and frustration of each need. Reliability parameters were acceptable. There were significant positive relations of needs satisfaction with happiness resources, and negative relations with symptoms of mental health disorders, psychache, and the risk of alcoholism (opposite relations for needs frustration). Significantly higher need frustration among alcoholics supported diagnostic validity. The Polish version of BPNS&FS is a valuable and reliable measurement tool. Moreover, satisfaction and frustration of needs are essential for well-being and mental health.

Keywords:

mental health, addiction, basic psychological needs, validation



INTERNAL AUDIT AS A TOOL CREATING ADDED VALUE IN THE MANAGEMENT OF A LOCAL AUTHORITY

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A few words about the author(s):

A graduate of the Faculty of Law and Administration, currently as a personal data administrator, research area: control, management – public finance sector.

Abstract:

Today's internal audit is considered to create added value in management. In the latest definition of internal audit, the Institute of Internal Auditors refers to the concept of value creation for the organisation and its stakeholders. The purpose of the article is to identify and characterise selected values resulting from the application of modern internal audit in local government units to identify actions conducive to the improvement of the quality of public services provided and the most frequently emerging risks. Research methods, typical of legal sciences m.in. such as dogmological and legal methods, logical-linguistic method and legal and comparative method, were used to achieve this objective.

Keywords:

internal audit, added value, risk, risk management, quality of public services



RESEARCH ON CONSUMER AWARENESS OF THE IMPACT OF MENTAL ACCOUNTING ON FINANCIAL DECISIONS

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A few words about the author(s):

I am a third-year student of finance and accounting at the University of Economics in Cracow. I am interested in behavioral economics and psychology.

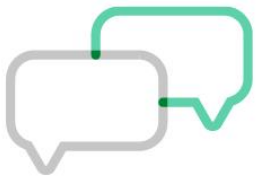
Abstract:

There is an analogy between financial accounting and the accounts people keep in their minds. This analogy is described by the idea of mental accounting introduced by Richard Thaler. People's attitudes to money are often disturbed and distorted by many factors that most of us are unaware of. Whether we like it or not, money is an integral part of our lives and plays a huge role in it. The aim of the research was to investigate how consumers evaluate and perceive their own rationality in the sphere of money management and how it manifests itself on the influence of the phenomenon of mental accounting on their financial decisions. The research tool used was a questionnaire. The results show that the majority of the research group considers themselves to be rational financial decision makers. Detailed conclusions on how this relates to the impact of mental accounting will be presented on the poster.

Keywords:

mental accounting, consumer rationality

ABSTRACTS OF **PRESENTATIONS**



**MEDICAL
SCIENCES**



THE IMPACT OF PLATINUM NANOPARTICLES ON CISPLATIN AND CARBOPLATIN: INTERACTIONS AND BIOLOGICAL ACTIVITY OF THE ANALYZED COMPOUNDS

Patrycja Beldzińska (1)*, Kamila Butowska (1, 2), Dariusz Wyrzykowski (3),
Jacek Piosik (1)

University of Gdansk:

(1) Intercollegiate Faculty of Biotechnology UG&MUG, Laboratory of Biophysics

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A few words about the author(s):

Patrycja Beldzińska obtained a bachelor's degree in Biotechnology at the Medical University of Lodz. Now, she is realizing her master's thesis in the Laboratory of Biophysics at the Intercollegiate Faculty of Biotechnology UG&MUG.

Abstract:

Nowadays, platinum nanoparticles (PtNPs) are crucial not only in technology but also in medicine. Due to their special characteristics such as large surface to mass ratio, high reactivity and catalytic applications, PtNPs are in the spotlight. The size of PtNPs has a significant impact on their solubility and also bioavailability. What is really important, PtNPs probably can act as drug delivery platforms which help in precise delivery, lower the toxicity with good efficiency and reduce resistance.

Cisplatin and carboplatin are the most effective platinum-based drugs used in the therapy of various malignancies including ovarian, testicular, head and neck or lung cancers. However, both agents induce severe side effects such as nephrotoxicity, hematotoxicity, cardiotoxicity and also could trigger resistance.

The aim of this research was to investigate whether the PtNPs could interact with the tested agents and influence on their biological activity.

In this study, we used two biophysical methods: Dynamic Light Scattering, Isothermal Titration Calorimetry and a biological Ames assay on *Salmonella typhimurium* TA102.

Taking the results into account, the direct interactions between PtNPs and cisplatin exist but it could not be confirmed in case of carboplatin. The bacteriological assay verify the impact of PtNPs on the biological activity of both chemotherapeutic agents.

Keywords:

platinum nanoparticles, cisplatin, carboplatin, non-covalent interactions, mutagenicity



APPLICATIONS SUPPORTING PHYSICAL ACTIVITY AS A TOOL FOR PHYSICAL EDUCATION TEACHERS

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A few words about the author(s):

My name is Daria Buczkowska. I started education at the Doctoral School at the University of Szczecin in 2020. I am a physical education teacher. I am interested in physical activity, especially among adolescent students.

Abstract:

The COVID-19 pandemic has caused changes that hinder learning in the field of education. From March 2020, most lessons in Poland were held remotely. Physical education teachers were forced to reflect on the form of work with students and to find new methods and ways of implementing physical activity. Due to the lack of direct contact, the educators had to learn to use applications supporting physical activity, motivate students in various ways and, above all, solidly prepare for lessons in order to arouse the interest of pupils. In two secondary schools in Szczecin, a study was carried out among young people on the use of applications supporting physical activity by students. The analysis of the results showed that only every third student uses the application: in LO XVI 28.8%, and in LO III 29%. The test result suggests that in order to make PE lessons more attractive, teachers should learn about modern forms. Applications supporting physical education classes are, for example: Fitnoteq, Home Workout, Strava. The person carrying out the subject of physical activity should be comprehensively prepared for the lesson if it is not possible to conduct them directly. The teacher must have very good contact with students and interpersonal skills that will allow them to motivate students to physical activity. It depends on how the teacher implements the subject whether the classes will be interesting and the students satisfied.

Keywords:

COVID-19, applications, physical activity, physical education, teachers



CAN REHABILITATION REPLACE RECONSTRUCTION? MANAGEMENT OF ANTERIOR CRUCIATE LIGAMENT INJURIES

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A few words about the author(s):

I am a physiotherapy student interested in human anatomy and physiology. Presentation I have prepared is related to my future master's thesis focused on ligamentous dysfunction of the knee. I treat this speech as the beginning of my academic career.

Abstract:

Knee injuries can end the careers of many athletes as well as being a serious disability for all individuals. Among the numerous ligament and meniscus injuries, the anterior cruciate ligament tear remains infamous. For years, surgical reconstruction was the gold standard, but in light of new research and therapeutic techniques, its position is being questioned.

The prospect of rehabilitation results as good as surgery or even better is extremely tempting for young athletes. The purpose of this study is to analyze the effectiveness of nonoperative versus operative treatment of anterior cruciate ligament injuries.

Based on the data collected, ACL reconstruction offers greater objective tibiofemoral stability; however, there is limited evidence to suggest that reconstruction is superior to nonoperative management in terms of functional outcomes in ACL tear survivors. Undergoing ACL reconstruction surgery does not guarantee that athletes will return to pre-injury sports, and return to pre-injury performance levels is unlikely. Furthermore, in the non-operative group, we observe that there was a higher level of sports participation in the first year after injury. Rehabilitation in certain groups of patients may give significantly better results than reconstruction, so the benefits should be considered individually in patients, especially taking into account such aspects as sports activity, age or risk of postoperative complications.

Keywords:

non-operative treatment, ACL, anterior cruciate ligament reconstruction



THYROID DYSFUNCTION AND THE RISK OF ALZHEIMER'S DISEASE

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A few words about the author(s):

Two medical students of Ludwik Rydygier Collegium Medicum in Bydgoszcz. At the beginning of their scientific path.

Abstract:

Alzheimer's disease is a progressive and incurable neurodegenerative disease that is the most common cause of dementia. Each year it is responsible for about 3% of deaths worldwide. Despite the advances in medicine, this number continues to grow.

Thyroid hormones regulate the work of almost every cell in the human body. Both their excess and deficiency lead to numerous disorders.

In recent years, there have been many studies showing the importance of these hormones in the etiopathogenesis of Alzheimer's disease, but there is still no consensus on many issues related to this topic.

According to some researchers the proper functioning of the thyroid gland plays an important role in preventing dementia in old age.

The aim of the study was to review the latest scientific reports on the relationship between thyroid hormone fluctuations and cognitive impairment, especially Alzheimer's disease.

Keywords:

Alzheimer's disease, hypothyroidism, hyperthyroidism



VIRTUAL REALITY AS A METHOD OF REHABILITATION OF PATIENTS DURING A PANDEMIC

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A few words about the author(s):

The authors of the study are students of the 4th year of physiotherapy, who belong to the "Kinezis" Student Scientific Society of the Pomeranian Medical University.

Abstract:

ADMISSION: In recent years, the subject of virtual reality has been improving. Virtual reality (VR) allows the user to interact with the three-dimensional virtual world. The effect of VR systems as a complement to rehabilitation is based on user interaction with simulated environments and receiving real-time feedback.

OBJECTIVE: The aim of the study was to assess the awareness of physiotherapists on the use of the virtual reality method in the rehabilitation of patients during a pandemic.

MATERIAL AND METHODS: 264 physiotherapists were recruited for the study, including 181 women and 83 men. They were divided into two groups in terms of seniority. The research tool was the original questionnaire prepared for the purposes of the study.

RESULTS: It has been shown that both study groups believe that patients particularly exposed to the severe course of COVID-19 should have rehabilitation using VR technology as an alternative to the traditional one during a pandemic and that physical activity using VR is safer than exercising in organized groups during the COVID-19 pandemic. Respondents with shorter work experience believe that VR is a good alternative to outdoor physical activity during a pandemic, as opposed to respondents with bigger work experience.

CONCLUSIONS: Rehabilitation using VR technology could be an alternative to traditional rehabilitation during the COVID-19 pandemic.

Keywords:

virtual reality, physiotherapy, telerehabilitation



PD-1 / PD-L1 INHIBITORS IN ADVANCED NON-SMALL CELL LUNG CANCER

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A few words about the author(s):

I am a medical student at Ludwik Rydygier Collegium Medicum in Bydgoszcz.

Abstract:

Lung cancer, despite many treatment methods, remains a great challenge for medicine. It is one of the most common cancers in the world and is the leading cause of death from cancer. About 80% to 85% of lung cancers are non-small-cell lung cancer (NSCLC). In recent years, immune checkpoint inhibitors have been successfully used as a result of a better understanding of mechanism of cancer evasion of immunity. Among the immunomodulators currently the most promising are the programmed cell death protein 1 (PD-1)/programmed cell-death ligand 1 (PD-L1) inhibitors, which have revolutionized the immunotherapy of advanced NSCLC. The therapy directly restores the immune system's ability to eliminate abnormal, cancer cells and significantly extends patients' survival compared to traditional therapies without visible side effects. Despite promising results, the use of PD-1/PD-L1 inhibitors in unselected patients produces response rates ranging from 14% to 20%, therefore it is necessary to further explore predictive biomarkers to identify the group of patients that will benefit most from this immunotherapy. Other challenges for clinical applications are also drug resistance and immune-related adverse events, which require further research to reduce the risk of serious complications and optimize treatment.

Keywords:

lung cancer, PD-1, PD-L1



IMMUNOLOGICAL AND MOLECULAR CHARACTERISTICS OF CHRONIC MYELOID LEUKEMIA PATIENTS AFTER STOPPING IMATINIB

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Abstract:

Thus far, there have been recommendations in clinical practice to maintain treatment with tyrosine kinase inhibitors (TKIs) in patients with chronic myeloid leukemia (CML) until the end of life. According to the latest recommendations of European Leukemia Net (ELN) experts from March 2020, the goal of CML treatment was to achieve long-term remission without treatment (TFR). Therefore, more research is needed to analyze the requirements and standards that determine the attempt to stop TKI treatment, aiming to optimize the recommendations and thus obtain the highest possible percentage of effective TFRs. The aim of the project is to analyze changes in the immune system based on the cytometric evaluation of the T, Treg, Breg, NK, iNKT, mDC, pDC lymphocyte subpopulations and PD-1 expression on these cells, as well as the molecular state of BCR-ABL1 after withdrawal and during molecular relapse in CML patients who previously achieved a profound molecular response with minimal MR4. Functional studies allowed for the identification of peptides with the highest affinity for the HLA-A2 receptor, derived from the tumor antigens SPAG9 and NEWREN60. Mixed cultures of lymphocytes with the selected peptides will show whether the selected peptides induce an immune response of T lymphocytes. Simultaneously, immunological and molecular analyzes are performed.

Keywords:

chronic myeloid leukemia, imatinib, immunological biomarkers, treatment-free remission (TFR), relapse-free survival (RFS)



PLATINUM NANOPARTICLES AND THEIR IMPACT ON DOXORUBICIN ACTIVITY

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Inez Mruk, M.A. second year student at the IFB UG & MUG. Her master's thesis done at the Laboratory of Biophysics under the supervision of dr hab. Jacek Piosik, and Ph.D. student Kamila Butowska – a mentor. Special thanks to dr hab. Dariusz Wyrzykowski.

Abstract:

The current standard in the treatment of cancer is chemotherapy, which is the use of cytostatic drugs. Despite their high efficiency, chemotherapeutic agents are not selective and affect the normal tissues of the body, which is associated with the occurrence of undesirable side effects that interfere with the proper functioning e.g., bone marrow or digestive system. Therefore, scientists are looking for a solution enabling efficient and effective transport of drugs to cancer cells, while maintaining the therapeutic antitumor activity and reduced interaction with normal cells of the body. On the other hand, the first basic step in this type of research is to check the interaction between the target drug and the transport system.

To address these challenges, we investigate potential interactions between platinum nanoparticles and doxorubicin, which is a commonly used chemotherapeutic agent in the treatment of many types of cancer, including breast, ovary, and lungs. For this purpose, experiments with the use of physicochemical methods such as spectrofluorimetry, dynamic light scattering, and isothermal titration calorimetry were carried out. Additionally, to check the influence of platinum nanoparticles on the biological activity of doxorubicin, the Ames test was used to test the DOX-PtNPs mutagenicity. The results so far indicate that there is a possibility of such interactions, but further studies are needed to confirm this.

Keywords:

platinum nanoparticles, doxorubicin, interactions



OXIDATIVE STRESS - FRIEND OR ENEMY?

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A few words about the author(s):

Szczepan Olszewski is dietetics student interested in metabolism.

Abstract:

Imbalance between production of reactive oxygen species and ability to detoxify or repair the resulting damage is called oxidative stress. It is most known for his harmful effects – disturbance in redox state of cell causes damage of proteins, lipids and DNA. But in physiological state oxidative stress is involved in immune system functions, cell signaling, metabolism, adaptation and response for stressors e.g. environmental stressors or exercise. The aim of this work is to present a review of the literature about the role of oxidative stress in health and disease. The presentation also contain guidances how to take care about oxidative stress hormesis by lifestyle factors.

Keywords:

oxidative stress, ROS, antioxidants, metabolism



NEW MELPHALAN ANALOGS AS INDUCERS OF MITOTIC CATASTROPHE AND APOPTOSIS IN HEMATOLOGICAL MALIGNANCY CELLS

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A few words about the author(s):

I am a Ph.D. student. I am interested in molecular biology, new anticancer therapies and medical biotechnology. Currently I'm working on biological evaluation of new melphalan analogues in hematological cancer models and normal peripheral blood cells.

Abstract:

Melphalan (MEL) in combination with ASCT is the standard approach for the treatment of patients with multiple myeloma (MM). We evaluated 3 highly cytotoxic melphalan derivatives- methyl and ethyl esters of melphalan, and methyl ester of melphalan modified with a morpholine ring. The study was performed using 3 models of hematological malignancy: RPMI8226, THP1, HL60. Therefore one of the main assumptions of our investigations was to obtain information about the mechanism of cell death induced by melphalan derivatives. For this purpose, we examined the activity of caspase-8, caspase-9, and caspase-3. In addition, we also investigated caspase-2 activity, which plays a key role in initiating the mitotic catastrophe process. The new analogues initiated an increase in caspase-3 activity in all cell lines tested. A strong increase in caspase-9 activity was noted with all tested derivatives in HL60 and THP1 cells. This suggested the dominance of the internal apoptotic pathway. There was no increase in caspase-9 or caspase-8 activity in MM cells. This may suggest the induction of cell death mechanisms other than apoptosis, such as mitotic catastrophe. The RPMI8226 cell line turned out to be the most sensitive to activate caspase-2, where an increase in the activity of this cysteine protease was observed after incubation with all tested derivatives. New MEL derivatives showed better anti-tumor activity than the parent drug.

Keywords:

multiple myeloma, melphalan, mitotic catastrophe, apoptosis, caspases activation



BODY IMAGE AND PHYSICAL ACTIVITY OBJECTIVES PHYSICAL EDUCATION TEACHERS

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Assistant professor Żaneta Szczepańska-Klunder, Ph.D. in Gdansk University of Physical Education and Sport. My main teaching and research interests revolve around cognitive and behavioral determinants of health, physical education teacher education.

Abstract:

BACKGROUND: The aim of the study was to determine the relationship between the body image and goals of physical activity in the group of PE teachers.

PARTICIPANTS AND PROCEDURE: The research was conducted among physical education teachers ($N = 203$), aged from 23 to 69 ($M = 42.92$; $SD = 9.21$). The Body Esteem Scale (BES) Franzoi & Shields (1984) in the Polish adaptation Lipowska and Lipowski (2013) was used for the study. The second research tool was The Inventory of Physical Activity Objectives (IPAO) developed by Lipowski and Zaleski, which includes the following scales: 1. Motivational value, 2. Time management, 3. Persistence in action and 4. Motivational conflict. As well as these dimensions, the test also measures the multidimensionality of objectives.

RESULTS: As body image evaluation increases, the degree of involvement in physical activity increases in order to: physical fitness, wellbeing, a shapely body, pleasure of physical activity and fulfilling the need for activity. The higher the body image of the respondents, the higher the motivational value of the goal.

CONCLUSIONS: The knowledge about the purposefulness of the unit's operation makes it possible to support and set further realistic pro-health goals.

Keywords:

body image, physical activity, motivation, physical education teacher



PSYCHODERMATOLOGY – THE INFLUENCE OF STRESS ON THE CONDITION OF THE SKIN

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A few words about the author(s):

I am a first year student of master's studies of cosmetology at the Ludwik Rydygier Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University in Toruń. In 2020, I obtained a bachelor's degree.

Abstract:

The stress has always been a part of human life. There are two types of stress: eustress and distress. Regardless of the type of stress that accompanies a person, long-term stress causes many negative effects e.g. anxiety, depression or exacerbation of different diseases such as dermatoses (e.g. atopic dermatitis, psoriasis, acne vulgaris, rosacea). Although in most cases dermatoses are not a direct threat for a person, its annoying symptoms significantly decrease the quality and comfort of living. These dermatoses have a significant impact on the appearance of a person and his self-esteem. The field of medicine dealing with relationship between emotional processes and the condition of the skin is psychodermatology. Psychodermatology combines the borderline of dermatology and psychiatry. The relationship between these two fields of medicines is already visible at the biological level, because the skin and the nervous system develop from the same germ layer – the ectoderm. Many dermatological patients are accompanied by symptoms of depressive disorders, therefore the treatment of dermatoses should not only be based on seeking help from dermatologist, but also the help of a psychologist or psychiatrist may be needed. The participation of the patient in appropriate therapy can help to relieve stress, anxiety, depression and in consequence bothersome symptoms of disease.

Keywords:

stress, skin, dermatosis, psychodermatology



ASSESSMENT OF THE FUNCTIONAL STATE OF NON-PROFESSIONAL CROSSFIT ATHLETES

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A few words about the author(s):

First year student of Master degree. Coach, athlete and ex-volleyball player. Passionate about CrossFit, sport physiology and healthy lifestyle.

Abstract:

In CrossFit training, participants are constantly subjected to various tests of physical capabilities. Exercises are based on strength, endurance and often consist of gymnastic movements requiring versatile preparations. Limitations in basic movement patterns can affect performance levels and increase the risk of injury.

The group consisted of 29 non-professional CrossFitters, 19 men and 10 women. They were tested with Functional Movement Screen which assessed: mobility of the joints, flexibility, stability and coordination. The results of the test were compared to training experience and the score of benchmark CrossFit workout “Karabel”. The participants had to do 10 rounds of: 3 power snatches, 15 wall balls as fast as possible.

The results have shown no correlation between the amount of points obtained in the FMS test and the workout score ($r=-0.16$) in men, however there was a correlation between the CrossFit experience and the workout score ($r=-0.58$).

A strong correlation between the FMS and the workout scores ($r=-0.6$) was observed in the group of women, however the experience was non-significant ($r=0.1$). Women received more points in every part of the FMS score compared to men.

Differences may be due to less muscle tissue in women, a different position and structure of the pelvis, a lower centre of gravity, and a looser structure of connective tissue. The experience in CrossFit training affects the effectiveness and strategies of the exercises.

Keywords:

CrossFit, training, Functional Movement Test



DISINFECTION, ANTISEPSIS AND ASEPTICS DURING COVID 19 PANDEMIC

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The authors of this work are students of the Medical University of Lublin. We conduct science works in Medical Microbiology Students Research Group supervised by Lab Research and Teaching Assistant Małgorzata Koziol, Ph.D. in microbiology.

Abstract:

INTRODUCTION: The COVID-19 pandemic has irreversibly affected the habits and behaviors of people around the world. The aim of this study was to analyze the change in hygienic adults behavior in preventing SARS-CoV-2 transmission.

MATERIALS AND METHODS: The author's questionnaire was used, which was filled in electronically by 202 people (maximum range of 65 years old; 154 females and 48 males), during February/March 2021.

RESULTS: 55% of people prior to the pandemic disinfected their mobile phone. This has changed to 75% at the beginning of the restriction and it persisted (72%) after one year. Surface decontamination also has evolved, it was done before pandemic by 53% vs. 77% (March/April 2020) vs. 74% (February/March 2021). At March/April 2020 respondents disinfected mobile phones and surfaces less regular. To protect the nose and mouth, most people use disposable masks and reusable cloth masks. Only 32% of respondents declared they daily change/wash their masks. In total, 88% said that the pandemic changed their approach in a significantly or partially to infection prevention/disinfection.

CONCLUSIONS: Analysis of the data collected shows a significant impact of the pandemic on prevention behaviors. Small changes among respondents (2020 vs 2021) may be due to mental fatigue of the ongoing epidemiological situation, as well as lack of direct experience of contracting the COVID-19. However, the pandemic was an experience that left lasting changes in the habits of the respondents.

Keywords:

SARS-CoV-2, hygiene, questionnaire



MICROFLORA ON DISPOSABLE MASKS ACCORDING TO THE TIME OF USE

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The authors of this work are students of the Medical University of Lublin. We conduct science works in Medical Microbiology Students Research Group supervised by Lab Research and Teaching Assistant Małgorzata Koziół, Ph.D. in microbiology.

Abstract:

INTRODUCTION: During the SARS-CoV-2 pandemic, disposable surgical masks are the basic element of nose and mouth protection most frequently used by the society to prevent the spread of infection. The aim of the study was analyze the quantitative/qualitative microflora contaminating masks depending on the time of their use.

MATERIALS AND METHODS: the study was performed by two subjects in duplicate. Convex meniscus contactplates (Rodac type, 25cm² area) for monitoring of microbial contamination were used. Measurements were made at different time points (inner and outer side): point 0 (control), after 2h, 4h, 6h and 8h of use. The masks were then left on and additionally sampled after 24h and after 48h (one repetition). The plates were incubated at 37°C/24h. The grown colonies were counted and the number of 'cfu'- colony forming units per 1cm² was assessed. The grown colonies were also analyzed qualitatively.

RESULTS: An upward trend in the number of colonies was observed at successive measuring points. After 24h a decrease was observed and after 48h an increase in the number of microorganisms.

CONCLUSIONS: The inner side of the mask is more colonized which is due to direct contact with the skin, this prolonged contact translates into the number of cultured microorganisms. Significant colonization of the mask after 48h indicates the need for its replacement, because it can be a source of various skin lesions/recurrent infections.

Keywords:

face protection, prevention, SARS-CoV-2, contamination



CROSS-RESISTANCE TO METHOTREXATE AND AZOLES IN CANDIDA SPP. STRAINS ISOLATED FROM PATIENTS TREATED WITH CYTOSTATICS

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A few words about the author(s):

The presenting author is a 6th-year student at the Faculty of Medicine, Wrocław Medical University and the vice-president of the Student Scientific Circle of Microbiology.

Abstract:

INTRODUCTION: It has been confirmed that *Candida* spp. incubated with methotrexate develop multi- drug resistance to azoles, but it is not clear whether this phenomenon occurs in vivo in patients treated with cytostatics.

AIM: The aim of the study was to assess whether systemic methotrexate therapy induces resistance to azoles among endogenous *Candida* strains in patients with rheumatological diseases.

MATERIALS AND METHODS: The study group consisted of 52 rheumatological patients on methotrexate therapy for at least 6 months, who have never been exposed to fluconazole. The control group was composed with 49 methotrexate- and fluconazole- naive individuals. Oral swab and clinical information were obtained from each participant. The acquired material was cultured, then each strain was isolated and identified. After that minimal inhibitory concentration (MIC) for fluconazole was determined.

RESULTS: The positive samples contained from 1 to 4 strains of *Candida*, with *C. albicans* being the most frequently isolated species. *Candida* species were present more often in samples taken from the study group patients (45/52, 87%) than in samples taken from the control group patients (34/49, 69%). MIC values ranged from <0.125 to 64 ug/ml with the most common result <0.125 ug/ml.

CONCLUSIONS: We found no solid evidence to support the idea that systemic methotrexate therapy induces resistance to azoles among endogenous *Candida* strains in patients with rheumatological diseases.

Keywords:

methotrexate, fluconazole, *Candida*, cross-resistance



SMALL INTESTINAL BACTERIAL OVERGROWTH (SIBO) – SYMPTOMS AND DIAGNOSIS

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A few words about the author(s):

A student of Dietetics at the College of Health in Gdansk. Also a personal trainer who is interested in a healthy lifestyle. Wishing to show how important it is to eat healthy and to take care of the diagnosis of various diseases and conditions.

Abstract:

Small intestine bacterial overgrowth (SIBO) occurs when there are too many bacteria in the small intestine. The development of civilization and the growing production of processed food cause an increase in the number of diseases of the digestive system, including SIBO. The main symptoms are: stomachache, bloating, uncomfortable fullness after eating, diarrhea or constipation. Moreover, this problem affects more and more people and should be treated. SIBO ailments can significantly reduce the quality of life, so it is important not to underestimate this problem. If it is suspected that a person has SIBO, it is important to get tested. Due to the fact, that nowadays people are more familiar with SIBO, I want to describe what is worth paying attention to when choosing the test.

To summarize, my presentation aims to show how to diagnose symptoms of this condition, how serious the problem is and how untreated SIBO can negatively impact people's everyday life.

Keywords:

SIBO, hydrogen breath test



DIET TREATMENT AND MANAGEMENT OF SIBO

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A few words about the author(s):

My name is Magdalena Daniszewska and one year ago I decided to start dietetics studies at Gdansk College of Health. I am interest in travels, pilates and healthy food. I would like to present the problem of SIBO and the methods of treatment.

Abstract:

SIBO is small intestinal bacterial overgrowth. SIBO is gaining popularity on the internet in addition to certain clinical research. Diagnosis of SIBO is not easy because of the low specificity of symptoms, the frequent association with other diseases of the gastrological problems like irritable bowel syndrom (IBS) and the absence of optimal objective diagnostic tests. This interest has expanded awareness of important new dietary, nutraceutical, and pharmaceutical treatments. The therapeutic approach to SIBO is oriented towards resolving predisposing conditions, and is supported by antibiotic treatment to restore the normal small intestinal microflora and by modifications of dietary habits for symptomatic relief.

Keywords:

small intestinal bacteria overgrowth (SIBO), diet, treatment, Low FODMAP, antibiotics, probiotics



WE APPRECIATE WHEN WE LOSE – POSTTRAUMATIC GROWTH AMONG PATIENTS SUFFERING FROM CANCER

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A few words about the author(s):

We are four students from Medical University in Lublin. We study nursing and we love it! Each one of us is interested in medical advancements and personal growth.

Abstract:

INTRODUCTION: Cancer is a very unpredictable disease, which can cause many unexpected and adverse reactions for example metastases, no response for treatment or mutilation. Occurrence of traumatic issues is common worldwide. Most frequent is suffering from incurable disease. However, experiencing stressful situations doesn't have to involve just negative consequences. There can be many positive mental changes among patients and we call it posttraumatic growth.

AIM OF THE STUDY: Presentation of impact of a traumatic event such as cancer on a further development of patient.

MATERIAL AND METHODS: Review of available literature

RESULTS: Traumatic events can also lead to many beneficial changes in mental sphere. This is called posttraumatic growth. These people are able to esteem their lives more and also are better at having relationships with others. However, the changes are not always immediate. One of the factors that grades the intensity of benefits coming from experiencing a trauma is time. One of the most important positive aspects is the psychological willingness.

CONCLUSIONS:

1. The biggest changes were about appreciating life and better relations with other people, smaller ones – spiritual sphere.
2. Age and gender aren't connected to the level of positive changes.
3. The bigger the fear, impatience and concentrating problems are the more positive changes can occur.

Keywords:

posttraumatic growth, cancer, development



INFLUENCE OF GUT MICROBIOME ON THE BRAIN

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A few words about the author(s):

Biologist, student of neurobiology. Passionate about psychodietetics.

Abstract:

The intestines play an important role in functioning of our organism. They regulate mood, emotions and they are responsible for neurotransmitters' production- dopamine and serotonin. Human intestines are inhabited by about two kilograms of microorganisms- bacteria, protozoa and viruses and fungi which are called microbiota. The microbiome is defined as microorganisms and their genes. In the intestinal microflora regulative factors we distinguish: nutrition, lifestyle, genetic background, medicines, stress, pregnancy, way of birth, and physical activity. The connection of microbiota with autism spectrum disorders and its meaning in neurodegenerative disorders such as Alzheimer's disease and Parkinson's disease, has been also proved. The microbiota communicates with central nervous system using vagus nerve, HPA stress axis (hypothalamus- hypophysis- adrenal glands), immune system and using the metabolites. There are lots of studies which confirm the intestines communication with the brain which have the influence on the brain functioning and neurodegenerative processes.

Keywords:

microbiome, brain, HPA stress axis



ARTIFICIAL NEURAL NETWORK AS A WAY TO IDENTIFY CELLULAR SENESENCE

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Klaudia Bonowicz is a fifth-year student of medical biotechnology, member and chairwoman of the Students Research Club of Tissue Engineering.

Abstract:

There are several significant problems with identifying senescent cells. The phenotype of senescent cells is highly heterogeneous and dynamic. There is no one way that would allow for their comprehensive identification. For these reasons, researchers are constantly looking for new and effective methods to detect cellular senescence. Machine learning algorithms are a promising alternative, which enables highly efficient qualitative and quantitative analysis of aging cells, based on many morphological parameters.

AFSC were cultured in a 96-well culture plate and exposed to four concentrations of Carboplatin CA and Cisplatin CP at three time points. B-galactosidase activity was determined using The Senescence Cells Histochemical Staining Kit. Objects were detected and counted with cellSens software's deep-learning technology.

The number of senescent cells was dependent on the drug dose and exposure time. Artificial neural network analysis distinguished the aging cell population from the young cell population with high accuracy, based on parameters such as cell shape and β -galactosidase activity.

Artificial neural networks are a way to accelerate and refine the identification of senescent cells. This approach can minimize many errors that occur with other methods, providing a very reliable diagnosis of diseases correlated with cellular senescence.

Keywords:

cellular senescence, artificial intelligence



SMALL BOWEL NEUROENDOCRINE TUMORS – BRIEFLY ON PATHOPHYSIOLOGY, DIAGNOSIS AND TREATMENT

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I am a Ph.D. student at Ludwik Rydygier Collegium Medicum in Bydgoszcz, Faculty of Medicine. Medical biology is our passion.

Abstract:

Small bowel neuroendocrine tumors (NETs) are currently the most common primary malignant neoplasms of the small bowel, the first of which was described in 1867. Their diagnosis is still difficult due to non-specific symptoms, heterogeneity in terms of malignancy potential, therapeutic options or tumor functionality. The significant increase in their incidence since the 1970s is probably due to increased diagnostic efficacy (innovative imaging methods, increased physician awareness), and not an actual increase in the number of cases. The most characteristic symptoms of NETs of the small bowel include: Zollinger-Ellison syndrome, jaundice, nausea, vomiting, diarrhea, abdominal pain and carcinoid syndrome. Until now, the detection of distant metastases, mainly to the liver or lymph nodes, was the basic diagnostic factor that reduced the survival of patients. Currently, the broadest possible understanding of the pathophysiology, diagnosis and treatment of small bowel neuroendocrine tumors is being pursued. There is a great need for continuous clinical trials that will broaden the knowledge of neuroendocrine neoplasms, allow to find new prognostic markers and effective therapies.

Keywords:

neuroendocrine tumors, small bowel neuroendocrien tumors, carcinoid syndrome



5-HYDROXYINDOLEACETIC ACID - IS IT STILL IMPORTANT IN THE DIAGNOSIS OF NEUROENDOCRINE TUMORS?

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Abstract:

Due to the variety of neuroendocrine tumors, many types of markers are used to diagnose and control their course, which are not specific and may appear in the body under physiological conditions. Hormones and biogenic amines released by neuroendocrine tumors cause characteristic clinical symptoms, e.g. carcinoid syndrome with redness and diarrhea, Zollinger-Ellison syndrome (symptoms of peptic ulcer disease, diarrhea, gastroesophageal reflux), or hyperglycemia. 5-hydroxyindole acetic acid (5-HIAA), a product of the breakdown of serotonin, characteristic of carcinoid syndrome, is the first diagnostic marker of neuroendocrine tumors derived from the middle intestine. Due to the fact that 5-HIAA is a metabolite of serotonin, many factors that increase its level in the body should be taken into account, including food. However, despite many limitations of the 5-HIAA marker, it is still important as a biomarker for NETs of the small bowel. Although biomarkers with higher predictive value already exist, 5-HIAA may also play a role in determining the risk of developing heart carcinoids.

Keywords:

5-hydroxyindoleacetic acid, serotonin, neuroendocrine tumors



THE ROLE OF SELECTED DISORDERS OF LIPID METABOLISM IN THE PATHOGENESIS OF ALZHEIMER'S DISEASE

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Abstract:

Alzheimer's disease (AD) is the most common cause of dementia nowadays. According to statistical data, a significant increase in the number of adults with AD will be noticeable in the following years. The mechanisms involved in the pathogenesis of AD are still not clearly defined, most of them are merely hypotheses. Taking reflection on AD in the context of the impact of lipid metabolism disorders in its development, attention should be paid to changes in lipid composition associated with aging. It is known that, in the early stage of AD, peroxidation of brain lipids occurs. Moreover, apoE4 gene has been indicated as the major genetic risk factor for AD. The apoE4 gene encodes apolipoprotein E which is crucial in the transport of lipids and their metabolism. Considering the increased risk of AD development with the presence of this apoE gene variant in the genotype, an undeniable role of lipid transport and metabolism disorders in the pathogenesis of AD can be noticed. On the other hand, circulating HDL (high-density lipoprotein) level was observed to be associated with decreased AD risk. Research shows that HDL plays an important role in protection against neuroinflammation and cerebral amyloid angiopathy, which are directly responsible for the development of neurodegeneration. Presented arguments prove that the pathogenesis of AD is multi-component process. With regard specifically to lipid metabolism and its disorders, preventive recommendations can be formulated.

Keywords:

Alzheimer's disease, disorders of lipid metabolism, neurodegenerative diseases



ANTITUMOR ACTIVITY OF BETULIN AND ITS DERIVATIVES, WITH PARTICULAR EMPHASIS ON LUNG CANCER THERAPY

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The author of the work is a third-year student of the Medical University of Lublin. Fascinated by the world of medicine, she works dynamically in scientific circles.

Abstract:

INTRODUCTION: Neoplastic diseases are a frequent cause of mortality, especially in developed countries. Work is constantly being carried out to find newer and newer methods of cancer therapy. A big problem is the serious side effects of synthetic drugs used in conjunction with conventional radio- and chemotherapy. Natural compounds seem to be a favourable direction in the search for substances with anti-cancer properties, due to their minimal side effects. Terpenes and terpenoids play a special role, including betulin and betulinic acid with the pentacyclic structure of lupane. They have a wide range of pharmacological activity.

CURRENT STATE OF KNOWLEDGE: The pharmacological action of betulin and its derivatives on cancer has been discussed. The focus was on its application in the treatment of lung cancer, which is the leading cause of cancer deaths in 2020. Betulin and its derivatives have the ability to influence the process of apoptosis, angiogenesis and autophagy. Additionally, they have the ability to sensitize, increasing the sensitivity to commonly used methods of cancer treatment.

CONCLUSIONS: The results of the cited studies confirm the anti-cancer properties of betulin. With regard to lung cancer, betulin shows significant therapeutic efficacy. This opens up new perspectives in the therapy of this cancer.

Keywords:

lung cancer, triterpenes, betulin, betulinic acid



THE EFFECT OF VITAMIN A IN THE TREATMENT OF PATIENTS WITH OVARIAN CANCER

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Abstract:

Vitamin A and its derivatives significantly influence the differentiation, proliferation and apoptosis of cells. The active metabolite of vitamin A is currently used as the primary treatment for acute lymphocytic leukemia. (Doi: 10.1186/s13046-018-10177) Many scientific reports also indicate the anti-cancer nature of retinoids, which gives hope for a new use of this vitamin in oncotherapy of various cancers. (doi: 10.1155/2015/624627).

The aim of the study is to present selected studies on the effect of vitamin A and its combination with other chemotherapeutic agents in the treatment of ovarian cancer cells. The proposed work is a research review based on scientific articles from the last 10 years, available from Pubmed and Google Scholar.

According to scientific reports, expression of the CRBP-1 gene may impair the metabolism of retinoic acid by reducing retinol transport. Decreased CRBP-1 levels result in increased transformation and progression of ovarian cancer cells. However, increased CRBP-1 levels are associated with increased sensitivity to retinol, which shortens the cancer cell viability (doi: 10.1155/2015/624627).

The use of retinoids is important in the treatment of ovarian cancer. Examination of the expression of the CRBP-1 gene in ovarian tumors enables the selection of patients potentially sensitive to adjuvant retinoid therapy.

Keywords:

vitamin A, ovarian cancer, CRBP-1, apoptosis



FRIEND OR FOE? THE ROLE OF ENDOGENOUS FACTORS IN UNDERSTANDING NEURAL STEM CELL BIOLOGY

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Magdalena Dębiec graduated from biotechnology and currently works at the Laboratory of Molecular Biology at the Faculty of Physiotherapy at the University of Physical Education. She is interested in topics related of neurobiology and neurology.

Abstract:

Neurogenesis literally means "the birth of neurons". It is defined as the process of the formation of new neurons during prenatal (embryonic) and postnatal (adult) age. It includes stem cell division, cell differentiation, migration and integration of new neurons. The speed with which neurogenesis occurs has a significant impact on every aspect of our lives. When the rate of neurogenesis is low, cognitive deficits and memory problems occur. Neurogenesis is regulated by many factors that directly or indirectly affect its various stages. Many extracellular and intracellular factors regulate neurogenesis at other stages of development, including morphogens/ growth factors and their receptors, hormones, neurotrophins, neurotransmitters, cell adhesion molecules, cytoplasmic factors, transcription factors, epigenetic modifiers, and niche elements. Most regulatory factors are common to both embryonic and adult neurogenesis, but some have only been characterized during adult neurogenesis. Understanding the role of neurogenesis-regulating factors might help to explain the importance of environmental changes affecting the biology of stem cells. The discovery of neural stem cells (NSCs) in the mature brain opened a new chapter in understanding pathological processes such as inflammation, ischemic stroke and seizures occurring in the brain that negatively affect neurogenesis.

Keywords:

neurogenesis, neuronal stem cells, regulation of neurogenesis



ROLE OF MICRORNA IN PARKINSON'S DISEASE

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Abstract:

Parkinson's disease (PD) is one of the most common neurodegenerative disorder, associated with symptoms such as tremor, bradykinesia, rigidity and postural instability. PD is a multivariate disease, research is currently underway to determine the influence of genetic factors on the development and progression of the disease. Unfortunately, discoveries in this field do not allow to conclude about the role of genetic factors in PD. Currently, researchers are focusing on other genetic markers of PD. One of the examples are microRNAs (miRNAs), molecules discovered in 1993. miRNA are single-stranded, small non-coding molecules, which have functions in post-transcriptional regulation of gene expression and in RNA silencing. Over some time, researchers were able to link miRNA with PD. Various studies identified miRNAs families such as miR-30, miR-29 or miR-26 that were dysregulated in patients with PD. On one hand, some of the miRNAs, including miR-30e and miR-26, were found to be neuroprotective in PD patients. It was observed that miR-26 may play a role in suppressing neuroinflammation in PD via modulating the immune system. On the other hand, some miRNAs like miR-30a are linked with neurotoxic influence in PD. Research is still ongoing and mainly focused on miRNAs' diagnostic potential, as well as their probable therapeutic value. miRNAs are proved to be highly promising tool in understanding PD.

Keywords:

diagnostics, genetics, miRNA, Parkinson's disease, treatment



PHYSICAL ACTIVITY OF OFFICIALS FROM MIELEC

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Abstract:

Physical activity is associated primarily with a healthy lifestyle, with optimal physical exertion, with proper nourishing or with a hygienic lifestyle. However, first of all, physical activity is a form of relaxation and hardening of the body.

The purpose of the studies was to assess the physical activity of officials from the city of Mielec and to check whether their physical activity was sufficient. The results were also intended to show whether the level of physical activity varies depending on the age of the subjects.

The method used in the study was a diagnostic survey, while the technique used was the International Physical Activity Questionnaire (IPAQ). The survey involved 100 people working in offices in Mielec.

The results of the studies showed that women show more moderate activity than men, but there are no big differences in activity more intensely. As for the relationship between physical activity levels and age, the youngest people are the most active.

Keywords:

health, physical activity



CORRELATION BETWEEN PARKINSON'S DISEASE AND MELANOMA

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Abstract:

Parkinson's disease (PD) is a neurodegenerative disease characterized by the loss of dopaminergic neurons in the substantia nigra. Decrease in the concentration of the enzyme tyrosine hydroxylase (TH) is also observed. TH is a key enzyme that catalyzes the conversion of L-tyrosine to L-3,4-dihydroxyphenylalanine (L-DOPA) which is converted to dopamine. TH is also found in human melanoma cells. Melanoma is a malignant tumor of pigment skin cells – melanocytes, derived from the nervous tissue of the integuments. Melanocytes produce endogenous pigment melanin. In the substantia nigra melanin is called neuromelanin. Neuromelanin protects against oxidative stress arising from the production of the dopamine neurotransmitter. Impaired melanin synthesis can lead to melanoma. In PD, we observe abnormalities in neuromelanin. PD and melanoma share embryonic origin melanocytes and enzyme pathways starting with phenylalanine, involved in the pathogenesis of both diseases. Also, pathological amyloid found in PD is also present in melanoma. These findings suggest correlation between PD and melanoma. More information on the relationship between PD and melanoma may provide better understanding of these diseases and form the basis for further research. These interesting findings may help to understand these diseases immensely. It can contribute to invent new therapeutic strategies and to treat both conditions more effectively.

Keywords:

melanin, melanoma, Parkinson's disease



ACUTE AND CHRONIC IMPACT OF BLOOD FLOW RESTRICTION ON MAXIMAL STRENGTH

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Abstract:

A training strategy that involves a partial or total occlusion of blood flow to the working muscles is known as blood flow restriction (BFR). It has been shown to be beneficial not only for the athletes, but also the patients and the elderly. BFR involves the use of a tourniquet, an inflatable cuff or commonly used elastic wraps. The main physiological mechanism influencing muscular adaptation following resistance training under BFR is metabolic stress, albeit also mechanical factors, such as mechanical energy accumulated and generated by the cuff have been indicated to influence acute changes after resistance training under BFR. Although, this strategy is most often used during low load resistance exercises, a few studies examined its impact on maximal strength performance, as assessed by one repetition maximum (1RM) test. It has been shown that chronic adaptations following combined BFR and traditional high load resistance training may be more effective in increasing 1RM performance compared to traditional strength training protocol, thus providing additional benefits to improve muscular strength. Moreover, BFR has been reported to acutely increase 1RM performance. Nonetheless, available scientific literature regarding this issue is scarce. These findings suggest that BFR may be effective, as regards to maximal strength performance, however this matter requires further investigation.

Keywords:

occlusion, resistance exercise, ischemia, strength training



THE EFFECT OF EZRIN EXPRESSION ON MIGRATION POTENTIAL OF CANCER CELL LINES.

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Abstract:

Ezrin (EZR) is one of the elements of the whole "machine" involved in the course of metastasis. The protein is the link between the membrane and the actin cytoskeleton. In addition, it plays a key role in the polarization, cell migration and division. It is involved in the creation of protrusions necessary for the cells to acquire motor properties. EZR overexpression has been identified in various types of cancer such as breast, colon and pancreatic cancer. On the other hand, the high protein expression correlates with worse prognosis among cancer patients.

The aim of the project is to determine the importance of EZR in conditioning the aggressiveness and metastatic potential of selected cancer cells. The ability of primary cancer cells to invade adjacent tissues is one of the determinants of high mortality in cancer patients. Single cancer cells, changing the phenotype from epithelial to mesenchymal, cross the border of the basal membrane. In turn due to reorganization of actin cytoskeleton, cells acquire motor skills.

The studies by Tango et al. (2019) showed that low level of EZR in nasopharyngeal cancer significantly inhibited the migration of C661 and NPC 6-10B cells [doi:10.3892/ol.2019.10370]. In turn, Li et al. (2019) presented that after silencing EZR, breast cancer cells (MCF-7, MDA-MB-231) achieved epithelial morphology and lost motor ability, while protein overexpression promoted the migratory phenotype (spindle morphology) [doi:10.1038/s41416-019-0383-z].

Keywords:

actin, ezrin, migration, cancer



ADVANCED COLON CANCER - TREATMENT BASED ON CURRENT GUIDELINES

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Abstract:

Colon cancer is one of the most common oncological diseases. Its detection and treatment at an early stage allows for complete recovery. However, many patients are still diagnosed too late. The diagnosis of colorectal cancer in the disseminated stage is associated with a serious prognosis, and the treatment undertaken in most cases is of a palliative nature. The introduction of new therapeutic methods in recent years for at least some of the patients with such a diagnosis made it possible to achieve a significant improvement in the response to the applied treatment, in the progression-free survival and in the overall survival. However, these methods are characterized by a different side effect profile than standard chemotherapy, and are a challenge for specialists and supportive therapies. In our presentation, we present the current therapeutic directions and procedures used in the treatment of patients with advanced colorectal cancer, based on current standards and guidelines of scientific societies.

Keywords:

advanced colon cancer, oncological therapies, current standards



ROLE OF PTAU181 IN PATOGENESIS OF ALZHEIMER'S DISEASE

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Dorian Julian Jarek is a first-year student of medicine at Collegium Medicum, Nicolaus Copernicus University, since October working at the Students Research Club of Medical Biology.

Abstract:

Alzheimer's disease (AD) is the most common neurodegenerative disease, affecting about 5 million patients every year, 60-70% of whom suffer from dementia. Characteristic symptoms are motor disorders, such as apraxia and non-motor symptoms, including sleep disorders, disorientation, agnosia and the most recognizable symptom, memory loss. All of these are caused by accumulation of neurofibrillary tangles and amyloid plaques resulting in neurodegeneration leading to macroscopic atrophy. Neurofibrillary tangles are formed by phosphorylated tau (pTau) peptides of various types. Cerebrospinal fluid (CSF) total-tau is used as a marker to many neurological disorders but only some of pTau peptides are specifically used in AD diagnostics. One of these is phosphorylated Tau-181 (pTau181), which levels remain normal in tau-related frontotemporal lobe degeneration and other tauopathies, what makes it perfect for differentiation AD and non-AD diseases. While pTau217 in CSF was proven to have a better correlation with another AD marker, Amyloid- β positron emission tomography (PET), than pTau181, there is also numerous evidence showing that plasma pTau181 can also be used in differentiating AD from other neurodegenerative diseases with high accuracy, similar to that of CSF pTau181 and Tau PET. That makes plasma pTau181 a predictive marker of AD which can be used in non-invasive tests.

Keywords:

Alzheimer's disease, dementia, phosphorylated tau-181



PHYSICAL ACTIVITY OF SCHOOL-AGE YOUNG PEOPLE IN PRIMARY SCHOOL IN KSIĘŻPOL

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Abstract:

Physical activity is an indispensable part of every person's life. Thanks to it, all organs work properly, especially within the system of movement, circulation, breathing, nervous, endocrine, immune and metabolism. Physical activity is also necessary for the proper development of children and adolescents.

The aim of the study was to analyse the physical activity of young people of school age in primary school in Księżpol and the impact of several variables on the level of physical activity of the subjects.

The test method used is a diagnostic survey, while the technique used was the International Physical Activity Questionnaire. The study was conducted on a group of school children from primary school in Księżpol. An additional tool for developing the research was the mobile phone app “Pedometer-Free Step and Calorie Counter”.

Keywords:

health, physical activity, motor activity of adolescents



TLC- DPPH AS A METHOD FOR DETERMINING THE ANTIOXIDANT PROPERTIES OF FUNCTIONAL FOOD (THEORETICAL BASICS AND ANALYSIS)

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A few words about the author(s):

Our scientific interests include human health sciences, in particular pharmaceutical sciences. Our scientific work consists, among others, in the analysis of functional foods in terms of polyphenols content and antioxidant activity.

Abstract:

Chromatography is a physicochemical separation method in which the components to be separated divide between two phases - stationary and mobile. Depending on the type of separation phase and the nature of the eluent, planar chromatography can be distinguished, while one of its types is thin layer chromatography. Detection of antioxidant properties of substances on developed TLC plates is possible thanks to the use of stable free radicals – alcoholic DPPH (1,1-diphenyl-2-picrylhydrazyl) solution. The determination of the antioxidant properties of the tested substances takes place by registering the changes occurring as a result of the reaction of the radical with the antioxidant. As a result of the reduction, the decrease in the intensity of the violet color decreases in proportion to the content of antioxidants. This reaction is seen as yellow spots on a purple background. The next stage is scanning the plates at specified intervals and analyzing the obtained results in a computer program.

The presentation covers the theoretical basis of TLC-DPPH, along with the analysis of functional food extracts (buckwheat noodles with variable technological parameters and buckwheat flour).

Keywords:

antioxidant capacity, TLC-DPPH, functional food



OXIDATIVE STRESS IN HUNTINGTON'S DISEASE

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Abstract:

Huntington's disease (HD) is a neurodegenerative disease caused by mutation of the Huntingtin (HTT) gene whose mechanism is still unclear. The first symptoms appear at the age of 35-50 and lead to death 15-20 years after their onset. The disease leads to neuronal degeneration in the striatum, cerebral cortex, and thalamus. As a result, motor, cognitive and behavioral dysfunctions appear. It is inherited in an autosomal dominant pattern.

Repetition of CAG triplets was found in patients' DNA, which leads to the formation of the abnormal huntingtin protein (mHTT). It is the cause of HTT misfolding and aggregation, which can be toxic to cells. Even though the process has not been explained it may be related to oxidative stress which is the imbalance between reactive oxygen and nitrogen species and biological defense systems. Oxidative stress can be both the cause and the effect of neurodegenerative diseases. The processes responsible for the high levels of oxidative stress in Huntington's disease include: mtDNA damage and depletion, Ca²⁺ imbalance, reduction of PGC-1 α transcription, higher levels of brain NOX activity and suppression of p53-regulated gene transcription.

Keywords:

oxidative stress, Huntington's disease, neurodegenerative disease



POTENTIAL ROLE OF GUT MICROBIOTA IN COURSE AND DEVELOPMENT OF DIABETES MELLITUS

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Abstract:

Diabetes mellitus induces most biological systems dysfunctions, its treatment is burdensome and expensive for patients and encumbers the health system additively. Composition of gut microbiota affects humans' health by influencing many metabolic processes, which led some scientists to explore that issue in reference to diabetes. Research on animals suggests that probiotics may reduce risk of having diabetes type 2 and lower severity of this disease due to its anti-inflammatory properties, boosting tight-junctions functions and influence on gastrointestinal hormones secretion. Probiotics may possibly affect diabetes type 1 course as well- researches suggest that increased proliferation and decreased apoptosis in beta-cells of pancreas are visible. Moreover, probiotics may lower autoimmunization, that is the essence cause of diabetes type 1. The outcomes suggest that gut microbiota may affect both types of diabetes. Further studies are necessary to acknowledge the relationship between intestinal dysbiosis and these diseases. The aim of this study was to review the articles from the last 5 years and present this linkage.

Keywords:

diabetes mellitus, gut microbiota, diabetes mellitus type 1, diabetes mellitus type 2



ROLE OF SELECTED PRO-INFLAMMATORY CYTOKINES IN HUNTINGTON'S DISEASE

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Abstract:

Huntington's disease (HD) is an autosomal dominantly inherited neurodegenerative disorder caused by mutation in HTT gene encoding huntingtin protein. HD is characterized by a loss of neurons in the cortex and striatum. Movement dysfunction, cognitive impairment, and behavioral disturbances are observed in the course of the disease. HD is incurable and is constantly progressing. The presence of inflammation and autoimmunization in the body can lead to the activation of microglia. This can happen both by the action of already activated microglia and by factors from outside the central nervous system (CNS). This response in HD is observed along with significant astrogliosis and microgliosis. Activated microglia secretes pro-inflammatory cytokines such as interleukin 1 β (IL-1 β), interleukin 6 (IL-6), interleukin 8 (IL-8), and tumor necrosis factor α (TNF- α). These cytokines initiate the further development and direction of inflammation. In HD microglial, immune response contributes to the damage of CNS. Increased levels of pro-inflammatory cytokines are observed both in blood serum and in the cerebrospinal fluid. Moreover, increased levels of IL-6 are recorded in saliva. Finding a clear correlation between the concentration of pro-inflammatory cytokines, the occurrence and progression of HD will significantly accelerate the diagnosis and introduce faster therapeutic solutions improving the quality of life of patients.

Keywords:

cytokines, Huntington's disease, neuroinflammation



REMYELINATION IN MULTIPLE SCLEROSIS – ITS IRREGULARITIES AND THERAPEUTIC OPPORTUNITIES

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Abstract:

Multiple sclerosis (MS) is a chronic, immune-mediated inflammatory disease of the central nervous system (CNS), which is one of the most common causes of neurological disability in young adults today. MS prevalence is still increasing globally. Notable pathogenic mechanisms of MS include inflammation-induced lesions and demyelination. These lead to axonal damage and neurological disability. Remyelination is a regenerative process within the nervous system that leads to the formation of new myelin sheaths by newly formed oligodendrocytes around denuded axons due to demyelination. This process is disturbed in patients with MS. Currently used methods in the treatment of MS are acute relapse management, disease-modifying treatments (DMTs) and symptomatic treatments. Whilst DMTs have been a therapeutic revolution, considerably reducing lesion incidence and severity by moderating immune cell activity, they remain ineffective against progressive subtypes of MS, both primary progressive MS, as well as secondary progressive MS. Recently, the concept of enhancing and supporting the process of endogenous remyelination has emerged, presenting an opportunity to delay, permanently halt, or even reverse the progression of MS. With some remyelinating treatments reporting efficacy in early clinical trials, this method is promising and could become a breakthrough in the treatment and prevention of progressive MS subtypes.

Keywords:

multiple sclerosis, progressive MS, remyelination



THE IMPACT OF MENTAL HEALTH ON THE PERCEPTION OF PHYSICAL PAIN

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Abstract:

The μ -opioid receptor system, well known for dampening physical pain, is also hypothesized to dampen “social pain”. There is an overlap in the brain regions implicated in opioid use disorder, pain and social–emotional functioning. Specifically, the anterior insula and the dorsal anterior cingulate cortex are activated both during the experience of physical pain, such as, a mild electric shock, and “social pain.” Positron emission tomography scanning with the selective MOR radioligand [11C]carfentanil was used to test the hypothesis that MOR system activation in response to social rejection is altered in medication-free patients diagnosed with current major depressive disorder (MDD) compared to healthy controls (HCs). During rejection, MDD patients showed reduced MOR activation (e.g, reduced endogenous opioid release) in brain regions regulating stress, mood compared to HC. In the another study, the authors selected a population of volunteers who recently experienced an unwanted breakup of their relationship, and used functional Magnetic Resonance Imaging (fMRI) to record the brain responses elicited by observing a photograph of their ex-partner as they thought about being rejected. Neuroscience research has connected the experience of physical pain with the experience of social pain by identifying a shared underlying neural pathway. A very interesting research issue is the answer to the question how similar the experiences of social rejection and physical pain are.

Keywords:

opioid, pain, social pain, rejection



NUTRITIONAL TREATMENT OF CANCER PATIENTS

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Abstract:

One of the most common and serious problems in patients undergoing oncological therapy is neoplastic cachexia. Cachexia not only reduces the effectiveness of the therapy used, but also has a huge impact on the incidence of complications, total mortality and overall treatment costs. Modern medicine has a number of methods for the prevention and treatment of malnutrition, such as special-purpose nutrients, enrichment substances, supplements and parenteral nutrition formulas for patients who cannot eat food by mouth. Interestingly, there is still a myth among some patients that nutritional treatment accelerates the development of cancer and that fasting should be a form of unconventional therapy. This is wrong thinking and the awareness of the importance of nutritional treatment should be constantly raised among both patients and medical staff.

Keywords:

cachexia, malnutrition, oncology



SARS-COV-2 – THERAPEUTIC STRATEGIES IN VITRO – A REVIEW

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Abstract:

SARS-CoV-2 virus has been spreading worldwide since the end of 2019. For over a year, the various therapies have been being tested by many researchers [DOI:10.3390/v13010121].

In this study, a short review of a few strategies, tested in vitro, has been shown. A review was prepared using the articles from the PubMed database.

To find the potential drug in COVID-19 disease many in vitro studies have been carried out. Research said that some antiviral agents (stenoparid, remdesivir) may reduce viral replication in the infected Vero E6 cell line by few pathways, e.g. inhibit the activity of cellular enzymes [DOI:10.1128/mBio.03495-20].

Furthermore, decreasing in cytotoxicity and antiviral effect is observed in combined therapy (stenoparib/remdesivir or gemcitabine/remdesivir) [DOI:10.3390/ijms22041581].

The SARS-CoV-2 in vitro studies are a great opportunity to test strategies, which are used in other diseases and might be helpful in clinical practice.

Keywords:

SARS-CoV-2, in vitro, therapy, molecular



HEALTH PROMOTING PROPERTIES OF COFFEE

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A few words about the author(s):

I am a dietetics student at the Gdansk College of Health. I'm part of the student scientific club. I have recently become interested in alternative coffee brewing methods and everything related to this beverage.

Abstract:

Coffee is one of the most consumed beverages in the world. In addition to caffeine which it is mainly associated with coffee, it contains hundreds of other compounds with various effects on the human physiology. Coffee ingredients affect the metabolic processes in an organism. Results of observational research indicate that drinking coffee protects against the development of diseases such as type 2 diabetes, cardiovascular diseases, liver diseases, some types of cancer and depression. The effect of coffee consumption depends mainly on genetic and environmental factors. In the light of current knowledge, moderate consumption of this beverage (3-4 cups/day) seems to be not only safe, but also showing positive health effects.

Keywords:

coffee, caffeine, chlorogenic acid, type 2 diabetes, cardiovascular diseases



POChP – EDUCATIONAL ROLE OF THE NURSE

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A few words about the author(s):

Nursing students from the Medical University in Lublin.

Abstract:

INTRODUCTION: Chronic obstructive pulmonary disease (POChP) is one of the civilization diseases. The number of patients with this disease in Poland exceeds two millions and about 20% of them have an advanced form. The main symptoms are dyspnoea, chronic cough and poor effort tolerance. The educational role of nurse for patient with POChP is an indispensable element in preventing complications, improving the patient's health and well-being.

AIM OF THE STUDY: To provide information needed to educate patients with POChP.

MATERIAL AND METHODS: The study analyzes the latest literature.

CONCLUSIONS: While educating patients with POChP, the nurse should dedicate large part of time to teach breathing exercises such as diaphragmatic respiration, exercise the inspiratory muscles and teach to cough effectively. The education of patient should also include information about essence of the disease, medications, pharmacotherapy, diet therapy, supplementation and infection prevention. Properly conducted education should be understandable for the patient. After presenting the information, the nurse should ask the patient to review the memorized content.

Keywords:

POChP, civilization diseases, education, nursing



THE ROLE OF METALLOPROTEINASES IN CANCER PROGNOSIS AND THERAPY

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A few words about the author(s):

I am a student of the the Nicolaus Copernicus University and a member of the Students' Scientific Circle of Cell Biology and Ultrastructure at Department of Histology and Embryology.

Abstract:

Metalloproteinases (MMPs) are enzymes belonging to the family of endopeptidases. Their activity is dependent on the presence of zinc ions in the active site. MMPs are characterized by the broad substrate spectrum, therefore can participate in many physiological processes. They are responsible for digesting the components of the extracellular matrix (ECM), molecules on the surface of the cell as well as substances that are part of the basement membrane. They also take part in bone formation as well as embryogenesis and production of blood cells. These enzymes play a vital role in regulating cell biology allowing for the maintenance of tissue homeostasis. Through numerous studies, increased activity of MMPs has been proven during each stage of carcinogenesis. MMPs are involved in the progression and migration of cancer cells, angiogenesis, and metastasis. The determination of MMPs activity during carcinogenesis allowed the use of some MMPs as biomarkers during the diagnosis of neoplastic diseases. The MMPs expression assessment is used for recognition of cancers e.g.: prostate (MMP-13), stomach (MMP-7, MMP-13), breast (MMP-2, MMP-9), pancreas (MMP-9), colon (MMP-15, MMP-19). In addition to the diagnosis itself, MMPs are used to determine the stage of cancer and as a prognostic factor. Potentially, it is possible to use a change in the level of MMP expression or to completely block it for therapeutic purposes.

Keywords:

metalloproteinases, cancer, carcinogenesis, metastasis



MALE INFERTILITY AND VITAMIN D

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A few words about the author(s):

We are group of young enthusiasts of medicine science.

Abstract:

INTRODUCTION: Infertility affects millions of people of reproductive age worldwide. Male infertility may be caused by a number of different factors including problems in the ejection of semen, absence or low levels of sperm, or abnormal morphology and movement of the sperm. Environmental and lifestyle factors also have a meaningful impact on male reproductive system. Fertility care should include the prevention, diagnosis and treatment of the disorder. That is why numerous studies have explored the role of vitamin D in up-regulating the functioning of the reproductive system.

AIM OF STUDY: Investigation of correlation between Vitamin D and male fertility.

RESULTS: Studies consistently show that Vitamin D deficiency has a negative influence on male fertility. Number of trials show that mean value of Vitamin D serum levels tend to be significantly lower in infertile men compared to fertile. Vitamin D insufficiency and deficiency has been noticed to be associated with poor semen quality (lower sperm concentrations, lower motility). It became evident that vitamin D exhibits positive correlation with the male fertility by maintaining the levels of sex hormones, down regulating oxidative stress and up regulating oxidative defence.

CONCLUSIONS: Although Vitamin D supplementation cannot be considered for treatment of male infertility itself, physicians should take the vitamin serum levels under consideration while providing treatment for infertile male patients.

Keywords:

male infertility, fertility, male reproductive system, vitamin D



THE EFFECT OF DRUGS ON THE ORGAN OF VISION

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Abstract:

Illicit drugs apart from their psychoactive effect, have a wide range of effects on numerous organs of the human body. They can also cause many visible changes and damage to the eye. The use of drugs in the world has been increasing, thus it is necessary to expand the knowledge of ocular complications of their use, which may facilitate the diagnosis and treatment of ophthalmic changes.

We analysed data published 2011 to 2021 in the PubMed database.

The use of illicit drugs can lead to visible changes in the eye, depending on the drug used. Smoking, taking cannabis decrease intraocular pressure, cause mydriasis, oculomotor dysfunction and pupils dilatation. Cocaine induces mydriasis, keratitis and ulcers, intraretinal haemorrhage, occlusion of retinal venous and dilatation of the pupils. Metamphetamine leads to dilatation of the pupils, retinopathy, clouding of the cornea, intraretinal haemorrhage, talc retinopathy. Lysergic acid diethylamide (LSD) leads to mydriasis, palinopsia and retinopathy. Opiates induces miosis, diplopia, retinopathy and decreased pupillary response to light. Poppers induces maculopathy.

Illicit drugs have many effects that can indicate the type of taken substance. They cause changes in the appearance, results of eye tests, which can facilitate the diagnosis of poisoning, but they also cause damage to ocular tissues. With a view to the type of taken substance, pathologic changes in the eye can be predicted and targeted early for treatment.

Keywords:

illicit drugs, eye, visible changes



ANTIOXIDANT PROPERTIES OF PREPARATION FROM CUCURBITS VEGETABLES IN IN VITRO STUDIES

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A few words about the author(s):

I am a Ph.D. student in University of Lodz. I am in InterDOC-STARt program. My thesis are based on effect of plant extract on hemostasis, including blood platelets.

Abstract:

Imbalance between the prooxidant and antioxidant activity can lead to oxidative stress, which is link with various disease including cardiovascular diseases. In hemostasis oxidative stress can lead to lipid peroxidation and protein carbonylation in plasma.

The Cucurbitaceae family is a large group of crops, for ages they were used not only as a elements of diet but also in traditional medicine, due to their health properties. Some studies demonstrate that these vegetables have hepatoprotective, cardiovascular and anti-inflammatory properties, which is connected with their chemical composition. However, the effect of vegetables from the Cucurbitaceae family on parameters of oxidative stress and haemostasis is not always well documented.

The aim of this study was determinated the effect of five cucurbit vegetable preparations (pumpkin, zucchini, cucumber, white and yellow pattypan squash), each containing various phytochemical compounds with potential on oxidative stress induced by the hydroxyl radical donors in human plasma in vitro. Activity of tested preparation was measured by TBARS reaction, the level of protein carbonylation and the level of thiols group in human plasm. In our in vitro experiments, while all five tested preparations had antioxidant potential, the preparation from yellow pattypan squash showed the strongest one.

Keywords:

oxidative stress, Cucurbitaceae family



THE VENTRAL SWIMMING START: STATE OF THE ART

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A few words about the author(s):

Daria Rudnik is a doctoral student at the University School of Physical Education in Wrocław and the Porto University. She is currently involved in numerous broad coverage investigations concerning optimization of swimming start performance.

Abstract:

The objective of this systematic review is to enable knowledge updates by organizing, comparing, and analyzing the newest findings in ventral swimming start research. In the literature search based on a series of inclusion criteria, online databases were utilized. An overview of papers published between January 2016 and 2020 was provided, reporting the current findings in ventral start and mapped in accordance with PRISMA guidance. The selected items scrutinization reveal twenty-six records that met the eligibility criteria, out of which four included relay changeovers, four did not apply techniques currently used by elite swimmers, and seven did not clarify the preferred starting position. The researched papers presented a diversity in aims, starting performance markers, experimental settings, and participants' proficiency levels. The kick-start technique was exposed as the most advantageous. Starting position highly determines the swimmer's further actions. Yet, during the underwater phase, most of the differences between starting positions tend to disappear. For successful start, a short block phase, high take-off velocity, long flight distance, and powerful underwater kick are required. We hope to assist researchers in selecting directions for future inquiries. Moreover, our review should improve the process of starting properties selection for its performance optimization, by making the literature context more understandable for practitioners.

Keywords:

swimming, ventral start, literature review



THE EFFECT OF COFFEE CONSUMPTION ON TYPE 2 DIABETES

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Jagoda Maria Skrzyszewska is a first-year student of medicine at Ludwik Rydygier Collegium Medicum in Bydgoszcz, Nicolaus Copernicus in Toruń; a member of the Students Research Club of Medical Biology.

Abstract:

Diabetes mellitus is a metabolic disease characterized by elevated level of blood glucose. The most common is type 2 diabetes (T2D), which affects adults more often. In T2D the pancreas does not produce enough insulin or tissues are resistant to this hormone. Type 1 diabetes is a chronic condition that cannot be currently prevented. However, effective approaches are available to prevent T2D. Early diagnosis is crucial for patients' well-being. T2D is treated with oral hypoglycemic drugs, special diet and a change of lifestyle and sometimes an insulin therapy is in order as well. Studies show that regular coffee consumption could have an impact on the development of T2D. Two main components of coffee, namely chlorogenic acids and caffeine, are responsible for many of the beneficial effects suggested in research into coffee consumption and the development of diabetes. Research shows that people who drink 4 or more cups of coffee per day have a lower risk of T2D compared with those who drink less than 2 cups per day. Short-term studies showed that caffeinated coffee consumption can cause higher glucose spikes in a glucose tolerance test; while according to long-term studies, caffeinated coffee can improve glycemic metabolism by normalizing glucose tolerance test results and reducing glucose spikes one hour after eating.

Keywords:

coffee, glucose, insulin sensitivity, type 2 diabetes mellitus



THE PROBLEM OF RECTUS ABDOMINIS DIASTASIS IN PHYSIOTHERAPY. WOMEN'S AWARENESS OF THE RECTUS ABDOMINIS DIASTASIS DURING PREGNANCY AND AFTER CHILDBIRTH. PREVENTION AND THERAPY

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Students of the School of Health Sciences at the Medical University of Silesia in Katowice, 3rd year long-cycle, full-time master's degree students in the field of physiotherapy.

Abstract:

The purpose of this research was to learn about the state of knowledge of women about the rectus abdominis diastasis during pregnancy and after childbirth and to pay attention to the available possibilities of prevention and therapy.

The study was conducted using an online survey in which respondents independently answered single or multiple-choice closed questions. The research sample consisted of 146 randomly selected women. The questionnaire has been divided into two sections - women who are pregnant or after delivery - first group and women who are not after childbirth and have never been pregnant – second group.

The rectus abdominis diastasis term is known for 86 out of 146 of the surveyed women including 54 of them belong to the first group, and 32 are members of the second group. It is also worth noting that the question whether the knowledge about the rectus abdominis diastasis should be better, more widely disseminated, was answered positively by 145 women.

The analysis of the results showed that the respondents from the first group were more aware of the problem of the rectus abdominis diastasis and they were more knowledgeable about it than the second group. It is worth noting, however, that currently a small percentage of women use the care of physiotherapists during pregnancy or after childbirth (23,3%) who could help in the rehabilitation of patients by applying individually selected prevention and therapy.

Keywords:

rectus abdominis diastasis, physiotherapy, women, survey



BURNOUT PROBLEM AMONG HEALTH CARE WORKERS

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A few words about the author(s):

We are students of the 1st year of Master's studies at the Medical University of Lublin. We are interested in the topics of broadly understood health.

Abstract:

ADMISSION: Burnout to costs related to stress problems with work problems. Burnout is a destructive process that occurs in the psyche of people who overuse their strength in working with other people. It is a number of factors such as job dissatisfaction, fatigue, and emotional exhaustion.

PURPOSE OF RESEARCH: Presentation of playing collaboration to the burnout team.

MATERIALS AND METHODS: The work presents an analysis of the literature.

RESULTS: The prevention and combating of burnout syndrome take place at three official levels: individual, individual-institutional and institutional. At the individual level at the negative psychological level the effects of stress by referring to individual employees as stressful. In the second one, it plays an introductory role in the workplace to deal with occupational stressors. The subject-related interventions focus on increasing quality and lowering labor costs.

Keywords:

burnout, health, emotional tension



TNF- α INHIBITORS THERAPY IN RHEUMATOID ARTHRITIS

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A few words about the author(s):

Students of 4th year of Laboratory Medicine in Medical University of Silesia interested in rheumatic diseases and laboratory diagnostics.

Abstract:

Rheumatoid arthritis (RA) is a chronic systemic autoimmune disease of connective tissue characterized by the nonspecific, symmetrical arthritis. Tumor necrosis factor alpha (TNF- α), one of the major pro-inflammatory cytokines, plays a key role in the pathogenesis of the disease. TNF- α stimulates catabolic processes in the cartilage tissue and periarticular structures as well as significantly affects the induction and persistence of inflammation.

A better understanding of the mechanisms of RA related to the activation of the pro-inflammatory immune response has allowed the development of biological drugs, including TNF- α inhibitors (iTNF- α). The results of clinical trials showed a reduction in disease activity and inhibition of radiographic progression, as well as an improvement in the quality of life and physical function in RA patients treated with iTNF α . However, there are side effects associated with the use of these inhibitors, such as the induction of antibodies. In addition, it may reactivate latent tuberculosis, chronic liver virus infections, and increase the risk of opportunistic infections.

The heterogeneity of RA, both in terms of disease development mechanisms and clinical symptoms, makes the use of iTNF less effective over time. Therefore, high hopes for the treatment of RA are provided by innovative therapies, such as the use of synthetic, targeted disease-modifying drugs belonging to the Janus kinase (JAK) inhibitors.

Keywords:

rheumatoid arthritis, TNF- α inhibitors, biological therapy



STARVATION – ALLY OR ENEMY OF THE IMMUNE SYSTEM?

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Students of 4th year of Laboratory Medicine in Medical University of Silesia. Interested in: immunology and laboratory diagnostics.

Abstract:

The immune system plays an important role in maintaining homeostasis of human body. Its proper functioning is affected by many environmental factors, including both diet and nutrition.

The purpose of this study is to present the effects of food restriction on immune system function, taking into account the potential health benefits and risks.

The studies conducted so far show that one-day fasting, repeated once a week, increases and improves immunity. Among other things, a process called autophagy is responsible for this effect: it plays a crucial role in keeping intercellular homeostasis through promoting transport of cytoplasmatic components and organelles to degradation in lysosomes. It results in the elimination of cell parts damaged by nutrient deficiency. Autophagy also mediates pathogen clearance, antigen presentation or regulation of cytokine production. On the other hand, in the case of long-term starvation due to deficiency of essential nutrients, the function of phagocytes, the complement system and the production of cytokines are impaired, which in turn has a negative effect on the immune response.

Properly conducted fasting or conscious and voluntary abstinence from food is an alternative way to improve health; however, long-lasting and uncontrolled starvation may lead to disorders in the functioning of the immune system, which is a threat to health and even life.

Keywords:

immune system, fasting, autophagy, starvation



APPLICATION OF ARTIFICIAL INTELLIGENCE (AI) IN MAMMOGRAPHY

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A few words about the author(s):

Medical students at the Medical University of Lublin. We love broadening our knowledge and gaining new experiences, especially in good company. And that's why we are here!

Abstract:

Mammography is the most commonly applied screening test for the diagnosis of breast cancer, which is now one of the leading causes of cancer deaths in women. Some of these cancers are still undetectable by mammography, e.g. due to doctors' misinterpretation. Furthermore, due to the high rate of false positives, which ventures patients to unnecessary breast biopsies, it seems indispensable to look for methods that can help to increase the sensitivity and specificity of breast cancer detection with mammography. The aim of this study was to review the articles from the last 5 years and present use of AI in mammography. The systems based on deep learning algorithms, that were used during the study, had similar accuracy in breast cancer detection as interpreting images by radiologists. It was also noticeable that the use of AI methods sometimes significantly improves the specialists' sensitivity in detecting cancer. Application of artificial intelligence in mammography has the potential to improve the work of specialists, detect breast cancer earlier and reduce false negative or false positive results. While the application of AI appears promising, the performance and impact of such a system in a health screening requires further research.

Keywords:

artificial intelligence, breast cancer, mammography, screening



THE POTENTIAL ROLE OF VITAMIN D IN DEVELOPMENT OF AUTISM SPECTRUM DISORDER

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Medical students at the Medical University of Lublin. We love broadening our knowledge and gaining new experiences, especially in good company. And that's why we are here!

Abstract:

Over the past few decades perturbing expansion in the number of children diagnosed with autism spectrum disorders (ASD) is noticeable. ASD is a neurodevelopment disorder that appears in early childhood, which is characterized by, among other things, impaired communication and repetitive behaviors. Vitamin D is a neurosteroid hormone that mediates many mechanisms in the development of the nervous system, i.e. nerve cell proliferation, neurotransmission, neuroprotective actions or oxidative stress; therefore vitamin D deficits are considered as one of possible causes involved in ASD etiopathogenesis. The aim of this study was to review the articles from the last 5 years and present the potential role of the vitamin D in development of ASD. Children who are diagnosed with ASD, as well as women pregnant with children soon-to-be determined, exhibit a significant vitamin D deficiency. Furthermore, pregnant women with mid-pregnancy vitamin D deficiency had more than double the risk of ASD in their offspring. Several studies have reported significant improvements in people with ASD who supplemented with vitamin D as an alternative treatment. Vitamin D may serve crucial role in the etiopathogenesis of ASD and its course. However, this issue requires profound research, to provide safety and evidence of efficiency of vitamin D administration to reduce the development of ASD and its treatment.

Keywords:

vitamin D, autism spectrum disorder, vitamin D deficiency, neurodevelopmental disorder, pregnancy



COLLECTIVE VS. SINGLE CELL MIGRATION. HOW TO STUDY MIGRATION IN CELL CULTURE?

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Abstract:

Migration inherently accompanies embryogenesis and regeneration of damaged tissues. However, it is also the basis of the metastasis. The manifestation of migration is remodeling of the actin cytoskeleton, alterations in cell shape, changes in the structure of cell-cell and cell-extracellular matrix interactions. The types of migration can be distinguished due to such features as: the number of cells migrating simultaneously, or the absence/presence of a chemoattractant guiding the direction of migration. In terms of the first parameter, single cell migration and collective migration are distinguished. Collective migration takes place when a movement of cells connected with each other by a network of functional intercellular connections occurs. The population divides into leaders who form the front of the migrating mass and set the direction of migration, and followers. These two populations face completely different environmental conditions. Leaders have to tear through the stiff ECM and break down its components, while the movement of followers is facilitated by the pre-digested ECM. This results in different phenotype of both types of cells. Due to the importance of cell movement in such processes as regeneration or metastasis, it is a phenomenon widely studied in cell culture. The aim of the study is to characterize individual types of cell movement and to present the most frequently used methods for studying migration in in vitro cell cultures.

Keywords:

migration, collective migration, single cell migration



TRPM2 CLACIUM CHANNEL IN INFLAMMATORY RESPONSE OF ENDOTHELIAL CELLS

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Abstract:

Inflammation is a process involving the interaction of cells building the wall of blood vessels and the immune system. As a result of the action of pro-inflammatory cytokines, both the endothelium and leukocytes are activated. Interactions between cells result in a transient increase in endothelial permeability, which is physiologically beneficial as it allows immune system cells to quickly enter the site of inflammation. The problem is chronic inflammation that leads to long-term and often irreversible changes in the structure of the endothelial barrier. Impaired endothelial barrier function may result in the accumulation of macrophages in the vessel wall and its thickening, which is the basis of the atherosclerotic process. One of the components of inflammation is the production of reactive oxygen species. Their main source in the context of the circulatory system are monocytes and macrophages, but endothelial cells are also capable of producing ROS. The action of hydrogen peroxide stimulates the production of adenosine 5'-diphosphorybose in cells, which is one of the agonists of the TRPM2 channel and causes its activation and, consequently, the influx of calcium ions from the extracellular space and stimulation of further changes within the cell. Considering the dependence of TRPM2 activation on the action of hydrogen peroxide, this channel may be of great importance for the course of the inflammatory response and oxidative stress of endothelial cells of blood vessels.

Keywords:

TRPM2, calcium ions, inflammation



PREVENTION OF ALZHEIMER'S DISEASE

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Alicja Ziętara is a first-year student of medicine at Ludwik Rydygier Collegium Medicum in Bydgoszcz, Nicolaus Copernicus University in Toruń, a member of the Students Research Club of Medical Biology.

Abstract:

The prevalence of Alzheimer's disease(AD), a chronic neurodegenerative disorder, is steadily increasing. Lack of effective treatment to date prompts the consideration of ways to prevent AD and improve the live of patients in its early stages. This paper reviews strategies for the prevention of AD related to patients' lifestyle, focusing on two types of prevention, including preventive strategies based on changes in dietary habits as well as the impact of physical activity in daily life. The major aim of this review is to underpin the idea that in Alzheimer's therapeutics, prevention through lifestyle changes makes sense. It seems appropriate not only to modify the disease through diet therapy focusing on diets with known anti-inflammatory and antioxidant properties, but also through modifying dietary habits, including intermittent fasting and calorie restriction. These interesting approaches seem to promote hippocampal neurogenesis, activate adaptive stress response systems and enhance neuronal plasticity. Special attention should also be paid to the potential role of physical exercise in the modulation of amyloid β turnover, inflammation, synthesis and release of neurotrophins, and improvement in cerebral blood flow. Changes in lifestyle seem to be a promising opportunity to delay the progression from asymptomatic AD to minimal cognitive impairment and then to dementia. The promotion of these changes might potentially delay the onset of one-third of dementia cases worldwide.

Keywords:

Alzheimer's disease, lifestyle factors, prevention

ABSTRACTS OF **POSTERS**



**MEDICAL
SCIENCES**



PSORIASIS AND STRESS

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A few words about the author(s):

Martyna Kuczyńska is a Ph.D. student at the Faculty of Biology at the University of Gdańsk. Her research focuses on the molecular mechanisms of psoriasis.

Abstract:

Psoriasis is a autoimmune disease that affects 1-3% of the world's population. It is characterized by chronic inflammation of the epidermis and hyperproliferation of keratinocytes, which manifests itself mainly in the form of red-brown skin lesions covered with silvery scales. The development of psoriasis is the result of both genetic and environmental factors, among which psychosocial stress plays an important role. Stress is involved both in the initiation process and the exacerbation of skin inflammation. These mechanisms are based on neuroendocrine-immune interactions. Chronic stress increases the level of pro-inflammatory cytokines such as IL-1 β , IL-6, IL-12, IFN- γ and TNF- α , and reduces the level of anti-inflammatory cytokines such as IL-4, IL-5, IL-10, which enhances the response of autoreactive T helper lymphocytes: Th1, Th17, Th22. Cytokines released as a consequence of chronic inflammation, such as IL-1, IL-6, IFN- γ and TNF- α , disrupt the levels of neurohormones in the body and contribute to the symptoms of depression and other psychosocial disorders. A thorough understanding of the interaction between psoriasis and psychosocial stress is essential for a comprehensive treatment approach to psoriasis.

Keywords:

psoriasis, stress, T cells



PSORIASIS AND OBESITY

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Martyna Kuczyńska is a Ph.D. student at the Faculty of Biology at the University of Gdańsk. Her research focuses on the molecular mechanisms of psoriasis.

Abstract:

Psoriasis is a disease characterized by chronic inflammation. It manifests itself primarily in the form of skin lesions, but it can also affect the joints, the cardiovascular system, the neuroendocrine system and affect the metabolism. The initiation and maintaining of psoriasis depend on genetic and environmental factors, including obesity. The obesity-related increase in body fat and impaired glucose metabolism increase the level of free fatty acids in the serum, which maintains inflammation. On the other hand, people with psoriasis have tendency to depression, social isolation, unhealthy eating habits and decreased physical activity, which indirectly causes obesity. This study shows the interaction between obesity and psoriasis.

Keywords:

psoriasis, obesity, free fatty acid



SHIKIMIC ACID AS AN INHIBITOR OF TYROSINASE ACTIVITY IN SKIN PIGMENTATION DISORDERS

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Abstract:

Hyperpigmentation is a condition in which, for various reasons, there is a local or generalized increase in the level of melanin in the skin. The accumulation or overproduction of melanin can cause esthetic problem and induce pigmentation disorders such as: chloasma, ephelides and senile lentigo. Melanogenesis is regulated by several melanocyte-specific enzymes, such as tyrosinase.

Tyrosinase (polyphenol oxidase), a binuclear copper enzyme, is a rate-limiting enzyme in melanin biosynthesis. Therefore, inhibition of tyrosinase, is the prime target in the treatment of hyperpigmentation. Combating unwanted hyperpigmentation is a major challenge in dermatology and cosmetology.

Some naturally occurring or synthetic compounds can exhibit tyrosinase inhibitory activity and effectively inhibit melanin formation. These compounds can be used in skin care products as a skin whitening active.

One of such compounds is shikimic acid. Shikimic acid (3,4,5-trihydroxy-1-cyclohexene-1-carboxylic acid) is an important intermediate in the biosynthesis of lignin, aromatic amino acids (phenylalanine, tyrosine), and most alkaloids of plants and microorganisms. It is produced from the extraction of star anise (*Illicium verum*) or by fermentation processes. The whitening effect of shikimic acid is most likely due to its tyrosinase inhibitory potential.

Shikimic acid can be considered an effective skin whitening compound as it has a strong effect as a bleach with a free radical scavenging ability.

Keywords:

shikimic acid, hyperpigmentation, tyrosinase inhibitor, melanine formation, skin whitening



SYNTHESIS AND EVALUATION OF BIOLOGICAL ACTIVITY OF NEW 5-(IMINOMETHYL) PYRIMIDINE DERIVATIVES

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All authors are Screening Laboratory of Biological Activity Test and Collection of Biological Material Team. The area of scientific interests are focused on non-clinical studies in drug discovery and development.

Abstract:

Schiff bases are one of the most important groups of molecules which present biological activity against viruses, bacteria, protozoa and cancer. Many of them have medical use, for example: nitrofurantoin, nifurtimol or nifuroxazide [1]. In presented study four new derivatives of (5-iminomethyl) pyrimidine with an azomethine bond were synthesized. Cytotoxic effect of synthesized compounds has been tested against human renal proximal tubule epithelial cells (RPTEC). Based on the obtained results three compounds (202, 204 and 205) which didn't show cytotoxic results were tested on cancerous cell lines: human Caucasian gastric adenocarcinoma (AGS), human glioblastoma (A172), human Caucasian colon adenocarcinoma (Caco-2), human cervix epithelioid carcinoma (HeLa) and Human Caucasian hepatocyte carcinoma (HepG2) towards anticancer activity. For compound 202 $IC_{50}=63.385 \mu M$ for A172 cell line and $IC_{50}=32.21 \mu M$ for AGS cell line have been obtained. Further analysis are required to confirm the activity and find mechanism of action.

[1] Sztanke, K., Maziarka, A., Osinka, A., & Sztanke, M.: An insight into synthetic Schiff bases revealing antiproliferative activities in vitro. *Bioorganic & Medicinal Chemistry*, 2013, 21(13), 3648–3666.

Keywords:

Schiff bases, pyrimidines, anticancer activity



THE POLISH BIOBANKING NETWORK - THE NEXUS BETWEEN GOOD RESEARCH BASED ON HIGH QUALITY PILLARS EXPLOITING NATIONAL SCIENTIFIC POTENTIAL IN COOPERATION WITH EUROPEAN BIOBANKING INFRASTRUCTURE BBMRI-ERIC

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All authors are involved in BBMRI.pl project, where Polish Biobanking Network has been established. The main area of interests is focused on unification and harmonization of quality management standards in biobanking area for scientific purposes.

Abstract:

Biobanks, as research entities, provides well organized collections of biological material sample and associated data which can be used as a reliable source for scientific and R&D purposes. Among international biobanking organisations, BBMRI-ERIC can be distinguished as one of the biggest in Europe. In 2014 BBMRI.pl consortium has been founded, where the main scope was a creation of Polish Biobank Network infrastructure project. All actions have been concentrated on effective connection between all biobanking units from all over the country. BBMRI.pl has determined the main working areas for Polish Biobanking Network development. One of the key aspects is quality management system unification and standardization. It provides guidelines and recommendations for quality assurance and standardization of biobanking methods. This leads to providing high quality sample collections among the network members.

Keywords:

biobanking, biological material, BBMRI-ERIC, BBMRI.pl, Polish Biobanking Network



CARDIOVASCULAR SYSTEM MANIFESTATION OF COVID-19

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A few words about the author(s):

Anna Maria Zoń is a Ph.D. student at Wrocław Medical University, who also works in cardiology outpatient clinic.

Abstract:

Although the SARS-CoV-2 virus primarily affects the lungs also has an impact on the cardiovascular system. The relationship between virus infection and the respiratory system and circulatory system is quite obvious, but multifactorial. Firstly, inflammation could lead to cardiovascular complications, on the other cardiovascular disease are a well-known factor of worse prognosis. To cardiac injury could lead not only indirect mechanisms (such as cardiac stress due to respiratory failure, hypoxemia, cardiac inflammation secondary to severe systemic hyperinflammation) but also the direct mechanism involves viral invasion into myocardial cells, resulting in cardiomyocyte death. Clinical manifestations of myocardial injury are acute coronary syndrome, acute myocardial injury without obstructive coronary artery disease, arrhythmias, heart failure pericardial effusion or thromboembolic complications.

Patients with COVID-19 (coronavirus disease 2019) and myocardial injury have a vast spectrum of cardiac abnormalities, and myocardial injury is associated with an increased risk of in-hospital and post-hospital mortality.

Acute myocardial injury (assessed by troponin release, which is observed in up to one-third of patients) is prognostic for worse intrahospital and after discharge outcomes. In this context it seems that homogenous assessment and management of COVID-19 with acute myocardial injury should be proposed.

Keywords:

cardiovascular diseases, biomarkers, coronavirus, inflammation



DIFFERENT FACES OF CORONARY ARTERY SYNDROMES

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Anna Maria Zoń is a Ph.D. student at Wroclaw Medical University, who also works in cardiology outpatient clinic.

Abstract:

Coronary artery disease (CAD) is a pathological process characterized by accumulation of atherosclerotic plaques in the epicardial arteries. This process can be modified by lifestyle changes, optimal pharmacological therapies and if required invasive interventions, designed to achieve disease stabilization.

The six most frequently clinical types could be distinguished in patients with suspected or established chronic coronary symptoms (CCS).

Most people associate CCS with obstructive CAD.

I would like to draw attention to patients with angina and non-obstructive CAD. Symptoms can be explained by the presence of stenosis with mild or moderate angiographic severity, disorders of the microcirculatory or dynamic stenosis of epicardial vessels caused by coronary spasm or intramyocardial bridges.

To sum up, these types of CCS involve different risks for future cardiovascular events and required also careful clinical analysis and optimisation of therapy.

Keywords:

chronic coronary syndrome, non- obstructive. angiography

ABSTRACTS OF **PRESENTATIONS**



**TECHNICAL
SCIENCES**



ANALYSIS OF THE PROPERTIES OF HEXAGONAL MICRO AND NANO BORON NITRIDE AS AN ADDITIVE TO LUBRICANTS

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A few words about the author(s):

The authors are Ph.D. students at the Doctoral School of the Military University of Technology in Warsaw. In their research work they deal with issues related to tribology and lubricants.

Abstract:

The article refers to lubricating oils and greases with hexagonal boron nitride. The aim of the authors was to determine the factors determining the effectiveness of the use of this material, which was achieved thanks to the analysis of the properties of this material and the review of publications. Particular attention was paid to the nano h-BN, due to the current scientific interest in nano-additives to lubricants. Moreover, the characteristics of various types of hexagonal boron nitride, currently used by the authors in the research, are presented. For this purpose, X-ray photoelectron spectrometry (XPS) and dynamic light scattering (DLS) were used. Based on the analysis, it was found that the determinants of the effectiveness of h-BN as an additive to lubricants are primarily its granulation and the use of an appropriate concentration for a specific lubricating oils or greases.

Keywords:

tribology, hexagonal boron nitride, lubricating oils, greases, nanoadditives



ANALYSIS OF TRIBOLOGICAL PROPERTIES AT ELEVATED TEMPERATURE OF WELDED LAYERS

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Ph.D. student in mechanical engineering at the AGH University of Science and Technology in Cracow. My scientific interests focus on tribology and Computer Aided Design.

Abstract:

This study presents the results of high temperature on the tribological properties of welded layers under dry friction conditions.

The first part of the speech presents the welding process and examples of the application of welding.

The second part shows the results of the analysis of the tribological study. The tests were performed at an elevated temperature, with appropriate parameters. In the next stage, the surface profile of the samples was inspected using a contactless ProFilm3D interferometer profiler. The microhardness of the layers has been tested using the Micro-Combi-Tester.

Based on the data collected during the laboratory tests, the friction coefficient for all welded layers had a similar value. Furthermore, the use of a non-contact profile meter allowed the roughness parameters (Ra and Sa) of all samples to be determined.

Keywords:

tribology, welding, microhardness



ORGANIC FIELD EFFECT TRANSISTORS MADE BY SOLUTION METHODS

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A few words about the author(s):

M.Sc. Rafał Dunal: A graduate of two faculties with Bachelor's degree in Biomedical Engineering and Master's degree in Nanotechnology. Within the scope of his theses he was investigating organic field effect transistors. Music passionate and drummer.

Abstract:

Organic electronics is more and more popular topic in the field of science and research due to unique properties of conjugated organic materials. Their solubility gives the ability to produce thin films of these materials by simple and cheap methods. Thanks to their elasticity their potential applications range from flexible displays to biomedical devices that make non-planar interfaces with skin or internal organs. The purpose of the presented research was to analyse electrical parameters of organic thin film field effect transistors (OFET) with the active layer made from TIPS-pentacene and polystyrene blend. The subsequent aim was to compare these parameters for OFETs made by two different methods: zone casting and spray coating. Devices were made on rigid (silicon) and flexible (foil) substrates. Higher charge carriers mobilities were obtained for devices made by zone-casting. Achieved mobility is one of the highest reported values of this parameter for TIPS-pentacene OFET.

[1] Ulański, J., El Shafee, E., Tracz, A., Debrue, G., & Deltour, R. Synthetic metals, 35(1-2), 221-228 (1990).

[2] Horowitz, G. J. Mater. Res. 19, 1946–1962 (2004).

[3] Smith, J. et al. J. Mater. Chem. 20, 2562 (2010).

[4] Koutsiaki, C. et al. Organic Electronics 73, 231–239 (2019).

Keywords:

organic field effect transistors, TIPS-pentacene, polystyrene, zone casting, spray coating



ARE URBAN CABLEWAYS COMFORTABLE FOR PASSENGERS? VIBRATION MEASUREMENTS IN MEANS OF PUBLIC TRANSPORT

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A Doctoral Student in the field of Mechanical Engineering focusing on friction and wear in transport. Holds a Master of Science from AGH University with Rope Transport as specialisation. Participated in research on cableways in London and Ankara.

Abstract:

Aerial cableways are gradually becoming identified not only with winter alpine tourism, but with mobility in cities as well. In the USA, Algeria, China, Bolivia, Germany and other countries, cableway systems are increasingly used as public transport. The most common systems are monocable gondola detachable (MGD) systems with continuous circular movement. This is due to both their efficiency, versatility and offered comfort of use. In order to determine the comfort of use of cableways in comparison to popular means of transport, I conducted vibrations measurements in buses, trams and gondolas of aerial cableways. For the signal recording, I used a triaxial accelerometer with a sampling frequency of 10 kHz, and with data processing - a Chebyshev type I low-pass filter to eliminate vibration measurements with frequencies above 120 Hz and the Fast Fourier Transform (FFT) to extract the dominant frequencies. The determined effective acceleration (RMS) values turned out to be 7% lower in case of aerial cableways than for buses and trams, maximum accelerations lower by up to 50%, and the maximum vibration amplitudes - even eight times lower. The results of the tests performed for both the ride phase, as well as for braking and passing through the stop zone phase, indicate greater passenger comfort during the operation of the cableway than in case of more popular means of transport. They can be used as a basis for initiating discussions and conducting further specialized research.

Keywords:

cableways, comfort, public transport, vibration measurements



THE (UN)BREAKABLE ENIGMA – MATHEMATICAL METHODS OF BREAKING ENIGMA'S CIPHER

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A few words about the author(s):

I am a student of Politechnika Lubelska, I study two subjects: Mathematics (4th year) and Computer Science (1st year). I am interested in statistics, machine learning, and other ways in which mathematics can be applied to solve everyday problems.

Abstract:

Breaking the Enigma code is one of the most controversial points in the history of the 20th century. For historical and political reasons, the question of who and how solved the riddle of this cipher has been widely debated for many years and still is not fully answered. In my work I will try to explain how the most famous cipher machine in the world worked and tell about mathematical methods of cryptanalysis, mentioning also historical background of these events.

The aim of this work is first of all to show mathematics as a powerful tool in cryptanalysis, to highlight the merits of Polish mathematicians and to present the methods they used to break the Enigma cipher. The work also mentions British cryptologists, especially Alan Turing. The work aims at presenting cryptanalytic algorithms in an accessible way, at the same time introducing the historical background of events.

Keywords:

cryptology, cryptography, military, encryption machine, Enigma



A NOVEL FAST LIGHT ALLOYS STAMPING TECHNOLOGY (FAST) FOR COMPLEX TITANIUM ALLOY COMPONENTS

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A few words about the author(s):

Head of the Materials and Structural Testing Laboratory / Professor Assistant in Institute of Fundamental Technological Research PAS and Academic visitor in Imperial College London.

Abstract:

The traditional hot pressing processes for titanium alloys require simultaneous heating of forming tools and blank within a furnace attached to the press. When the forming tools have a large mass, significant amounts of energy and time are required. A very high temperature, slow strain rate and simultaneous heating of tools and sheet during the process decrease significantly a productivity, and proportionally, increase the production cost of titanium components. FAST (Fast light Alloys Stamping Technology) was proposed to address the technological challenges of hot stamping and to support the multi-material mix for the next-generation vehicles. In this new technology, a titanium alloy blank was heated rapidly to the specified temperature, then formed and quenched immediately in dies at room temperature. The innovation of the FAST technology lies in the precise control of the phase transformation, grain growth and oxidation at elevated temperatures by the combination of tailored initial microstructure, precisely controlled heating, transfer, forming and in-die quenching, which could solve the dilemma discussed above, improve the formability and reduce the springback simultaneously. A novel ‘FAST’ hot stamping process allows to form complex shaped panel components from titanium alloys with an improved forming efficiency by more than 80%.

Keywords:

cold die- hot blank forming, titanium alloys, fast heating, formability, post-form strength

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WHICH WAY FURTHER IN PHYSICS?

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Abstract:

Development of physics abounds in many unexpected events. There were moments when it seemed that many things are already got to known, these, when new theories were crystallizing, these also, when apparently right conceptions were falling down or when as it were scientists were "standing in front of the wall" could not see way of further development. The same situations is nowadays, in time of great technological progress and, simultaneously, lasting several dozen years, considerable stagnation in many areas of discussed field of science, it is worth to look closer this issue and once again ask the question – which way further in physics?

Keywords:

catholic apologetics, physics, development in science and technology, history of physics



CZTS – A NEW MATERIAL FOR THIN FILM PHOTOVOLTAICS: FUNDAMENTAL STUDIES

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The main author is a student of Quantum Engineering at Wrocław University of Science and Technology. His main scientific interests include photovoltaics, semiconductor and material engineering.

Abstract:

At present, PV cells based on crystalline silicon wafers dominate the global PV market with over 90% of total annual production. Their further potential advancement seems to be limited, though. There are mainly thin film solar cells based on CIGS, CdTe or amorphous silicon, that represent the remaining 10% of the market. Such devices require less material usage during manufacturing process and are less prone to temperature changes. However, their efficiencies are lower in comparison to traditional c-Si wafer-based PV cells.

When it comes to the future of thin film solar cells, CZTS ($\text{Cu}_2\text{ZnSnS}_4$) kesterite thin films are one of the most promising materials. Undeniable assets of CZTS are that it is a nontoxic substance and it contains only easily accessible elements. Nevertheless, there are some obstacles related to the fabrication of CZTS layers with homogenous crystal structure without unwanted secondary phases.

In this work, an experimental solar cell consisting of sol-gel spin coated CZTS/CdS/ZnO/AZO structures deposited on soda-lime glass covered with Mo were investigated. Essential electrical parameters were obtained with the use of current-voltage characteristics of the sample. Measured Raman scattering spectrum revealed a composition of the examined structure - observed Raman bands were related to CZTS and CdS. Additionally, atomic force microscopy was used to obtain and analyse data connected with surface structure of the sample.

Keywords:

CZTS, kesterite, thin film solar cells, Raman spectroscopy



IMPROVING THE QUALITY OF PISTON CASTINGS MADE OF NEAR-EUTECTIC AL-Si ALLOYS - THE IMPACT OF THE USE OF PRODUCTION RETURNS ON THE QUALITY OF THE RAW MATERIAL

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The author is a student of the SUT doctor's school. At the same time, he works in Złotecki Sp. z o. o. as a Production Director.

Abstract:

The aim of the research work was to identify the stages of the production process of near-eutectic Al-Si piston castings in terms of improving their quality. The scope of the carried out research included: assessment of the management of production returns, stabilization of the casting process parameters, treatment of the liquid aluminum alloy in terms of determining the optimal level of the amount of hydrogen in alloy. The paper presents issues related to the management of production returns.

A detailed analysis of the current method of managing production returns allowed to locate the factors increasing the occurrence of casting defects. The characteristics of the material structure and the study of the chemical composition allowed for the identification of impurities introduced into the alloy along with the production returns. On the basis of the performed quantitative tests, the possibility of a significant reduction of casting defects in production conditions was confirmed. The overall number of defective castings was reduced from 9-8% to less than 5%.

Thus, the modification of the production returns management method has led to a significant reduction in the production costs of piston castings. The reduction in the amount of foundry deficiencies level also reduced the consumption of raw materials and energy.

Keywords:

AlSi alloys, piston casting quality, production returns management



ANALYSIS OF THE INFLUENCE OF SELECTED FACTORS ON GEOMETRICAL PARAMETERS OF THE SURFACE LAYER OF MAGNETICALLY ABRASIVE PROCESSED ELEMENTS WITH THE USE OF MAGNETORHEOLOGICAL FLUIDS

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A few words about the author(s):

I am doctoral student at AGH University of Science and Technology in Faculty of Mechanical Engineering and Robotics. My scientific interests focus on rheology, smart fluids but also on widely understood Computer Aided Design.

Abstract:

The purpose of the study was to analyse the impact of selected factors on the geometric parameters of the surface layer of magnetically abrasive processed elements with the use of magnetorheological fluids

As part of the undertaken topic, abrasive magnetic fluids were produced based on carbonyl iron micropowder and alundum with different grain gradations and as the carrier liquid was used kerosene. The manufactured fluids were given to tests to determine their rheological properties. The data obtained was used to conduct CFD simulations.

The main part of the work concerned the abrasive machining of samples and evaluation of the final effects of the magneto-abrasive finishing with the use of MR fluids. The tests were carried out for two types of samples (steel and aluminium), for MR liquid containing abrasive powder with fractions F100, F320, F1200.

Test results show an improvement of Ra parameter among aluminum samples in the extreme case by 85%. Mirror polish was observed on samples made of aluminum treated with F100 and F320 abrasive. Among steel samples, no increased reflectivity of the surface was observed. The roughness increased up to 180% on all steel samples.

Keywords:

magnetic abrasive finishing, magnetorheological fluids, magnetorheological finishing, surface layer, surface roughness



PHONON SPECTRA ANALYSIS FOR INVESTIGATION OF PROPERTIES OF AlGaN/GaN/AlN NANOWIRES

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A few words about the author(s):

Radosław Szymon is a M.Sc. student of Quantum Engineering at Wrocław University of Science and Technology since 2017. As a young scientist works for investigation of semiconductors with experimental as well as numerical methods.

Abstract:

Nanotechnology makes possible to investigate semiconductors engineering applying low dimensional structures such as nanoparticles or thin films. Their development favours production of new semiconductor devices such as: lasers, diodes, and transistors, which are commonly used in our life. Along with new technologies' process, basic properties of obtained materials must be investigated which is a crucial part of material engineering.

Performed Raman spectroscopy measurements of AlGaN/GaN/AlN nanowires grown on Si substrates by plasma-assisted molecular beam epitaxy helped to characterise nanostructure, determine their composition, structure and describe lattice vibrations mechanisms. A basic analysis of Raman spectra with typical E₂(high) and A₁(LO) phonon modes was carried out as well as investigation of reasons for observed shift of their frequency. A series of mechanisms, such as: temperature effects, phonon confinement effect, micro-strain and phonon-plasmon interaction, were analyzed, whose consequence is observation of the aforementioned shift.

Measurements were performed at room temperature, without polarization detection in a backscattering geometry. Two excitation wavelengths were used to illuminate the samples: a 514.5 nm Ar⁺ laser (non-resonant excitation) and a 325 nm He-Cd laser (resonant excitation). Also atomic force microscopy was applied to confirm one dimensional character of investigated nanostructures.

Keywords:

nanowires, AlGaN, GaN, Raman spectroscopy, Atomic Force Microscopy



THE IMPACT OF BETALAINS ON ANTIMICROBIAL ACTIVITY OF MULTI-COLOURED P. GRANDIFLORA PETALS

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A few words about the author(s):

Anna Tekieli is a student of chemical technology at the Cracow University of Technology. She researches natural pigments betalain, which exhibit health-promoting properties.

Abstract:

Portulaca grandiflora Hook is a plant with beneficial properties for health, such as antimutagenic and antiviral. It is a rich source of bioactive compounds, such as betalains. Betalain pigments are divided into betaxanthins and betacyanins. A considerable interest in betalains is a result of their confirmed pharmacological properties.

This report is aimed at exploring the relations between betacyanin and betaxanthin profiles in yellow, orange, purple and red petal extracts of *P. grandiflora* and the antimicrobial properties of the extracts. Obtained results enabled the characterisation of 19 betaxanthins and 2 betacyanins in all studied samples of which 15 new betaxanthins were detected for the first time in *P. grandiflora*. The highest concentration of betalains was noticed for the purple *P. grandiflora* (464.7 mg/kg fresh weight). The orange petals of *P. grandiflora* accumulated the highest betaxanthin content (301.7 mg/kg fresh weight) while the purple one had the highest concentration of betacyanins (310.6 mg/kg fresh weight).

All the extracts had the same activity against yeasts but different antibacterial activities were reported. The extracts from yellow and orange flowers were more active against Gram-positive bacteria whereas extracts from red and violet flowers were slightly more active against Gram-negative bacteria. The highest activity was observed against *M. luteus* ATCC 10240 and *B. subtilis* ATCC 6633 with MIC = 4 mg/mL for yellow and orange extracts.

Keywords:

antimicrobial, betalains, betaxanthins, *Portulaca grandiflora* Hook



THE USE OF VARIOUS METAL CITRATES IN THE SYNTHESIS OF GOLD NANOPARTICLES

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A few words about the author(s):

I am a second-year graduate student in chemistry at the University of Lodz. I am researching gold nanoparticles and modifying their surface.

Abstract:

The Turkevich method is one of the most widely described methods of gold nanoparticle (AuNPs) synthesis in the literature. Citrate - which is also a stabilizer, reduces chloroauric acid, thanks to which it is possible to obtain monodisperse AuNPs. Additionally, the currently known research results indicate that the final result of the synthesis is influenced by the reductant structure, in citrate, it is a hydroxyl group attached to the α -position of the carboxyl group. When utilizing gold nanoparticle colloids in specific applications, particularly in medicine, the stability of AuNPs is an important aspect as they must remain stable under harsh conditions such as in a cell or blood. In the study, a series of syntheses with the use of citrates of various metals was carried out to investigate the effect of the type of cation on the shape and size of the obtained AuNPs. Subsequently, the AuNPs colloids were examined over time to determine their stability. For the detailed characterization of AuNPs, the following techniques were used: dynamic light scattering technique - DLS, scanning transmission electron microscope - STEM, and UV-Vis spectroscopy. Research financed by the University of Lodz project "Student Research Grants" 5th edition - "Research on the stability of colloids of gold nanoparticles produced from citrates of various metals".

Keywords:

nanotechnology, gold nanoparticles, synthesis, stability



FUNCTIONAL SMART MATERIALS AND THEIR CURRENT IMPORTANCE AND APPLICATIONS

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A few words about the author(s):

Anna Fenyk is Ph.D. student at the Department of Inorganic and Analytical Chemistry of the University of Lodz. Scientific interests: inorganic chemistry, magnetochemistry, electrochemistry, ecology.

Abstract:

Functional materials with controllable properties are unique as these may undergo reversible changes in physical or chemical properties in response to external stimuli such as temperature, humidity, pH, light intensity and wavelength, electric or magnetic field. This group of materials includes, among others, piezoelectric, magnetostrictive and electrostrictive materials, rheological fluids and shape memory alloys. Interest in this type of materials has arisen due to the possibility of their various applications in industry, materials science, medicine, biology, chemistry and also in the automotive sector. Smart materials allow not only the creation of new technical devices, but also improve the properties of existing structures. In this presentation, we are focused on the description and characterization of intelligent materials, presented the division and types of materials, reviewed the protocols of their production, and drew attention to innovative research perspectives and their practical use.

Keywords:

smart materials, external factors, properties



THE IMPACT OF SARS-COV-2 ON THE WORK OF THE OHS SERVICE

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A few words about the author(s):

I am a student of work safety engineering. I am interested in many things. For example occupationally health and safety, fire safety, industrial security and other.

Abstract:

In the article the impact of SARS-CoV-2 virus on occupational health and safety will be discussed. The author of this article will describe the difficulties faced by employees of this group. The impact on the work of employees and their health and mental health as well as risks that may occur in the workplace will be presented. In addition, the author will present the positive and negative effects of a pandemic based on the observations and available literature. Occupational health and safety (OHS) issues in newly created workplaces and problems with their adaptation to new conditions will also be discussed. The problem of the lack of state guidelines in the initial stage of the pandemic will be discussed, as well as an attempt to regulate internal company regulations and their adaptation to the new situation. The impact on the positive improvement of health and safety standards and regulations in enterprises will also be presented.

Keywords:

occupationally health and safety, employee safety, problems with new threats in the work environment



RECONSTRUCTION PROCESS OF COMPLEX SHAPED PART USING 3D SCANNING

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A few words about the author(s):

BSc in Mechanical Engineering. During his studies at the Lodz University of Technology, member of Iron Warriors, a team that built the most efficient vehicle in Poland. Co-author of two scientific articles. Currently designer of flow machines.

Abstract:

Presentation is concerned with reverse engineering methods used to obtain duplicates of complex-shaped machine parts in custom manufacturing, based on the motorcycle part reproduction process. The aspect of production possibilities for the reconstructed part was also discussed. Significant for presentation is refocusing attention from the application of described methods in the mass industry to using these methods by e.g. collectors. The process of reproduction was based on optical 3D scanning, editing digital model in Geomagic Design X software and printing a prototype on the 3D printer – Zortrax M200.

Keywords:

3D scanning, photogrammetry, reverse engineering, motorcycle part



REMOVAL OF DYES FROM AQUEOUS SOLUTIONS BY SYSTEM MADE OF LACCASE/ELECTROSPUN FIBERS/MEMBRANE

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A few words about the author(s):

Katarzyna Jankowska is a Ph.D. student at Poznan University of Technology. She works in the research group of Prof. Teofil Jesionowski at the Institute of Chemical Technology and Engineering. Enzyme immobilization is her scientific interest.

Abstract:

The increasing number of phenolic compounds in wastewaters and even ground and surface waters is still unsolved problem. Among them, dyes from textile or automotive industries, are the most dangerous one, being toxic even at low concentrations. They can get through to ecosystems and may have negative impact on the natural environment as well as on human health. Therefore, new methods of dyes removal from aqueous solutions are still being sought. In this work new tool made of laccase/electrospun fibers/membrane was used for decolorization of anthraquinone dyes from model solutions. The crucial step was selection of removal conditions, such as pH, temperature, amount of immobilized laccase of applied pressure. After optimalization of whole process, almost 100% of dyes decolorization was reached.

Acknowledgements: This work was supported from funding of a doctoral scholarship by the National Science Centre, Poland under the research Grant number 2020/36/T/ST8/00213.

Keywords:

laccase, electrospun fibers, membranes, dyes, decolorization, separation



THE USE OF POLYPHENOLS IN THE SYNTHESIS OF SILVER NANOPARTICLES

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A few words about the author(s):

I am a student at the Faculty of Chemistry at the University of Lodz. I deal with the synthesis of silver nanoparticles and also investigate their characterization using techniques such as electron microscopy, DLS and UV-VIS spectroscopy.

Abstract:

Nowadays, silver nanoparticles (AgNPs) are widely used as antiviral and antibacterial agents. Their unique properties result not only from their nanometer size but also from the modification of their surface. The compounds of natural origin are used in the synthesis of AgNPs, such as polyphenols, which are known for their antioxidant and anti-inflammatory properties. This makes it possible to prepare new nanomaterials in the form of bioconjugates with unique biological properties. The most common method of preparing AgNPs is the chemical reduction method, which allows easy control of the size and shape of synthesized nanomaterials.

In my work, I prepared AgNPs using silver nitrate (V) and two types of compounds - gallic acid and catechin. I analyzed the influence of the molar ratio of the reactants on the shape and size of the prepared nanoparticles. At the same time, I investigated the influence of the presence of additional compounds (sodium citrate) on the morphology of the prepared AgNPs. I also tested the stability of the prepared colloids. I investigated the morphology of AgNPs using techniques as Dynamic Light Scattering (DLS), UV-VIS spectroscopy and electron microscopy (STEM).

Research financed by the University of Lodz project "Student Research Grants" 5th edition - "Research on the stability of colloids of silver nanoparticles produced with polyphenols in an aqueous environment".

Keywords:

silver nanoparticles, polyphenols, surface modification



COMMUNITY ARCHITECTURE /TEMPORARY ARCHITECTURE IN SOCIAL SERVICE/

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A few words about the author(s):

M.Sc. Arch. Agnieszka Mańkowska – An active architect belonging to the Lodz Chamber of Architects and a Ph.D. student at the Faculty of Civil Engineering, Architecture and Environmental Engineering of the Lodz University of Technology.

Abstract:

Temporary architecture, like its permanent counterpart, has undergone a remarkable transformation over the centuries. From ancient Rome through the first prototypes of residential houses to modern pop-ups for entertainment and commercial purposes. Its two basic features, diversity and variability are its greatest asset, which makes it interesting for both the designer and the observer. In the 21st century, temporary architecture seems to play the role of a catalyst for social change.

This phenomenon is particularly visible in highly developed countries, where this type of architecture has been gaining popularity for years. In the presentation, using the method of multiple case studies, selected examples will present solutions atypical for permanent cubature architecture, which symbolically close a fragment of space, blending in an attractive way with the existing urban planning, while opening it to localness society. This kind of architecture helps to build and nurture interpersonal bonds.

Keywords:

temporary architecture, prototype, pop-up, community, contemporary society



INFLUENCE OF THE MODIFICATION OF ALUMINOSILICATE GLASSES ON VISCOSITY AND ACIDITY MODULUS

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A few words about the author(s):

MSc. Adrian Nowak – graduated from the Faculty of Production Engineering and Materials Technology at the Czestochowa University of Technology, Ph.D. student at the Department of Materials Science. Interests: glasses, directed crystallization process.

Abstract:

The paper presents the effect of modification of aluminosilicate glasses obtained by melting basalt and amphibolite with the addition of modifying substances - glass cullet and/or dolomite. Knowledge of the basic properties of glasses, mainly the chemical composition and viscosity, is important in the design and the possibility of their use. Six raw material sets were prepared for the work, characterized by various contents of amphibolite and basalt as well as modifying substances. The melting process was carried out in an electric furnace at the temperature of 1450 °C for 2 hours. Based on the dilatometric tests and mathematical relationships, the viscosity and the acidity modulus of the obtained glasses were determined. The characteristic transformation temperatures (T_g) and dilatometric softening (DTM) temperatures were determined and used to calculate the viscosity using the single point method. The temperatures at the characteristic glass viscosity values were also determined on the basis of M.W. Ochotin. The chemical composition of the glass sets was determined using XRF spectroscopy, on the basis of which the acidity modulus of the glasses was determined. After the tests, it was found that the modification of aluminosilicate glasses with dolomite or glass cullet has a positive effect on the technological properties of the glasses.

Keywords:

aluminosilicate glasses, basalt, amphibolite, viscosity



PATTERN RECOGNITION AND ELECTROFACIES IDENTIFICATION USING ARTIFICIAL INTELLIGENCE (AI)

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A few words about the author(s):

AGH University of Science and Technology – Ph.D. student. My research are focuses on integrating of machine learning to facilitate well log analysis, well test interpretation, hydrocarbon reservoir simulation.

Abstract:

Artificial Intelligence has been used for more than two decades as a development tool for solutions in several areas of the E&P industry: production control and optimization, forecasting, simulation, among many others. The pattern recognition, identification and classification of lithofacies is key to understand the heterogeneity of the reservoir. Traditional manual facies prediction using well log data are characterized by uncertainties and are often time consuming. The new approach using Machine Learning (ML) integrates drilling, core data, and high resolution wireline log data, provides a more efficient way of predicting facies. The complete workflow including data preprocessing, calculation, analysis, classification and achieved results are presented. The base utilizing data are standard well logging data e.g. density, resistivity, neutron porosity, sonic logs, photoelectric effect and core data (laboratory analysis). The different methods of classification: cluster analysis, self-organizing map (SOM), decision trees, principal component analysis (PCA), support vector machine (SVM), artificial neural network (ANN) and other statistic and geostatistics data analysis methods were used for data from hydrocarbon reservoir. Compared with the conventional methodology, the presented approach shows the added value of identifying intermediate lithology, thus leading to a more-accurate quantification of the thickness of the potentially hydrocarbon-bearing net reservoir.

Keywords:

neural network, machine learning, log, PCA, electrofacies



THE EFFECT OF EXTRACTION CONDITIONS ON THE ANTIOXIDANT PROPERTIES OF ALCOHOLIC EXTRACTS OF APRICOT (*PRUNUS ARMENIACA* L.) LEAVES COLLECTED AFTER THE VEGETATION

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A few words about the author(s):

Anna Pietrzyk is a student of cosmetology and a member of Student Research Club. Dr inż. Łukasz Kucharski and prof. dr hab. Adam Klimowicz, a Head of the Department, are involved in studies on application of natural active substances in cosmetics.

Abstract:

The apricot belongs to the Rosaceae family. It is known for its great antioxidant features and it contains many pro-health and anti-ageing components like carotenoids and polyphenols. Polyphenols, a broad group of phytochemicals that include phenolic acids and flavonoids, are commonly found in plant-based foods. This is a reason they are commonly used in the medical and cosmetic industry.

The aim of the study was to evaluate whether the extraction's conditions could affect the antioxidant activity of alcoholic extracts of the apricot leaves that were collected after the vegetation. The type of solvent, its concentration and the time of extraction were all examined in terms of their impact on free radicals scavenging potential of the extracts.

Apricot leaves dried at room temperature were used as raw material for the study. The extracts were prepared using methanol, ethanol, n-propanol and isopropanol in 40, 70 and 99% (v/v) (96% (v/v) for ethanol) concentrations as extractants. The process lasted 15, 30 or 60 minutes. Antioxidant activity was evaluated using the DPPH method.

Extracts of apricot leaves were characterized by high and diversified antioxidant potential. Their radical scavenging activity (RSA) was influenced by all three mentioned factors. The results suggest that apricot leaves could be a potential source of active compounds with antioxidant potential in the cosmetic industry.

Keywords:

antioxidant activity, free radicals, apricot, DPPH



EFFECT OF SOLVENT AND CATALYST TYPES ON STABILITY AND PROPERTIES OF METAL PHTHALOCYANINE IN THE HYBRID GLASS

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A few words about the author(s):

Barbara Popanda completed her Master degree studies in Biological Chemistry in 2019 at the University of Opole. From October 2019 she is a PhD student at AGH University of Science and Technology in Kraków.

Abstract:

Zinc phthalocyanine was incorporated into the hybrid glass by the sol-gel method using four protic solvents and aprotic solvent. The effect of alkaline condition with NaOH addition (a one-stage process) and acid-alkaline condition with CH₃COOH-NH₄OH and HCl-NaOH (a two-stage process) was analyzed. UV-Vis spectroscopy was used to study stability of ZnPc in the sol. The highest stability of zinc phthalocyanine in the glass was obtained for synthesis with protic solvent in the presence of the alkaline catalyst. The lowest stability of ZnPc was observed when the aprotic solvent was used. The structure and optical properties of the gels were studied by SEM, FTIR and XRD techniques and optically stimulated luminescence (OSL) and thermoluminescence (TL), respectively. The thermal stability of the materials was analyzed by TG-DSC methods. The different ways of fabrication, i.e., kind of solvent and catalysts affect the optical properties of ZnPc in the glass matrix. The best optical results were observed for samples based on a single stage process.

Keywords:

ORMOSIL, phosphorescence, phthalocyanine, sol-gel



MODEL-BASED CONTROLLERS IN CONTROL OF DYNAMIC OBJECTS

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A few words about the author(s):

Aleksandra Rzeszowska graduated from engineering studies at the Faculty of Electronics in 2020. Her main area of interest is data analysis, optimization and control strategies.

Abstract:

Model-based control has been developed to deal with various problems that arise when the PID controller is insufficient or the system is specific - it changes over time or has long transport delays. This type of control systems requires prior building a sufficiently good model of the real object, described by transmittance, i.e. linear. As part of this work, the approach using the Smith predictor and the Reswick regulator was described, and the results obtained in this way were compared with the results obtained under the classic, widely used PID control. The tests were carried out for a linear object described by transfer function and a nonlinear object described by differential equations, and all simulations were carried out using MATLAB software with the Simulink package.

Keywords:

control systems, model-based control, control strategies



GLYCOCONJUGATION OF NATURAL BIOLOGICALLY ACTIVE COMPOUNDS AS A METHOD OF OBTAINING POTENTIAL ANTICANCER AGENTS

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A few words about the author(s):

The main authors are fifth-year students in the field of Chemistry and carry out their master theses at Faculty of Chemistry of the Silesian University of Technology under supervision of M. Grymel and G. Pastuch-Gawolek.

Abstract:

According to the reports of the World Health Organisation, cancers are one of the biggest problems of modern medicine and are one of the main reasons of death in the world in the 21st century. Despite the medical science development, there is still a lack of effective pharmaceuticals which can be used to fight against cancers. Many natural compounds, including quinoline, pentacyclic triterpenoids, anthracyclines or podophyllotoxin, exhibit a broad spectrum of biological properties, especially antitumor, antibacterial or antiretroviral. Due to their poor solubility in aqueous environment and low selectivity, a number of chemical modifications of parent structures have been described in the literature to improve their physicochemical and pharmacokinetic properties. Cancer cells, compared to normal cells, are characterized by increased demand for glucose, which they metabolize in order to obtain appropriate amount of energy necessary for increased cell proliferation (Warburg effect). Glucose derivatives, which are captured by glucose transporters in cancer cells, undergo hydrolysis leading to release the active aglycone. The resulting possibility of delivering conjugates of glucose and biologically active compounds selectively has become an attractive strategy in the development of antitumor drugs. Therefore, we presented research review, in which the influence of glycoconjugation on the properties and action of natural biologically active compounds was assessed.

Keywords:

glycoconjugation, natural biologically active compounds, antitumor activity



EXPERT SYSTEMS IN MEDICINE

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A few words about the author(s):

Mariusz Nowak: Ph.D. in the Institute of Computer Science at the Poznań University of Technology. Lecturer, specializes in intelligent control systems.

Joanna Szewczyk: Master's student at Poznan University of Technology in the field of ICT. She specializes in IT in medicine.

Abstract:

Expert systems are one of the areas of practical use of Artificial Intelligence. They are used in many areas of our life, where detailed knowledge of a given problem is needed. They are most useful when there is a shortage of human experts in a specific, narrow field. In medicine, they are primarily used to assist doctors in making diagnosis. Despite the steadily growing interest in telemedicine, there are still many concerns about trusting machines. The aim of the publication is to review the existing solutions and possibilities of expert systems in medicine, as well as ethical concerns and threats resulting from their use, as well as to present pre-project assumptions and research preparations for the developed project of an expert system supporting the work of a general practitioner. The applied research method is a literature review. If used properly, expert systems can support and significantly accelerate the work of health care workers.

Keywords:

expert systems, Artificial Intelligence, telemedicine, Artificial Intelligence safety, patient's safety

ABSTRACTS OF **POSTERS**



**TECHNICAL
SCIENCES**



SYNTHESIS AND STUDY OF DIBENZO[B,F]OXEPINE COMBINED WITH FLUOROAZOBENZENES – NEW PHOTOSWITCHES FOR APPLICATION IN BIOLOGICAL SYSTEMS

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A few words about the author(s):

Filip Borys – Ph.D. student, Piotr Tobiasz – Ph.D. student, Jakub Sobel – M.Sc. student, Hanna Krawczyk – professor.

Abstract:

Dibenzo[b,f]oxepin is an important scaffold in natural, medicinal chemistry and its derivatives occur in several medicinally relevant plants. The dibenzo [b, f] oxepine systems can be found in connections with various biological properties such as antidepressant and anti-estrogenic, analgesic, anti-inflammatory, antipsychotic, angiotensin II receptor antagonistic, antioxidant, antimycobacterial, antidiabetic, and antitumor, as well as anti-apoptotic. Considering the importance of these compounds, we synthesized dibenzo[b,f] oxepines combined with fluoroazobenzenes. We made use of fluoroazobenzene as a molecular photoswitch to change intrinsically the geometry and the polarity of the linking unit and to control its activation by light. Incorporating molecular photoswitches into various materials provides unique opportunities for controlling their properties and functions with high spatiotemporal resolution using remote optical stimuli. These molecules can be used in remotely manipulating biological systems. Synthesis of dibenzo[b,f]oxepine combined with fluoroazobenzenes and spectroscopic study will be presented in the poster.

Keywords:

photoswitches, dibenzo[b,f]oxepine, fluoroazobenzenes



INFLUENCE OF SHIELDING GASES USED IN WAAM TECHNOLOGY ON THE GEOMETRY OF THE ELEMENTS PRINTED USING CuAl₈ ALLOY

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A few words about the author(s):

The area of scientific and research activity of the authors: metallurgy and material engineering in the field of production and processing of non-ferrous metals, as well as metal matrix composites.

Abstract:

Additive technologies are currently the fastest developing production methods and consist of deposition of layers of the material until the final form of the object is obtained. Wire Arc Additive Manufacturing technology (WAAM) uses a form of MIG/MAG welding process for printing, which involves welding with an electric arc, produced between a consumable electrode and the material being welded. A wire, fed continuously, is the consumable electrode while the arc and liquid metal are protected by a stream of shielding gas. Apart from protecting the welded area, shielding gases used in this process also determine the conditions for the glow of the electric arc, welding speed and the shape of the weld. The research focused on the assessment of the influence of various gas mixtures (Ar+He, Ar+CO₂) used in the WAAM process on the geometry of printed objects. Inert gases, argon and helium dedicated to the layering process of copper alloy materials perfectly protect the melt pool against the access of the atmosphere. Proper selection of the gas mixtures proportions allows to increase the stability of the arc, which has an impact on the metallurgical processes taking place in the melt pool and the elimination of spatter formation. A commercial CuAl₈ alloy welding wire was used for testing. It is characterized by high corrosion resistance in the sea water environment, due to this it is used among others in the shipbuilding industry for the production of fittings for ships and yachts.

Keywords:

Additive Manufacturing, WAAM, copper alloys, shielding gas



APPLICATION OF BIOORTHOGONAL HETERO-DIELS–ALDER CYCLOADDITION OF 5-ARYLIDENE DERIVATIVES OF 1,3-DIMETHYLBARBITURIC ACID AND VINYL THIOETHER FOR IMAGING INSIDE LIVING CELLS

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A few words about the author(s):

All authors study or work at the Faculty of Chemistry of the Jagiellonian University. Their research interests are focused on the subject of imaging drugs or biomolecules in cells using the cycloaddition reaction.

Abstract:

One of the main goals of bioorthogonal chemistry is to image biomolecules and drugs which are present in living cells through bioconjugation reactions with a fluorescent tag. This work focuses on the synthesis of reactive 1-oxa-1,3-butadienes, the structure of which is based on 1,3-dimethylbarbituric acid. The obtained heterodienes may find application in the bioorthogonal cycloaddition of hetero-Diels-Alder with inverse-electron-demand. The fluorescent 5-arylidene derivative of 1,3-dimethylbarbituric acid as heterodiene reacted with vinyl thioether equipped with taxol forming pyrane derivative cycloadduct junction. The reaction is high yielding, selective, and fast in aqueous media. In the course of the research, four heterodienes were obtained for which the rate constants k_2 of the reaction with vinyl thioether were determined. Biological studies were carried out for the FITC-conjugated 1-oxa-1,3-butadiene derivative. This heterodiene selectively and rapidly labels cancer cells previously treated with dienophile-taxol.

Keywords:

bioorthogonal chemistry, hetero-Diels-Alder reaction with inverse-electron-demand, 1-oxa-1,3-butadiene, vinyl thioether, taxol



EVALUATION OF THE ANTIBACTERIAL PROPERTIES OF CuNPs/TiO₂-LOADED CARBON FIBERS BASED ON DEACTIVATION ENTEROBACTER CLOACAE AND BACILLUS SUBTILIS BACTERIA CELLS

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A few words about the author(s):

In scientific research, author conducts experiments related to demonstrating the antibacterial properties of carbon fiber cloths loaded with titanium dioxide nanoparticles modified with silver or copper for in water and air purification.

Abstract:

The aim of this study was to confirm the antibacterial properties of carbon fiber cloths loaded with TiO₂ modified with copper nanoparticles. The antibacterial properties were determined on the basis of the measurements of the size of zones of inhibition of bacterial cell growth. Strains of *Enterobacter cloacae* and *Bacillus subtilis* were used in this research. Several types of graphitized carbon fiber materials were used (basis weight: 68, 160, 200, 300, 600 g/m²).

In tests with the use of plain CFCs and CFCs modified with TiO₂, no inhibition zones were observed. For CFCs modified with CuNPs/TiO₂ with a concentration of approx. 1% of Cu (15 mg photocatalyst/CFCs or 50 mg photocatalyst/CFCs), the inhibition zone was not shown. Only in the case of using the photocatalyst in the amount of 50 mg/CFCs and with the concentration of c.a. 3% of CuNPs, the antibacterial properties were found. The largest inhibition zone of the bacteria growth was noted for carbon fibers with a basis weight of 160 g/m² (2.78 mm for *E. cloacae*, and 2.51 mm for *B. subtilis*) and thus, the best deactivation properties for CuNPs/TiO₂ containing 3.21 wt.% copper. The toxicity of copper depends on its concentration. Copper is an essential nutrient for bacteria, but in low concentrations. However, when there is an excess of copper, it is highly toxic.

Acknowledgements: This work was supported by the National Centre for Research and Development, Poland under project No. LIDER/31/0115/L-9/17/NCBR/2018.

Keywords:

carbon fibers, inhibition zone, copper modified titanium dioxide NPs, *Bacillus subtilis*, *Enterobacter cloacae*



HIGHLY EFFECTIVE SUPPORTED IONIC LIQUID-PHASE (SILP) CATALYSTS: CHARACTERIZATION AND APPLICATION TO THE HYDROSILYLATION REACTION

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Joanna Działkowska is a 4th year chemistry student at Adam Mickiewicz University. She's part of a team working in a project called "Multifunctional composite systems based on epoxy resins with ionic liquids as initiators of the crosslinking process".

Abstract:

Functionalized siloxanes due to their unique properties are an important class of organosilicon compounds. One of the methods of their synthesis is hydrosilylation reaction between 1,1,3,3-tetramethyldisiloxane (TMDSO) and 1-octene. This reaction is carried out using supported ionic liquid phase (SILP) materials. The SILPs are materials in which the ionic liquid and catalyst dissolved in IL is immobilized on solid silica support in form of thin layer. In this research three different rhodium catalysts were used: $[\text{Rh}(\text{PPh}_3)_3\text{Cl}]$, $[\{\text{Rh}(\mu\text{-OSiMe}_3)(\text{cod})\}_2]$, $[\{\text{Rh}(\mu\text{-Cl})(\text{cod})\}_2]$. They were immobilized in three phosphonium ionic liquids (ILs) differing in the length of the carbon chain in the cation: $[\text{P4441}][\text{NTf}_2]$, $[\text{P8888}][\text{NTf}_2]$ and $[\text{P66614}][\text{NTf}_2]$. SILP materials due to their high catalytic activity and selectivity, easy separation from reaction products have a great potential for use in heterogeneous catalysis and possibility of reusing the catalyst in subsequent reaction cycles without adding a new portion of the catalyst. Using SILP materials allows for carrying out of many reaction cycles with high conversion. The best example of it is usage of SILP material containing $[\{\text{Rh}(\mu\text{-OSiMe}_3)(\text{cod})\}_2]$ catalyst immobilized in $[\text{P66614}][\text{NTf}_2]$ ionic liquid. It allows for reuse of the catalyst at least 50 times with high conversion.

This work was supported by the National Science Centre (Poland), project SONATA BIS no UMO-2017/26/E/ST8/01059.

Keywords:

ionic liquid, heterogeneous catalysis, catalyst, SILP material, hydrosilylation



HETEROGENEOUS PHOTOCATALYSIS AND ITS APPLICATION IN ENVIRONMENTAL PROTECTION

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A few words about the author(s):

I am a student of the University of Gdańsk. I am studying chemistry, specializing in analyst and diagnostics.

Abstract:

One of the greatest problems of the 21st is the deteriorating state of the environment. The rapid increase in urbanization and our way of life are adversely affecting the environment. For this reason, scientists are developing modern methods to combat increased environmental degradation to reduce pollution. Heterogeneous photocatalysis, which in the presence of semiconductor materials and solar radiation is an excellent example of environmentally friendly technology. It is used to degrade organic and inorganic compounds in water and air. It enables the generation of hydrogen through water decomposition, the photoconversion of carbon dioxide to light hydrocarbons and organic transformations. It is also used in nanotechnology, where researchers are presenting innovative hydrophobic coatings or self-cleaning surfaces. The poster will present the main applications of photocatalysis based on examples coming into operation [1].

[1] Adriana Zalewska-Medynska, Metal oxide-based photocatalysis: fundamentals and prospects for application, Metal Oxides, 2018, Elsevier, ISBN 978-0-12-811634-0, 364 s.

Keywords:

heterogeneous photocatalysis, nanotechnology, environmental



QUATERNARY AMMONIUM SALTS BASED ON BICYCLIC AMINES–SYNTHESIS AND ASSESSMENT OF THE APPLICATION POTENTIAL AS HARDENERS FOR EPOXY RESINS

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Paulina Hinc is a 5th year chemistry student at Adam Mickiewicz University. She is currently working at PPNT as a student in a project called “High resolution optical and electron beam patterning processes with new ionic liquid based resists”.

Abstract:

Continuous development in the field of composite materials and their technology prompts scientists to look for new solutions. The aim of the research is to search for new substances and raw materials, necessary in the production processes of composites, both resins and hardeners. One of the key parameters is the effectiveness of new technologies and environmental friendliness. However, epoxy resin is commonly at liquid phase, therefore important is to looking for new chemical compounds that will induce its curing. Quaternary ammonium salts (QAS) are considered as a new type of hardeners, activated at elevated temperature (decomposition). The object of this study is to develop a new series of QAS and ionic liquids, able to initiate polymerization of epoxies. Compounds with such properties have been successfully obtained by using a bicyclic amines DABCO and HMTA, as a starting material. In this research QAS of DABCO and HMTA was obtained. Next, metathesis reaction was used to deliver derivatives with bis(trifluoromethanesulfonyl)imide and dicyanamide anion. Synthesized compounds was then used in screening tests with two commercial resins to verify theirs potential as latent curing agents. All cured samples was also tested with Shore Durometer.

This work was supported by the National Science Centre (Poland), project SONATA BIS no UMO-2017/26/E/ST8/01059 and project OPUS no UMO-2019/35/B/ST8/03736.

Keywords:

ionic liquids, epoxy resins, crosslinking initiators, ion chromatography



EFFECT OF AMMONIA MODIFICATION OF SORPTION PROPERTIES OF CARBON MATERIALS PRODUCED FROM POLYFURFURYL ALCOHOL

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Agnieszka Kałamaga – chemical technology engineer, master student of chemical technology at West Pomeranian University of Technology Szczecin.

Abstract:

Ultra-pure carbon materials produced from polyfurfuryl alcohol are used in carbon electrodes productions. These materials are N-doped to improve conductivity. Owing to their purity these materials are suitable for investigation of adsorption processes. The aim of the experiment was researching the impact of NH_3 treatment on sorption properties of carbon materials produced from polyfurfuryl alcohol. Adsorbents were produced through carbonization at 600°C under N_2 atmosphere for 4 h followed by physical activation under CO_2 atmosphere at 1000°C for 3 h. Samples were treated with NH_3 after both processes. Sorption capacity was measured with thermogravimetry method (TGA) at 30°C . As adsorbate was used CO_2 . The purity of materials was confirmed with X-ray photoelectron spectroscopy (XPS). Specific surface area (SSA) and pore volume were determined by BET analysis. NH_3 treatment increased sorption capacity for sample after carbonization step and decreased after activation step.

Keywords:

carbon materials, polyfurfuryl alcohol, CO_2 adsorption, NH_3 treatment



APPLICATION OF NEW BTH DERIVATIVE AS SUPPLEMENT OF STANDARD FUNGICIDAL PROGRAM IN STRAWBERRY CULTIVATION

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Rafał Kukawka holds a post-doc position at Innosil Sp. z o.o. since 2019 and since 2021 he works as a researcher at PPNT. His field of interest focuses on application of ionic liquids in the organometallic catalysis and plant protection products.

Abstract:

Triggering plants resistance induction phenomenon by chemical compounds has been known and described in scientific literature. The tested substance, N-methyl-N-methoxyamide-7-carboxybenzo[1,2,3]thiadiazole (BTHWA), is an amide derivative of benzothiadiazole, showing a stimulating effect on plant growth, apart from its plant resistance inducing activity. The impact of BTHWA, used solo and in the program with fungicides, on the strawberry plants development, fruits health, yield, and quality parameters of the crop is presented. The results show that the combined use of BTHWA and fungicides had a positive impact on the plants health as well as fruits health and nutraceutical and nutritional composition of compounds when compared to the results obtained when strawberries were treated only with the BTHWA or the fungicide. As a result of BTHWA use, the partitioning of assimilates has changed, which directly translated into the results of the conducted experiments. A correlation between the parameters determined during the experiment was found. The BTHWA mode of action was evidenced to be beneficial to strawberry plants and fruit.

The „New plant resistance inducers and their application as innovative approach to plant protection against pathogens” project is carried out within the TEAMTECH (POIR.04/04.00-00-5BD9/17-00) program of the Foundation for Polish Science co-financed by the European Union under the European Regional Development Fund.

Keywords:

strawberry cultivation, benzothiadiazole, plant stimulant, plant resistance inducer



4-VINYLBENZYL BASED IONIC LIQUIDS AS NOVEL POLYMERIZABLE GROUP OF COMPOUNDS

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Aleksandra Lorek is a 5th year chemistry student at Adam Mickiewicz University. She is currently working at PPNT as a student in a project called “High resolution optical and electron beam patterning processes with new ionic liquid based resists”.

Abstract:

Over the last few years interest in ionic liquids (ILs) is rapidly growing, because of their potential application in green chemistry. Their unique and easily tunable properties, such as: low volatility, low vapor pressure, high thermal stability, and non-flammability, make them very desirable in handful of studies. Potentially polymerizable ionic liquids bearing unsaturated substituent seem to attract increasing attention. They can combine all of the characteristics of an ionic liquid state and add potentially available corresponding polymer. 4-vinylbenzyl based ionic liquids include terminal double bond, which can easily participate in polymerization process. Polymeric forms of ionic liquids may be materials with exceptional properties, such as high stability, electrochemical activity and CO₂ absorption ability.

Therefore, new 4-vinylbenzyl based ionic liquids with one more polymerizable group have been synthesized. First as halides, mainly chlorides, next they underwent different metathesis reaction with (i) metal salts (lithium bis(trifluoromethanesulfonyl) amide – LiNTf₂), sodium dicyanamide – NaDCA), and (ii) methylating agents (methyl triflate - MeOTf, methyl p-toluenesulfonate - MeOTs). Purity of all obtained ionic liquids has been analysed by ion chromatography (IC) and nuclear magnetic resonance (NMR).

This work was supported by the National Science Centre (Poland), project SONATA BIS no UMO-2017/26/E/ST8/01059 and project OPUS no UMO-2019/35/B/ST8/03736.

Keywords:

ionic liquids, ion chromatography, 4-vinylbenzyl group



DEVELOPMENT AND VALIDATION OF A MULTICLASS METHOD FOR ANALYSIS OF VETERINARY ANTIBIOTIC RESIDUES IN EGGS BY LIQUID CHROMATOGRAPHY-TANDEM MASS SPECTROMETRY

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A few words about the author(s):

I am an employee of Chemical Research Laboratory of the Provincial Veterinary Inspectorate in Poznań and a Ph.D. student at the Adam Mickiewicz University.

Abstract:

A liquid chromatography-tandem mass spectrometry method has been developed and validated for the simultaneous identification, confirmation and quantitation of 49 veterinary antibiotics belonging to seven distinct classes: β -lactams, lincosamides, macrolides, pleuromutilins, quinolones, sulfonamides and tetracyclines in egg samples. The samples were extracted by a single extraction step using acetonitrile containing oxalic acid and Na_2EDTA and subsequently cleaned up by solid-phase extraction using OASIS HLB cartridges. Determination and separation was carried out using ultraperformance liquid chromatography coupled to tandem mass spectrometry. The system contained an electrospray ionization source (ESI) operating in positive ion mode. Multiple Reaction Monitoring (MRM) of two ion transitions per compound was used to ensure a high degree of sensitivity and specificity. Veterinary antibiotic were separated on a ACQUITY UPLC HSS C18 analytical column with mobile phase consisting of 0.02% formic acid in acetonitrile and 0.02% formic acid in water using gradient mode. The developed method was validated according to the Commission Decision 2002/657/EC with measurement of response function accuracy, repeatability, specificity, linearity, decision limit ($\text{CC } \alpha$), detection capability ($\text{CC } \beta$) and measurement uncertainty. For all examined compounds the accuracy varied from 87 to 114% and the measured precision values were lower than 6%.

Keywords:

antibiotic, liquid chromatography-tandem mass spectrometry, validation



METHODS OF HYDROGEN STORAGE IN THE AUTOMOTIVE INDUSTRY

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A few words about the author(s):

I am Ph.D. Student at Military University of Technology. My research are focused on 3D printing technology in particular intermetallic alloys and for several years I am also interested in research on materials for hydrogen storage.

Abstract:

The shortage of energy resources creates the need to search for new and alternative sources of energy. There are hopes associated with hydrogen, since a significant amount of energy is released during combustion in oxygen and only water vapor is a by-product. However, an important problem that must be faced in order to commercially use hydrogen in the automotive industry is how it is stored.

One solution is to store hydrogen in the gaseous state, but in such tanks, despite large volumes, a very small mass of hydrogen is stored, in order to reduce the ratio of the mass of the tank to the mass of hydrogen it contains, high pressures are required.

Another approach is to store hydrogen in the liquid state, liquefying hydrogen from the gaseous state allows to increase the density, but it is a more expensive process than its compression, and it is necessary to use low temperatures.

An increasingly interesting approach is to store hydrogen in the solid state, as it is the most effective and safe method. Storage in metal hydrides allows for the best ratio of the weight of the tank to the weight of the hydrogen stored in it.

There are a number of possibilities for storing hydrogen for use in the automotive industry, but each method presents certain difficulties.

This work was financially supported by The National Centre (NCN) in Poland, No. 2018/29/N/ST8/01417.

Keywords:

hydrogen storage, solid state hydrogen storage, automotive industry



INVESTIGATION OF PARTICLE SIZE DISTRIBUTION OF ADSORBENTS

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A few words about the author(s):

Graduate of the Faculty of Chemistry at Rzeszow University of Technology, faculties: Biotechnology and Chemical and process engineering. Research topics: liquid chromatography, extraction chromatography, proteins extraction.

Abstract:

The aim of this study was to investigate the particle size distribution of selected adsorbents and attempt to evaluate their use in liquid chromatography processes.

The particle size distribution was determined by laser diffraction measurements. This value was measured via probability density curves. Commercial adsorbents were used as column packing in liquid chromatography.

It is worth noting that adsorption on a heterogeneous adsorbent surface can, in chromatographic processes, lead to blurring/expansion of the shapes of the peaks obtained and thus to a decrease in column efficiency. It is obviously unfavorable phenomenon. Another reason for obtaining blurred peak shapes may also be a wide range of adsorbent grain sizes in the chromatographic column. In order to more accurately assess the phenomena occurring in the systems tested, in this work, measurements of the adsorbent grain size distribution in the chromatographic columns tested were also performed. Significant scatter in particle size was observed compared to the value reported by the manufacturers. In addition, the effect of ultrasonic exposure of the samples was investigated. The effect of ultrasound was observed manifested by a change in the particle distribution curves and their shift towards smaller particles. The particle size distribution affects the external surface area of the adsorbents and thus the adsorption process.

Keywords:

adsorbents, liquid chromatography, particle size distribution



THE INFLUENCE OF GREEN SOLVENTS ON THE ENANTIOSELECTIVITY OF BIOTRANSFORMATION REACTIONS- IONIC LIQUIDS AND DEEP EUTECTIC SOLVENTS

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A few words about the author(s):

I am M.Sc. student of Biotechnology at the Faculty of Chemistry. My specialization is Molecular Biotechnology and Biocatalysis. Interested in improving reaction enantioselectivity, using bacterial and fungal strains as biocatalysts.

Abstract:

Obtaining optically pure products is important in many fields, especially in the pharmaceutical industry. An effective method for this purpose is the use of biocatalysts- bacteria, fungi and plants or enzymes isolated from them. Various methods can be used to improve the enantioselectivity of the reaction. One of such methods is selecting an appropriate solvent as co-solvent or a reaction medium. It should have a positive effect on both the biocatalyst and the reactants. These include green solvents. Their compliance with the principles of green chemistry make them popular in use. Ionic liquids and deep eutectic solvents are readily used in biocatalysis due to properties such as structure design, non-toxicity, biodegradability, recyclability, and low cost. By using them as the reaction medium, the enantioselectivity of the reaction can be controlled. The enantiomeric excess of the desired compound can be increased, and the resulting S or R enantiomer can be influenced by changing the ratio of solvents.

Keywords:

biocatalysis, enantioselectivity, DES, IL, green solvents



IS IT POSSIBLE TO MANUFACTURE Mg_2FeH_6 FROM AUSTENITIC STAINLESS STEEL?

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A few words about the author(s):

I am a Ph.D. student. My faculty is Material Engineering. My research area is hydrogen storage, especially in solid phase. My interests are mainly science (materials science, chemistry, mechanics) but also sport and an active and healthy lifestyle.

Abstract:

Magnesium-iron hydride (Mg_2FeH_6) is one of the most commonly used compounds for storing hydrogen in a solid state. Its popularity is due to the very high volumetric hydrogen density and the gravimetric hydrogen density. This compound is usually produced as a result of mechanochemical synthesis of iron powder (very high purity) and magnesium hydride or pure magnesium. This work demonstrates the possibility of producing this valuable compound from steel powder - austenitic stainless steel. The iron contained therein, unlike pure iron (alpha), occurs in the form of austenite (gamma iron). The use of steel powder instead of pure iron has many advantages, among others acceleration of the synthesis reaction, reduction of reaction costs as well as a positive ecological aspect (steel powder can be obtained in a very simple way by recycling).

This work was financially supported by The National Science Centre (NCN) in Poland, No. 2018/29/N/ST8/01417.

Keywords:

hydrogen storage, hydrogen solid state, magnesium hydride, ball milling



IONIC LIQUIDS BEARING ONE OR MORE 4-VINYLBENZYL GROUPS AS POLYMERIZATION INITIATORS FOR EPOXY RESINS

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A few words about the author(s):

Andrea Szpecht is a 5th year PhD student at Adam Mickiewicz University. She is currently working at PPNT in a project called “High resolution optical and electron beam patterning processes with new ionic liquid based resists”.

Abstract:

Epoxy resins are an example of most common and widely used thermosets, they cure upon heating or radiation and are characterized by the presence of an oxirane or epoxy ring. Such groups are very reactive with both electrophilic and nucleophilic species, that is why they can crosslink with array of curing agents, like amines or acid anhydrides. Recently, ionic liquids (ILs) have presented themselves as a great alternative for commercially used amines as a hardener for epoxy resin systems. ILs possess an array of an interesting properties, such as: high thermal stability, low volatility, low vapor pressure and many more. The simplicity in modification in their structure allows them to be implemented in many different applications, such as: catalysis, photonics, green chemistry and material chemistry.

In this work, we present synthesis and application of new ionic liquids with at least one 4-vinylbenzyl group in the cation structure. All obtained compounds were analysed by ion chromatography for their purity and thermal properties have been measured. Since almost all obtained halides were solid crystals, metathesis reactions were conducted in order to obtain liquid form of those ILs. Their ability to initiate polymerization of epoxies was analysed by DSC analysis.

This work was supported by the National Science Centre (Poland), project SONATA BIS no UMO-2017/26/E/ST8/01059 and project OPUS no UMO-2019/35/B/ST8/03736.

Keywords:

ionic liquids, epoxy resins, crosslinking initiators, DSC



SYNTHESIS OF HYBRID DIBENZO[B,F]OXEPINE AND 4,4'-DIETHOXYBIPHENYL SUBUNITS

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Abstract:

Dibenzo[b,f]oxepines are commonly known to exhibit various biological activities. These compounds are stilbene analogs in which two aromatic rings bond with each other with a vinyl bridge and an oxygen atom. Many dibenzo[b,f]oxepines have strong antipsychotic, anti-inflammatory, anti-depressant, insecticidal, anti-epileptic, and anticancer properties. Ring macrocycles are important class of compounds because of their host-guest properties. Host-guest chemistry can form complexes with selected molecules or ions, which are held by forces other than covalent bonds. One example of this class of compounds is biphen[n]arenes – macrocycles that are created due to the reaction between 4,4'-diethoxybiphenyl and paraformaldehyde. A new-created macrocycle containing dibenzo[b,f]oxepine scaffold may be more effective in treatment due to the combination of two therapeutic features – the activity of functional groups in dibenzo[b,f]oxepine subunits and activity of the drug placed in it. This provides the extension of dibenzo[b,f]oxepines activities in living organisms. The purpose of the thesis was to develop a method of synthesis of dibenzo[b,f]oxepine derivatives containing biphenyl subunits, which in the future could be used to create a ring macrocycle containing the skeleton of dibenzo[b,f]oxepine. For this purpose reactions were conducted in the presence of selected oxepine and a proper aldehyde, catalyzed by Lewis acid.

Keywords:

dibenzo[b,f]oxepine, host-guest chemistry, biphen[n]arenes, stilbene



COMPOSITION, DISTRIBUTION, CHARACTERISTICS AND APPLICATIONS OF ACTIVATED CARBONS

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A few words about the author(s):

Currently, Jadwiga Tolpa is a Ph.D. student at the Faculty of Chemical Technology and Engineering at ZUT in Szczecin. In her research work she deals with the oxidation of alpha-pinene on heterogeneous catalysts such as TS-1, ZSM-5.

Abstract:

Activated carbon is a material that consists mainly of elemental carbon (85-95% wt%) in an amorphous form and partially in the form of finely crystalline graphite. In addition to elemental carbon, the activated carbon includes: oxygen, hydrogen, sulphur, nitrogen and halogens. There are also mineral substances in the pores of active carbon. Activated carbons in terms of particle size are divided into: powdered activated carbon, granulated activated carbon and activated carbon fibres. The first group of activated carbons is characterized by particle sizes smaller than 0.1 mm, and the average particle size of these materials ranges from 0.015 to 0.025 mm. Powdered activated carbons have found application in the adsorption process on fixed beds. These materials cause some problems during regeneration. The second group of activated carbons mentioned above is characterized by the average particle size of 0.6 to 4 mm. Granular activated carbons are used in continuous processes in both liquid and gas phases. In adsorption processes, these materials are more readily used compared to powdered carbons due to the lower pressure drop across the bed. These materials can be easily regenerated and reused. Initially, activated carbon fibres were obtained using viscose fibre as a carbon precursor. Later, thermosetting polymeric materials were used. Today, carbon fibres are obtained from various inexpensive precursors. However, these materials have limited applications due to their price.

Keywords:

activated carbon, carbon fibres, soot



SYNTHESIS AND STUDY OF SPECTROSCOPIC PROPERTIES MOLECULAR PROBES FOR DETERMINING THE ABSOLUTE CONFIGURATION OF SECONDARY ALCOHOLS

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A few words about the author(s):

I am a graduate of the Faculty of Chemistry at the Gdańsk University of Technology. My scientific interests consist of methods of glycoside synthesis and determination of the absolute configuration using NMR spectroscopy.

Abstract:

The derivatives of monosaccharides in which the hydroxyl group on carbon (C-2') were replaced with a hydrogen atom i.e. 2-deoxy-O-glycosides, which are multifunctional compounds obtained through complex synthesis. One of the possible and often used methods of O-glycosidation is the Schmidt reaction. Recently, during spectroscopic studies of polyene antibiotics, it has been determined that in addition to known uses these stereochemically defined sugars can also act as chiral probes.

The poster depicts the synthesis path of benzoyl derivative of the 2-deoxy-D-glucose and its subsequent reaction with selected chiral secondary alcohol, which was (1S, 2R, 5S) - (+) - menthol, conclusions of each individual steps included. Additionally, the poster provides information related to the use of glycosides for determination of the absolute configuration of asymmetric carbon in an aglycone utilizing 2D NMR spectroscopy.

The continuation of the project will be focused on the use of other monosaccharide derivatives which can act as chiral probes.

Keywords:

chiral secondary alcohols, absolute configuration, chiral probes, monosaccharides



ELECTROCATALYTIC PROPERTIES OF REDUCED-GRAPHENE-OXIDE SUPPORTED BY TRANSITION METAL HEXACYANOFERRATES AS AN EFFICIENT CATALYSTS FOR OXYGEN REDUCTION

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Barbara Zakrzewska is Ph.D. student in Faculty of Chemistry in University of Warsaw and Warsaw University of Technology doing research based on electrochemistry, especially oxygen electroreduction process.

Abstract:

Reduced graphene-oxide supported by transition metal hexacyanoferrates are considered here as catalytic materials for oxygen reduction in alkaline media. This process is one of the most important reaction in energy converting systems like fuel cells. The mechanism of the electrochemical oxygen reduction is quite complicated. Four-electron direct pathway is highly preferred in fuel cells, because during this mechanism only water is produced. On the other hand, this reaction can go by two-electron pathway with hydrogen peroxide production as an intermediate product. This undesirable reaction decreases the activity of the catalyst and consequently can decrease the efficiency of the fuel cell. Electrocatalysts based on graphene structure possess properties such as: high conductivity, good mechanical and chemical stability and also can be functionalized in a controlled manner. In our research we proposed materials based on reduced graphene - oxide and inorganic complex salt such as hexacyanoferrates (Fe,Ru), as an efficient catalysts for oxygen reduction. In this experiments, cyclic voltammetry (CV) and rotating ring-disk electrode (RRDE) were used as an electrochemical methods.

Keywords:

oxygen reduction, catalysts, fuel cells



INVESTIGATION ON DABCO DICYANAMIDE IONIC LIQUIDS APPLICATION AS LATENT CURING AGENTS FOR EPOXY RESIN

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A few words about the author(s):

Dawid Zielinski is working at PPNT since 2017 and is also a 2nd year Ph.D. student at Adam Mickiewicz University. Main topics of his research are epoxy resins and new polymerization initiators based on ionic liquids, supported by two national grants.

Abstract:

For over a decade, research has been underway on ionic liquids as a new generation of epoxy resin curing agents. In addition, ionic liquids impart additional properties to the final epoxy based composite materials. Ionic liquids (ILs) are a group of ionic compounds, consisting of a cation (mainly based on amines) and an anion. A feature of ILs is a large pool of special applications and remaining in a liquid state below 100 degrees Celsius. ILs show a beneficial effect through increasing hardness, stiffness and flame retardancy. Moreover, ionic liquids allow to redesign the classic techniques of epoxy composites production. Due to their latent curing activity (ILs initiate polymerization process only at elevated temperature, when the decomposition process, releasing the active amine from IL, takes place), enabling longer storage of the mixture of resin and hardener (without the need to mix components every time). The object of this study is to evaluate application of novel DABCO based dicyanamide ionic liquids as latent curing agents for epoxies. Nine ILs was synthesized and combined with epoxy resin. In the next step, compounds were examined using Differential Scanning Calorimetry (DSC) to characterize curing process and to propose a mechanism for this polymerization.

This work was supported by the National Science Centre (Poland), project SONATA BIS no UMO-2017/26/E/ST8/01059 and project OPUS no UMO- 2019/35/B/ST8/03736.

Keywords:

ionic liquids, dicyanamide, epoxy resins, initiators, polymerisation mechanism

ABSTRACTS OF **PRESENTATIONS**



**NATURAL
SCIENCES**



CAR-T AS A NOVEL ANTICANCER THERAPY: RECENT DISCOVERIES AND LIMITATIONS

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A few words about the author(s):

Student of Master degree at University of Wrocław, Genetics and Experimental Biology course.

Abstract:

Despite the fact, that cancer diseases have been known for centuries, the treatment and curing methods have not yielded the results expected by scientists. In previous years, according to World Health Organization, cancer is one of the leading causes of death across the world. Conventional treatments, such as radiotherapy or chemotherapy, have not lived up to the expectations and, unfortunately, they are known to cause damaging side effects. That is why more and more scientists have started to research experimental treatments. One of them, which deserves special attention, is Chimeric antigen receptor (CAR)-T cell therapy. This treatment uses, predominantly, modified T-cells to attack a specific antigen found on the surface of the patient's tumor cells. This makes the therapy personalized for each patient. CAR-T treatment has, over the past few years, shown favorable results with specific cancer types. In 2017 was approved by The United States Food and Drug Administration (FDA) as one of the official cancer treatment methods. Despite the early positive results, scientists still face many limitations and side effects of this method, such as cytokine release syndrome or antigen escape. Overcoming these important challenges requires engineering more powerful and innovative CAR-T cells with reduced toxicity.

Keywords:

cancer, cell therapy, CAR-T



HOW CAN TAXONOMIC REVISION AFFECT THE PROTECTION OF BIODIVERSITY?

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A few words about the author(s):

Aleksandra Burzacka-Hinz – Ph.D. student at the Doctoral School of Exact and Natural Sciences at the University of Gdańsk. Her specialty is taxonomy and phylogeography.

Abstract:

Genus *Eulophia* R. Br. ex Lindl. is a large genera belonging to the Orchidaceae family. It was described by Lindley in 1823 and includes about 200 species. The species occupy a surprisingly wide variety of habitats, with the greatest diversity in tropical and southern Africa. In addition, they are also found in Madagascar, Asia, Australia and the Pacific Islands. Due to large morphological diversity and problems in the *Eulophia* classification, there was a need for a taxonomic revision.

Malagasy species of *Eulophia* are still insufficiently known. In my studies I using the methods of classical taxonomy. My work was based on examining and analyzing herbarium specimens, originally diagnosis and other literatures and online databases.

The results of my studies was determined a list of species of *Eulophia* which are distributing on Madagascar. I have also developed a detailed descriptions for each of them, and noted about the life form, flowering time and the occupied habitat.

The completely taxonomic revision allows for broadening the state of knowledge of species. Sometimes it is a starting a point for further detailed research on the problems of the endangered genera or species. The taxonomic review is also obligatory in order to recognize the diversity of the particular taxa. Understanding the ecological spectrum of the species concerned, inventory and monitoring of local sites are needed to plan and undertake conservation measures in the research area.

Keywords:

Eulophia, taxonomic revision, protection



IMMUNOHISTOCHEMICAL CHARACTERIZATION OF PACAP EXPRESSION IN THE PIG ENTERIC NEURONS OF THE DUODENUM DURING STREPTOZOTOCIN INDUCED HYPERGLICAEMIA CONDITIONS

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A few words about the author(s):

I am the second year veterinary student belonging to the scientific circle of clinical physiologists, actively participating in researches under the supervision of dr hab. Katarzyna Palus, prof. UWM and dr hab. Michał Bulc, prof. UWM.

Abstract:

Hyperglycemia is one of the main reasons of diabetes complications, gastrointestinal disturbances are one of the most frequent complications that occur during diabetes. The porcine digestive tract has physiological similarities to the human digestive tract. Therefore, the goal of this study was to provide data on the influence of streptozotocin (STZ)-induced hyperglycaemia on the pituitary adenylate cyclase activating peptide (PACAP) on enteric neurons of the porcine duodenum.

The study was performed on 10 gilts at the age of 8 weeks. The animals were divided into 2 groups (control and experimental). Pigs from the experimental group received streptozotocin solution (150 mg/animal), administrated via an intravenous needle inserted into an ear. The experiment lasted 6 weeks, then pigs were euthanized. After fixation and freezing section of the collected material double immunofluorescence staining was performed. Primary antibodies against the Hu C/D, PACAP and secondary antibodies Alexa Fluor 488 and 546 were used. Sections were examined in fluorescence microscope.

Streptozotocin-induced diabetes evoked alterations in the number of PACAP-LI neurons in the porcine duodenum. In the duodenum, a large increase in the population of PACAP-LI neurons was observed in the MP (to 18.39 ± 2.10 %) and a slightly smaller population was observed in the ISP (to 11.25 ± 0.45 %). In the jejunum, an increase was detected in the MP (to 15.64 ± 0.20 %) as well as in the OSP (to 12.05 ± 0.74 %).

Keywords:

PACAP, pig, hyperglycemia, enteric neurons



EFFECT OF LOW AND HIGH DOSES OF ACRYLAMIDE ON THE EXPRESSION OF GALANIN (GAL) IN INTRAMURAL NEURONS OF THE PORCINE JEJUNUM

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A few words about the author(s):

2nd year veterinary students belonging to the scientific circle of clinical physiologists, actively participating in research on the effects of acrylamide on the gastrointestinal tract under the supervision of dr hab. Katarzyna Palus, prof. UWM.

Abstract:

Acrylamide is a chemical compound found in food products that are manufactured and processed at high temperatures, such as biscuits, chips, coffee and corn flakes. The aim of the study was to elucidate the effect of low and high doses of acrylamide on the population of galanin (GAL)-immunoreactive intramural neurons in the porcine jejunum.

The experiment was carried out on 15 sexually immature gilts. The animals were assigned into three groups: Control (C group); a low dose group (LD group), animals given capsules with a tolerable daily intake (TDI) dose of acrylamide (0.5 g/kg b.w./day); and a high dose group (HD group), animals given capsules with acrylamide in a dose ten times higher than TDI (5.0 g/kg b.w./day). The capsules in all groups of animals were administered per os, once daily before the morning feed for 28 days. After the supplementation period, all animals were euthanized and the jejunum fragments were collected. The frozen sections were then subjected to a double immunofluorescence staining procedure using primary antibodies directed against PGP 9.5 (panneuronal marker) and galanin (GAL) and appropriate secondary antibodies.

Acrylamide supplementation induced a response of ENS neurons in the porcine jejunum expressed as a change in their neurochemical phenotype. An increase in the population of neurons exhibiting GAL immunoreactivity was observed in all types of intramural plexuses (myenteric plexus, outer submucous plexus and inner submucous plexus).

Keywords:

acrylamide, enteric nervous system, galanin, jejunum, pig



KEEPING AND BREEDING SOLITARY BEE – A WILD POLLINATOR FOR EVERYONE (OSMIA)

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A few words about the author(s):

Authors are working together in University of Life Science in Lublin at Environmental Biology Section of the Environmental Protection Research Club. Their main object of experimental are pollinators.

Abstract:

Recently, solitary bees are gaining popularity as an alternative to the demanding honey bee (*Apis mellifera*). The red mason (*Osmia rufa*) is a pollinator that is characterized by low life needs.

Osmia can be kept in a variety of conditions: in a garden or also on a flower balcony. They do not produce honey, therefore they do not need specially prepared hives and a large amount of space. The nest of these insects usually consists of reed tubes in which insects gather food (collected pollen) and lay eggs, which over time transform into cocoons. *O. rufa* tolerate the mistakes of novice breeders very well, thanks to independent reproduction and closing the development cycle without human assistance. The undoubted advantage of this pollinator is also its reduced sting and gentle behavior.

The mason bee, thanks to its small requirements and many advantages, can become a close ally in shaping green space in all conditions.

Keywords:

Red mason, *Osmia rufa*, pollinator, insect



CHARACTERISTICS OF GENOME SEQUENCE OF *PROTEUS MIRABILIS* K817

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A few words about the author(s):

Katarzyna Zegadło work focuses on pathogenesis of swarming bacteria. Dawid Gmiter focuses on bioinformatic analysis of bacterial genome. Grzegorz Czerwonka work focuses on bacterial biofilm formation, including *Proteus mirabilis*. Wiesław Kaca is an expert.

Abstract:

The aim of the study was the characterization and analysis of genome sequences of *Proteus mirabilis* K817, an opportunistic human pathogen. An analysis was carried out using the Unicycler, Mauve, fastANI algorithm, CSI Phylogeny, RAST server and the local version of the BLAST+. Thanks to the conducted analyses, information was obtained on: basic parameters of the genome sequence, its structural organisation and phylogeny. Analysis also allowed for the annotation of genes and their assignment to appropriate subsystems. Virulome analysis suggests a high conservatism of genes associated with *P. mirabilis* virulence. Analysis using the BLAST+ showed that K817 belongs to the O11 serogroup. Additionally, plasmid sequences of 43,198 bp in length was detected. Such an in-depth analysis of presented K817 genome sequence will facilitate studies on its virulence and diversity in the ecological aspect.

Authors acknowledge support from the National Science Centre, Poland Grant No. 2019/33/N/NZ6/02406.

Keywords:

genome sequences, *Proteus mirabilis*, virulome, in silico analysis



NOSEMA – NOT ONLY BEE PARASITES

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The co-authors work together in the Environmental Biology Section of the Environmental Protection Research Club at the University of Life Sciences in Lublin. Their research interests focus on pollinating insects.

Abstract:

Invertebrates accompany people in many areas of life. In addition to activity unseen by humans, many insects produce valuable materials and food additives. They also provide ecological services such as pollination. As a result of the worsening state of the environment, there is a general tendency of weakening of the immune system in many beneficial insect species, which contributes to the spread of parasites. One such parasite is *Nosema* spp.

According to Index Fungorum, there are about 330 species of *Nosema* infecting many species of entomofauna. The common characteristic of all these infections is development of spores in cells, mainly in the epithelium of the midgut, causing tissue damage. Spores also develop in other organs, impairing their functioning. The spread of the disease can result in a large decline in the population of a given invertebrate.

Two species of *Nosema* affect the honey bee (*Apidae*): *Nosema apis* and *Nosema ceranae*. Nowadays, mainly *N. ceranae* infections become a problem due to their rapid spread and their asymptomatic nature. Other effective pollinators, bumblebee (*Bombus*), are infected with *Nosema bombi*. Butterflies (*Lepidoptera*) are attacked by *Nosema bombycis* – the main parasite of the *Bombyx mori*, causes pébrine (a disease that causes high mortality in larvae).

Nosema infections usually result in death of the infected individuals, which is why it is so important to expand knowledge about these parasites and develop countermeasures against them.

Keywords:

Microsporidia, *Nosema apis*, *Nosema ceranae*, *Nosema bombi*, *Nosema bombycis*



EFFECT OF MECHANICAL CONDITIONING ON GROWTH DYNAMICS AND AUXIN CONTENT IN SELECTED SPECIES OF ORNAMENTAL PLANTS

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A few words about the author(s):

In my research interests I focus on ornamental plants. I am most interested in the influence of various treatments on their growth, as well as all kinds of reactions inside the plant organism.

Abstract:

In the studies carried out, the effectiveness of the mechanical stunting procedure was checked using 80, 120, 160 runs of the stunting machine in day and night modes to limit the growth force, the number of side shoots and the width of the diameter in the *Petunia × atkinsiana* 'Pegasus Special Burgundy Bicolor' and 'Table White' and also *Pelargonium × hortorum* 'Compact Line Samba' and *Euphorbia pulcherrima* 'Christmas Feelings', observing the effect of the treatment on growth, number of shoots, leaf and flower surface. The effectiveness was compared to chemical retarding, in which the B-nine preparation was used in a concentration of 0.1% of the working liquid, where the active substance is daminoside. the effect of the treatment was checked on the content of endogenous IAA in the growth cones of shoots and roots in two varieties of petunias was verified.

The *Petunia × atkinsiana* and *Pelargonium × hortorum* the treated were characterized by lower growth, narrower diameter and a greater number of side shoots than the control plants. It was observed that the effectiveness of the treatment was influenced by the number of machine runs and the time of day when the above-mentioned method was used. In the case of surplus poinsettias, the stunted plants did not differ significantly in height from the plants from the control group. Biochemical analyzes showed that the content of inolyl-3-acetic acid in the shoot apical meristem in petunia, was higher than in the root growth cones.

Keywords:

tigmmorphogenesis, growth control, IAA content, chemical retarding, plant growth hormones



TISSUE ENGINEERING AS A TECHNIQUE OF REGENERATIVE MEDICINE

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A few words about the author(s):

Oskar Kamiński – student of Adam Mickiewicz University in Poznań. Passionate of biology, starting from single cells going through fully functional organisms ending on whole ecosystems.

Abstract:

Tissue engineering is an interdisciplinary field of science, which combines a materials engineering and medicine with the cell biology science. Its aim is to create biological substitutes that can restore, support, or improve the functioning of specific tissues. The techniques used in it allow for a transplantation starting with a small number of cells, or with the absence of a donor. That sort of science can revolutionize transplantology.

Keywords:

tissue engineering, scaffolds, biomaterials, regeneration



ASSESSMENT OF CONSUMER KNOWLEDGE ON DRIED FRUIT SNACKS AND THE AVAILABILITY OF THESE PRODUCTS ON THE POLISH MARKET

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A few words about the author(s):

I'm a third year Ph.D. student at the Warsaw University of Life Sciences (SGGW), Department of Food Sciences. My work concerned the risk and hazard analyses, interactive models in simulations and optimization of production and designing new products.

Abstract:

The work analyzes the market of dried fruit snacks in selected online stores. The group of respondents consisted of 237 people. The survey consisted of 17 questions and was divided into two parts (test and open-ended questions).

Keywords:

fruit snacks, market analysis, consumer



THE USE OF DRYING IN THE PRODUCTION OF CEREAL-GRAIN BARS

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A few words about the author(s):

I am a third year Ph.D. student at the Warsaw University of Life Sciences (SGGW), Department of Food Sciences. My work concerned the risk and hazard analyses, interactive models in simulations and optimizations of production and new products design.

Abstract:

The study compares baking methods and convection drying (microwave and belt), freeze-drying and hybrid (convection-microwave-vacuum) methods in terms of the production of cereal-grain snacks with fiber content, based on a review of the literature.

Keywords:

drying, fiber, microwave, fiber



COSMETIC POTENCIAL OF CENTELLA ASIATICA

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A few words about the author(s):

The authors are students who actively participate in research projects as part of the Student's Science Club under the supervision of M. Grymel. The presented subject is related with their interests in cosmetology, especially in natural substances.

Abstract:

Centella asiatica (L.) Urban is a valuable source of natural bioactive substances with a wide range of spectrum of biological activity, including anti-inflammatory, antibacterial and neuroprotective properties. It is used in cosmetology, dermatology and medicine all over the world – it is more and more often chosen natural raw material, positively influencing not only the skin, but also the entire body. For many years, intensive research has been carried out on the biological activity of substances responsible for the properties of this plant (i.a. asiaticoside, madecassoside, asiatic acid and madecassic acid). Numerous studies have confirmed the beneficial effects of these substances in dermatological and neurological diseases. Therefore, they have a chance to become a natural alternative to synthetic cosmetic substances or even therapeutic agents.

Keywords:

Centella asiatica, dermatological activity, pharmacological activity, pentacyclic triterpenoids, application



SYNTHESIS OF NEW CAFFEINE DERIVATIVES OF BIOLOGICAL ACTIVITY

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A few words about the author(s):

Our research group from the Faculty of Chemistry is focused on the modification of natural origins compounds, mainly alkaloids.

Abstract:

Caffeine is one of the most popular substances globally, but its stimulating effect is one of the many properties it has. This article briefly describes the biological activity of caffeine and shows the methodology of synthesis new caffeine analogs bearing hydrazine moieties.

Keywords:

caffeine, caffeine analogs, biological activity, hydrazine



CHALLENGES OF MODERN ANIMAL THERAPY

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Fourth-year student of veterinary medicine at the University of Warmia and Mazury. Author of several scientific works and active member of science clubs.

Abstract:

The idea of animals as aids and therapeutic tools goes back a long way. Images of dogs licking wounds or helping to find a way are a common theme in art. However, the real beginning of animal therapy dates back to the 1960s, when the positive influence of contact with animals on the treatment of mental disorders was noticed.

Animal therapy can be divided according to the nature of the patient's contact with the animal and its role. There are AAT – animals assisted therapy, AAI – animal assisted interventions, AAA – animals assisted activities, AAE – animal assisted education. Animal therapy is also divided according to the species of the animal. The most common types are dog therapy, felinotherapy, hippotherapy and dolphin therapy.

Animal therapy has found application in the treatment of mental and psychogeriatric disorders, in palliative care and many others.

The proper use of animal therapy requires education and preparation. It is an emerging field that still requires research to get the best out of it.

Keywords:

animal therapy, veterinary



DOG ROLES IN HUMAN LIFE

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Abstract:

The dog (*Canis familiaris*) was domesticated by humans about 12,000 – 17,000 years ago. It is assumed that it was the first ever domesticated species. Man found a partner in the dog and help in tasks such as hunting or protecting the household. Over time, the dog's roles in human life have changed. In order to best match the dogs' characteristics to the task at hand, appropriate breeds were created. The division of working dogs is extensive and has been largely covered in this paper. Social and civilization changes are constantly transforming the roles of dogs in human life, but do not diminish their importance. Understanding these changes should be important to Veterinarians practicing with small animals as a factor in understanding the needs of the pet and its owner.

Keywords:

dog, veterinary



ASSESSMENT OF THE SENSORY QUALITY OF THE DESIGNED DATE-BASED SNACK WITH INCREASED OIL CONTENT

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A few words about the author(s):

PhD student at the Department of Commodity Science and Food Analysis at the Faculty of Food Science at the University of Warmia and Mazury in Olsztyn. The research interests of the PhD student focus on the analysis of bioactive compounds in food.

Abstract:

More snacks based on dried fruit and nuts appear on the market. These products provide many nutrients, like fibre and minerals. Until now, no one has designed a date snack enriched with oils, which will be a rich source of polyunsaturated fatty acids and vitamin D. The aim of the research was to assess the sensory quality of a date snack enriched with oils.

The snack was made with dried dates, hazelnuts, almonds, sunflower seeds, dried banana and mango, with the addition of iodized sea salt coated with dark chocolate (72% cocoa) with the addition of (linseed and rapeseed) and fish oil. The content of oils in relation to all ingredients was 3%. Dates were blended to a homogeneous mass, mixed with sunflower seeds, chopped hazelnuts, almonds, dried bananas and mangoes. Oils and fish oil were added to tempered chocolate. The molds were lined with chocolate, after it solidified, the date mass was applied, covered with a layer of chocolate and allowed to set.

The snack was assessed organoleptically by an evaluation team of ten people. For the evaluation of the prepared snacks, evaluation cards containing a structured graphical scale and a nine-point hedonic scale were used. The individual distinguishing features received high marks. The smell of the product was rated the highest, which was rated 10. General appearance, color and general desirability were rated 9.6, taste was 9.5 and consistency was rated 8.4. The evaluators declared that the snack had no smell and taste of oils.

Keywords:

snack, date, nuts, oils, sensory quality



DIET OF HONEYBEE – IMMUNO-STIMULATING FACTOR

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A few words about the author(s):

Authors are working together in University of Life Science in Lublin at Environmental Biology Section of the Environmental Protection Research Club. Their main object of experimental are pollinators.

Abstract:

A well-functioning immune system is a key barrier in fighting unwanted microbes and other environmental factors. The diet determines the proper development from the egg to the adult form - imago, the amount of the immune system potential of individuals is the main factor building the strength of the family.

The bee diet consists of several components. These include: carbohydrates, proteins (aminoacids), lipids, minerals and vitamins. The main source of sugar in the diet of bees is nectar. The resources of the remaining ingredients are found in pollen and royal jelly produced by 5-15 day-old bees. Royal jelly is the main food for the queen, which shows the highest level of immune parameters among the rest of the family. Worker larvae also receive it for the first days after hatching.

A proper diet additionally influences: achieving a high body weight, proper development of wings and their muscles, development of castes while maintaining proportions.

In Poland, there is a relatively small number of nectar and pollen-containing plants, especially in early spring nectar. By reducing the quality and quantity of nutrients in the diet, pollinator immunity is reduced and colony health problems are affected.

Keywords:

honey bee, diet, bee diet, insect



USING THE SPAD INDEX TO ASSESS WINTER WHEAT NITROGEN NUTRITION UNDER DIFFERENT CULTIVATION SYSTEMS

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A few words about the author(s):

Karolina Smytkiewicz – Ph.D. student at the Institute of Soil Science and Plant Cultivation – State Research Institute in Puławy.

Abstract:

The aim of this study was to compare the effect of crop production systems (conventional, integrated, organic and monoculture) on wheat plants nitrogen nutrition and grain yield.

The experiment was conducted at the Experimental Station of the Institute of Soil Science and Plant Cultivation - State Research Institute in Osiny in 2017/2018. In the study, one winter wheat variety Hondia was sampled at three developmental stages in four replicates under all cultivation systems. In this experiment, leaf greenness index was measured, as well as nitrogen, potassium and phosphorus contents in the above-ground parts of plants were determined. After the harvest the grain yield and yield components were estimated. The technological parameters of the obtained grain were also evaluated.

The research proved that applied nitrogen doses in different farming systems influence the level of plant nutrition with this element. The NSI – Nitrogen Sufficiency Index, index showed that winter wheat grown under conventional farming system was optimally nourished with nitrogen throughout the entire growing season. A deficit of nitrogen was recorded in organic farming at the stage of stem formation (BBCH 31). The highest grain yield was obtained from the integrated crop production system. This yield was significantly higher than the yield obtained from organic farming. Optimal nutrition of plants with nitrogen positively influenced the quality parameters of winter wheat grain.

Keywords:

winter wheat, farming systems, nitrogen fertilization, nitrogen nutrient evaluation



THE ROLE OF VARIOUS LIPIDS IN SHAPING THE STABILITY OF DAIRY CREAM ANALOGUES

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A few words about the author(s):

I am a Ph.D. student at the 3st year of doctoral studies at the Institute of Food Sciences at the Warsaw University of Life Sciences. My research mainly concerns aspects related to edible oils and fats, emulsions, and oleogels.

Abstract:

The purpose of the study was to assess the effect of lipid type, with different content of saturated fatty acids – SFAs) on physicochemical characteristics of O/W (30/70 w/w) emulsions, in comparison with dairy cream. The lipid phase comprises a milk fat (~65% SFAs), palm oil (~8% SFAs) or oleogel (~65% SFAs) based on a rapeseed oil and linseed oil mixture (1:1 ratio) with 3% w/w candelilla wax, while an organic soybean drink was used as the aqueous phase. The samples were emulsified for 1 min using an ultrasonic homogenizer. Titration, centrifugation and open capillary method were used to characterize the lipids. The creams were studied by using potentiometric, optical microscopic, diffusing wave spectroscopy and centrifugal stability analysis methods.

Oleogel (OG) and milk fat (MF) exhibited the highest acidity values. Palm oil (PO) had the lowest peroxide value and physical stability (~81%). OG was characterized by the highest slip melting point (~39°C) and almost 100% physical stability. A pH value for dairy cream was lower than for soybean drink and vegan creams. All emulsions showed a single-fraction (unimodal) particles size distribution. The formulations with OG or MF were the most viscous and elastic. Cream with PO had the highest dispersity index (~1.15) and instability index (~0.05), which can prove its lowest durability.

Inferring, the high potential using of oleogels to obtain stable vegan creams has been demonstrated.

Keywords:

vegan cream, dairy cream, conventional fats, oleogel, stability, particle size distribution



IMPACT OF SONICATION TIME ON THE PROPERTIES OF O/W EMULSIONS WITH DIFFERENT LIPIDS

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I am a Ph.D. student at the 3st year of doctoral studies at the Institute of Food Sciences at the Warsaw University of Life Sciences. My research mainly concerns aspects related to edible oils and fats, emulsions, and oleogels.

Abstract:

In this study the influence of ultrasound homogenization time on properties of O/W emulsions, containing different lipids (milk fat, palm oil or oleogel with 3% w/w candelilla wax), was investigated. The lipid phase (30% w/w) and aqueous phase (soybean drink) were preheated to 55°C, and immediately emulsified for 2, 3 or 4 min using ultrasound homogenizer (80% amplitude, 100% pulse, 46W). The energy density (J/ml) and maximum temperature achieved by sample were greater, if the sonication last longer (e.g. for 4 min – 9.36 J/ml and 62.4°C, respectively). The acidity, colour, viscosity, particles size, microrheology and physical stability of emulsions were analyzed. The sonication time had no effect on the acidity, colour parameters and average particles size, however significantly affected the increase of viscosity, elasticity and centrifugal stability of emulsions. The emulsion with PO and emulsion with OG did not differ in terms of whiteness and yellowness indexes. The most stable was the emulsion with OG obtained after 2 or 3 min sonication. The extension of homogenization time from 3 to 4 min resulted in a decrease of centrifugal stability and the highest viscosity increase for all formulations. The local temperature leap of sample near to sonotrode could have contributed to the denaturation and gelation of part of the soy protein, that had lost its emulsifying properties. It was found that the sonication time of 2.5 min is optimal for this type of emulsions.

Keywords:

ultrasound homogenization, vegan creams, particle size, centrifugation resistance, microrheology



PETROGRAPHY OF POTTERY FROM TEL AKKO ON THE EXAMPLE OF MORTARIA

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A few words about the author(s):

Ph.D. student in interdisciplinary project GEO+.

Abstract:

Use of geological methods for the study of ceramics is now the standard of archaeometric research. Tel Akko is located in Galilee. Examined vessels Mortaria are shallow open bowls, with characteristic thick rim. In the southern Levant the earliest mortaria appeared at the end of 8th century BC and has spread out along the southern. The presentation focuses on current stage of research which is thin section petrography analysis. Main goal of whole study is to determine provenance of vessels. Additional goal is to document fabric diversity. Thin sections petrography analysis and photographic documentation were made in transmitted light with parallel and crossed polarizers. Support for recognition mineral phases was scanning electron microscope with an EDS detector. The undertaken research allowed to distinguish fabric groups, of which two note our special attention. The first group has components associated with the areas of occurrence of mafic and ultramafic rocks. Such composition of mortaria fabric is attributed to the ophiolite complexes. Previous research indicates the Cypriot origin of this type of pottery. The second group is distinguished by microfossils and silty rendzina clay lumps that suggesting a local levant cost origin.

Keywords:

petrography, pottery, archaeometry



INFLUENCE OF PHTHALOCYANINES ON MICROORGANISMS AND THEIR USE IN PACT THERAPY

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A few words about the author(s):

Completed studies of a specialization in food and drug biotechnology and postgraduate studies in chemical analytics and diagnostics. The presented issue about influence of phthalocyanines on microorganisms was the basis of the MA thesis.

Abstract:

Phthalocyanines are a group of chemicals that are activated under the influence of light. They undergo various types of chemical transformations, i.e. polymerization, aggregation, coordination, oxidation and reduction reactions. In recent years, more and more studies have been conducted in which these compounds are being used in pdt photodynamic therapy and pact photodynamic antibacterial therapy.

The methods are based on the use of phthalocyanines and irradiating them with visible light, which is aimed at obtaining reactive oxygen species (ROS), i.e. a factor that deactivates cancer cells and drug-resistant strains of microorganisms.

Using photosensitizers to inactivate bacteria and fungi excludes the phenomenon of drug resistance and minimizes the risk of side effects for traditional antibiotic therapy. The use of PACT shortens the duration of therapy and reduces the cost of treatment, moreover, it is much more beneficial than traditional antibiotic therapy because it allows for multiple interventions without the risk of microbial resistance. PACT therapy is selective for pathogens and not very toxic. The photosensitizers used in therapy are m.in. phthalocyanine without metal or with a metal atom. The central atom affects the biological activity and persistence of phthalocyanine.

Keywords:

phthalocyanines, PACT therapy, microorganisms, bacteria, fungi

ABSTRACTS OF **POSTERS**



**NATURAL
SCIENCES**



NOVEL IFN- γ REPORTER SENTINELS FOR THE REAL-TIME MONITORING OF LABORATORY MICE'S HEALTH

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A few words about the author(s):

Martyna Chotomska is 5th year student of veterinary medicine. Aleksandra Studzińska graduated from veterinary medicine in 2021. Professor Arkadiusz Miążek is a researcher at the Department of Biochemistry and Molecular Biology.

Abstract:

Objectives: To refine the traditional laboratory animal health monitoring system we devised a novel transgenic sentinel mouse model IFN- γ LUCIA secreting luciferase upon stimulation of interferon gamma (IFN- γ) promoter.

Methods: IFN- γ -LUCIA mice were generated by pronuclear injection of linear DNA encoding a synthetic luciferase gene under a minimal IFN- γ promoter. The specificity of transgene expression was assessed in vitro using transgenic splenocytes exposed to various T and B cell mitogens. The level of luciferase activity in tissues was also examined ex vivo using tissue lysates from antigen-immunized IFN- γ -LUCIA mice. In vivo experiment was carried out on a group of 5 IFN- γ -LUCIA mice transferred from a specific pathogen free animal facility to a conventional facility. Levels of luciferase in the urine were determined twice a day for 14 days.

Results: In vitro treatment of splenocytes from IFN- γ -LUCIA mice with T cell mitogens, but not B cell mitogen led to 2-3 fold increase in the secreted luciferase levels after 24 hours of cell culture. Tissue lysates from lymphoid organs of immunized IFN- γ -LUCIA mice revealed over tenfold difference in luciferase levels over nonlymphoid tissues. Mice exposed to pathogens in conventional animal facility induced a statistically significant increase in luciferase levels in urine.

Conclusions: The conducted studies showed the usefulness of IFN- γ -LUCIA mice for examining the exposure of laboratory rodents to environmental pathogens.

Keywords:

interferon-gamma, luciferase, luminescence, pathogen detection, sentinel mice



HYDROLYSIS OF POULTRY BY-PRODUCTS

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Master of Science and Engineer in Food Technology, assistant at the Department of Functional Food Product Development at the University of Life Sciences in Wrocław. Research interests include various ways of using slaughter by-products.

Abstract:

In recent years, in Poland and in the world, there has been a significant increase in the consumption of poultry meat and its products. It also increases the volume of by-products of slaughter such as skin, bones, cartilage, blood, inedible guts, chicken feathers and feet. The by-products mentioned above contribute to environmental pollution as their disposal is challenging and carries high costs. One of the methods of their use is the production of protein preparations, including hydrolysates, which are widely used in the food industry and in animal nutrition. The main theme of the study was to develop a quick, simple, cheap and effective method of producing protein hydrolysates from inedible by-products of poultry slaughter. The process of proteolysis of Slaughter's by-products was optimized, in this case the guts and heads of broiler chickens in two time variants (1 and 2 hours), three variants of pH (2.75; 4.5 and 6.0) and three variants of temperature (22, 37 and 60 °C). The chemical composition of raw materials was analyzed. Then the study was conducted to check the degree of protein degradation, recovery of glycosaminoglycans and antioxidant properties of the hydrolysates. The results show that endogenous proteolytic enzymes present in the gut accelerate the proteolysis process. The best hydrolysis effect was observed for the intestinal preparations at 22 and 37 °C at pH 6.0, the same hydrolysates also showed the best antioxidant properties.

Keywords:

broiler, viscera, heads, autolysis, hydrolysates



PEPTIDES BASED ON SER-HIS MOTIF IN PREBIOTIC REACTIONS

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A few words about the author(s):

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Abstract:

The fundamental role peptides and proteins play in biology today indicates that peptides must have been essential ingredients in the emergence of life. In the cells present, all processes are carried out by enzymes of high efficiency and specificity. It is therefore assumed that the early enzymes had to be much shorter peptides with lower efficiency and specificity. Even dipeptides have already been reported to have some catalytic properties. They have been shown to play a role in increasing the speed of many reactions, for example bond hydrolysis as well as polymerization reactions, possibly leading to the formation of RNA chains. SerHis is such a promising dipeptide. Its availability in the early Earth is not yet confirmed, but there are reports of its prebiotic synthesis. SerHis modifications, such as Ser2Ala4His, also show catalytic properties. These properties are also influenced by the formation of copper complexes with peptides. So it was shown that simple peptides such as SerHis could have been fundamental in the origin of life on Earth.

Keywords:

peptides, enzymes, prebiotic chemistry, proteins, catalysis



THE PREVALENCE OF TOXIC FUNGI IN SELECTED DRIED PLANTS USED IN RABBIT NUTRITION

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A few words about the author(s):

I have graduated from the faculty of Veterinary Medicine at the University of Warmia and Mazury in Olsztyn, Poland, in 2021.

Abstract:

Dried plants are used in the nutrition of rabbits to diversify the diet and provide all the necessary nutritional value. According to the recommendations, an adult rabbit should be fed 3 different types of greens daily. The aim of the research was to determine the fungi inhabiting drought plants for rabbits from commercial sale. The following were selected for the study: dandelion herb, strawberry leaves, linden leaves, plantain leaves, lemon balm herb, plantain herb available in the assortment of pet stores. The research involved the application of a PDA culture technique on which material was randomly collected from each sample. Grown fungi cultures were marked by genus and species based on the available keys based on morphotic features under the microscope. The study revealed the presence of 22 species of fungi in the studied droughts. Strawberry leaves turned out to be the most severely affected by toxicogenic species (55 isolates from four species). The most common causes of dried plants infection with fungi are bad harvest time, bad humidity conditions during drying and improper storage.

Keywords:

rabbit, fungi, nutrition, dried plants



DIRECT AND INDIRECT MECHANISMS FOR PLANT STIMULATION BY PLANT GROWTH PROMOTING RHIZOBACTERIA (PGPR)

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A few words about the author(s):

We are young, ambitious scientists who are fascinated by the world of microorganisms and their use in various aspects of life.

Abstract:

Rhizosphere is a space surrounding plant roots that affect the biochemical properties of soil. In this zone there are intense interactions between plants, soil molecules, as well as microorganisms that live in the rhizosphere. Existing in that way relations can have both positive, negative and neutral effects on plant growth and development. The population of soil microorganisms is considered to be one of the largest groups of microorganisms. Among the microorganisms inhabiting the rhizosphere, a large group of bacteria is capable of promoting plant growth and development, rhizobacteria (PGPR) can be distinguished. PGPR has a positive effect on plant growth and development. They contribute in reinforcement of plant immunity in response to pathogens, abiotic and/or biotic stress. For reasons of beneficial effects of PGPR on plants, they are classified as biofertilizers. In order to increase the productivity of sustainable agricultural, horticultural or forestry crops, rhizobacteria have been used as an alternative form of fertilization. This work is an overview of the mechanisms of direct and indirect stimulation of plants by PGPR bacteria and the achievements of their application to this day.

Keywords:

rhizobacteria, PGPR, indirect stimulation, direct stimulation, rhizosphere



MICROBIOLOGICAL ANALYSIS UNPASTEURIZED VEGETABLE JUICES

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W. Sęk, V. Kolotylo, and A. Kisiołek – students of the Faculty of Food Technology of (WULS-SGGW), A. Kot and M. Kieliszek – promoters of engineering and master's theses, authors of several dozen articles (listed in JCR), managers of research projects.

Abstract:

Vegetables and fruits are a desirable element in the daily diet. They play an important role in nutrition because they provide the body with essential vitamins and minerals needed for proper functioning. A very good replacement for fresh fruit and vegetables in the diet are unpasteurized vegetable juices. These products are not subjected to technological processes, thanks to which they retain their nutritional value. However, skipping these procedures is associated with the possibility of microbial contamination in juices. The aim of the study was to analyze selected indicators characterizing the microbiological quality of unpasteurized vegetable juices. The research determined the amount of mesophilic and psychophilic microorganisms, fungi and *Escherichia coli* bacteria according to the Polish Standards.

The presence of a large number of aerobic mesophilic, aerobic psychophilic microorganisms (10^6 cfu/mL) and lactic acid bacteria (10^4 cfu/mL) was as a result of the conducted research. There were 4 fungal generas (*Geotrichum*, *Alternaria*, *Mucor*, and *Penicillium*) isolated and identified during the research. A large number of *Escherichia coli* bacteria (10^3 cfu/mL) indicates the need to improve the quality in this regard.

Keywords:

microbiological quality, microbiological analysis, unpasteurized juices



GRANZYME A ACTIVATES PROGRAMMED CELL DEATH

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I am studying Biotechnology at Wrocław University of Science and Technology. The main field of my interest are compounds contained in natural resources and their activity in the treatment of diseases and activation mechanisms of apoptosis.

Abstract:

The granzymes are proteins, a family of serine proteases. Their nomenclature (granule secreted enzymes) comes from the place of their storage in the granules of killer cells. There are produced by NK cells (natural killer cells) and cytotoxic T cells. There are five granzymes (A, B, H, K and M) in human and ten granzymes (A, B, C, D, E, F, G, K, M and N) in mouse. They are encoded in three distinct gene clusters. The granzymes major function is to activate the process of apoptosis, programmed cell death, to eliminate viruses and tumor cells. In cytotoxic granules of activate cytotoxic T lymphocytes and NK cells the most abundant serine protease is Granzyme A (GzmA). The protease activates programmed cell death by caspase-independent mechanisms that begins in the mitochondria of target cell. In the mitochondrial matrix, protease cleaves NDUFS3 (NADH dehydrogenase [ubiquinone] iron-sulfur protein 3), a component of electron transport complex I. Disrupting complex I leads to reactive oxygen species (ROS) generation drives an ER-associated SET complex which plays a critical role in GzmA-induced nuclear damage, into the nucleus.

Keywords:

serine proteases, granzymes, killer cells, granzyme A, apoptosis



WHAT DO WE KNOW ABOUT HUMAN NEUTROPHIL SERINE PROTEASE 4?

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A few words about the author(s):

I obtained the title of engineer of biotechnology in the Bioorganic Chemistry Department at the Faculty of Chemistry at Wrocław University of Science and Technology. I continue my study with scientific specialization-pharmaceutical biotechnology.

Abstract:

One type of immune response observed in humans is innate immune system. In this process neutrophils are engaged. These short-lived cells are produced in bone marrow and they are the most abundant cells of immune system in circulation. The neutrophils contain azurophilic granules with neutrophil serine proteases (NSPs). These enzymes are released at sites of inflammations and their main function is antimicrobial activity. For many decades there were known only three of NSPs: neutrophil elastase (NE), cathepsin G (CG) and proteinase 3 (PR3). However, in 2012 human neutrophil serine protease 4 (NSP4) was discovered. From that moment, intense researches were initiated in order to get to know e.g. substrate specificity, localization and biological function of NSP4. I am going to present an overview of the current knowledge about fourth member of NSPs.

Keywords:

NSPs, NSP4, substrate specificity, neutrophils



AS-PCR BASED DETECTION AND IDENTIFICATION OF GLU-A1 HIGH MOLECULAR WEIGHT GLUTENIN SUBUNITS (HMW-GS) IN POLISH COMMON WHEAT CULTIVARS (TRITICUM AESTIVUM L.)

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Karolina Woronko is a student of Biotechnology at University of Szczecin and representative of the MATRIX scientific circle. Ewa Filip is a PhD in the Institute of Biology at University of Szczecin and president of MATRIX scientific circle.

Abstract:

Common wheat is one of the most important staple food crops both in Poland and around the world. Even though grains are used in many wheat products, bread is actually the most popular of them. Wheat owes its success in breadmaking mainly to essential flour ingredients that form gluten complex. Gluten consists of monomeric gliadins and polymeric glutenins, which represent 80% of total seed storage proteins. Numerous studies have indicated that glutenins are one of the key factors affecting viscoelasticity of wheat dough. While 1-Glu-A1a, 2*-Glu-A1b alleles have positive effect on rheological properties, null-Glu-A1c allele have negative. The present study aimed to detect and identify all locus Glu-A1 alleles in 16 Polish common wheat cultivars (*Triticum aestivum* L.). Allele composition of Glu-A1 loci in selected common wheat cultivars were detected by using AS-PCR with allele specific primers. The study of AS-PCR showed of amplicons of 300-324 bp for 1-Glu-A1a allele, 295-310 bp for 2*-Glu-A1b allele, and 295-319 bp for null-Glu-A1c. Results indicated the presence of 1-Glu-A1a allele in 5 cultivars, 2*-Glu-A1b allele in 3 cultivars, and null-Glu-A1c allele in 8 cultivars. Thus, the null-Glu-A1c allele was the most common in the pool of tested varieties with a 50% frequency.

Keywords:

common wheat, breadmaking, gluten, HMW-GS, Glu-A1



HOW DO ENVIRONMENTAL FACTORS INFLUENCE THE END-USE QUALITY OF COMMON WHEAT (TRITICUM AESTIVUM L.) ?

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A few words about the author(s):

Karolina Woronko is a last year student of Master degree studies in Biotechnology at University of Szczecin and representative of the MATRIX scientific circle.

Abstract:

Nowadays, consumer expectations and production requirements pose a numbers of challenges for the wheat cereal market. Wheat is one of the most important crops worldwide and as a resilient cereal it grows in a various climatic zones. It is well known that genotype, environment and their interactions influence wheat quality parameters. Furthermore, climate change and naturally occurring environmental fluctuations have a significant impact on the development and growth of wheat and its kernels, thus contributing to alterations of crop yields. Under climate changing conditions breeders aim to reach stable yields, while millers and bakers strive to obtain flour of consistently high quality. Abiotic stressors, such as high temperature, especially during grain filling, drought and excessive water availability or nitrogen and sulfur deficiency are known factors leading to deterioration of wheat grain quality and crop yields reduction. Therefore, knowledge of the environmental effects on wheat can prevent from decreasing its end-use quality and contribute to successful and sustainable wheat breeding and grain processing.

Keywords:

abiotic stress, common wheat, environment, environmental conditions, end-use quality



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