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# THE BOOK OF ABSTRACTS

## National Scientific e-Conference "e-Factory of Science" III edition

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## **MEDICAL SCIENCES**





## THE IMPACT OF COFFEE ON HUMAN HEALTH

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## A few words about the authors:

The authors are medical students at the Medical University of Lublin who are interested in studying the impact of various factors on the functioning of the human body.

## Abstract:

INTRODUCTION: Coffee is one of the most popular beverages in the world, so it is important to study its effects on health. It contains over 1000 biologically active ingredients. These compounds are mainly caffeine, coffee acid, chlorogenic acid, trigoneline, diterpenes and melanoids. These compounds have not only aromatic properties, but many of them also have antioxidant, hepatoprotective, anti-inflammatory, antibacterial, antiviral and relaxing smooth muscles properties.

MATERIAL AND METHOD: The aim of the study is to present the impact of coffee on human health based on a literature review on Pubmed and Google Scholar platform.

RESULTS: Numerous studies have been conducted, which show that the effect of coffee on health is important if the drink is consumed in very large quantities. Chlorogenic acid, caffeine and trigoneline have a positive effect on health thanks to their antibacterial, antioxidant and hypoglycemic properties. Diterpenes can have a negative effect on health. Results show that caffeine can also reduce the risk of Parkinson's disease and type 2 diabetes.

CONCLUSIONS: The results show that caffeine has both negative and positive influence on human body. There is not enough evidence to say that coffee should be excluded or included in our menu. Further research is needed to determine the mechanisms responsible for its effects on diabetes and Parkinson's disease, among others.

## **Keywords:**

coffee, health, caffeine, diabetes





## EXTRACTION AND USE OF STEM CELLS DERIVED FROM UMBILICAL CORD BLOOD

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#### A few words about the authors:

PhD students at the Faculty of Medicine of the CM UMK, conduct research on the use of modern gene therapy techniques and immunotherapy in the treatment of many diseases, e.g. cancer, rheumatic or interstitial lung diseases.

#### Abstract:

Cord blood is a rich source of stem cells. Their presence and function can potentially be used in the treatment of hematopoietic diseases, genetic diseases and immune deficiencies. In umbilical cord blood sample we can distinguish hematopoietic and non-haematopoietic cells constituting about 1% of the mononuclear cell population. In the non-haematopoietic cell group, we can find, mesenchymal stem cells and endothelial progenitor cells. First one support the process of hematopoiesis in the bone marrow and have immunomodulatory capabilities. The second ones participate in the regeneration of blood vessels. The umbilical cord blood preparation should have low immunogenicity and a sufficiently high number of cells (25 million cells/kg body weight). Due to the often insufficient number of cells, it is necessary to obtain more of them, which is obtained, for example, by ex vivo culture. The challenge facing modern medicine is to develop standardization methods for obtaining cord blood stem cells preparations.

## **Keywords:**

stem cells, ublilical cord blood, hematopoietic diseases





## THE ROLE OF CANCER STEM CELLS IN LUNG CANCER

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#### Abstract:

Stem cell research are fundamentaly important in the development of lung cancer treatment. Particularly dangerous are malignant tumors with a tendency to metastasis to other tissues and capable of renewing themselves after treatment. For this reason, cancer stem cells (CSS) should be the goal of oncological therapy, for which conventional therapies such as radiation or chemotherapy seem to be insufficiently effective, since after treatment these cells may initiate the return of the disease. Studies have revealed that isolated putative lung CSCs exhibit the characteristics of multipotent stem cells, and their genetic composition may be valuable for future genetic therapies targeting specific components of CSC regulation pathways.

## **Keywords:**

cancer stem cells, lung cancer, bronchio alveolar stem cells





## CRISPR-CAS – A NEW TOOL IN DIAGNOSTICS AND TREATMENT OF VIRAL AND CANCEROUS DISEASES

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## Abstract:

CRISPR-Cas is the new method which rapidly shows promising results as a useful tool in treatment and diagnostics. CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a naturally occurring defence system found in bacteria and archaea. This system is used as a genome editing technique with great therapeutic potential, but also proved to be useful as a diagnostic tool. CRISPR-Cas has the ability to accurately recognize and cleave (through Cas enzymes) specific DNA and RNA sequences. There are couple of subclasses of CRISPR-Cas. The most promising CRISPR-Cas9 is found to be a potential therapeutic tool in cancer and disease treatment. CRISPR-Cas9 studies include in vitro editing, which entered trials, but also in vivo approach.

In diagnosis and detection, recent studies discovered new Cas proteins: Cas13, Cas13a and Cas12a, which gave promising results as a new strategy for rapid detection of viral infection or tumour nucleic acids. Two main detection systems were introduced by the researchers based on newly discovered Cas proteins: SHERLOCK (Specific High-sensitivity Enzymatic Reporter unLOCKing) and DETECTR (DNA Endonuclease Targeted CRISPR Trans Reporter). Their sensitivity and specificity are satisfactory; however, it is a qualitative readout and the signal is fluorescent. In conclusion, CRISPR-Cas systems are constantly being studied and we may be in the verge of a breakthrough in medicine.

## **Keywords:**

cancer, CRISPR-Cas, diagnostics, gene editing tool, treatment





## ROLE OF PROLACTIN AND PROLACTIN RECEPTOR IN CANCER PROGRESSION

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## Abstract:

Prolactin (PRL) is a peptide hormone synthesized in the pituitary gland. Its main role is to stimulate lactation, but it also plays a role in other processes. Increased blood PRL levels have been reported in people with breast, prostate and colorectal cancer. Studies have shown that PRL levels tested less than 10 years before the diagnosis of postmenopausal breast cancer show an increase in concentration. PRL is considered to be the main physiological prolactin receptor (PRLR) trigger. Immunohistochemical tests confirmed the high expression of the PRLR in benign and malignant prostate cancer. In the case of breast cancer, PRLR is overexpressed, which promotes the cancer formation process and activates the transcription factor STAT5a in the cell nucleus, which can also be a good prognostic factor. In contrast, the increased expression of PRLR is associated with tumour progression in colorectal cancer. Furthermore, increased concentrations of mRNA for this receptor were detected in colorectal tumour.

PRLP studies suggest it may become a potential therapeutic target. SMO inhibitor (splice-modulating oligomers) is one of the example that gives promising results. It reduces mRNA concentration for PRLR and reduces the number of metastases in breast cancer. There are high hopes for prolactin and its receptor for early cancer detection, but the research is still ongoing.

## **Keywords:**

cancer, cancerogenesis, prolactin, prolactin receptor





## DIAGNOSTICS AND TREATMENT PROCESS OF ACROMEGALY

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My name is Olaf Francik. Two years ago I graduated nursing at the Jan Kochanowski University in Kielce but currently I am studying medicine at the same University. In the future I would like to combine scientific activity with work in a hospital ward.

#### Abstract:

Acromegaly is a rare disease that results from excess growth hormone (somatotropin, GH) that occurs after a period of epiphyseal plate atrophy. The cause of this situation, in the vast majority of cases, is a hormonally active benign tumor, known as a pituitary adenoma. The multiplicity of symptoms makes that the disease is often diagnosed a few years after the first symptoms appear, which usually leads to the development of complications that are the cause of an increased risk of death. Therefore, the cooperation of many medical specializations is a necessary issue. Diagnosis of this disorder is based on measuring insulin-like growth factor 1 (IGF-1) in the blood and growth hormone after drinking glucose. After the disease is diagnosed, pituitary imaging is also performed to determine the presence of a tumor. Treatment options include surgery, pharmacotherapy and radiation therapy. The main goal of treatment is normalization of GH and IGF-1 levels and control of tumor size by its removal or reduction in the volume.

## **Keywords:**

acromegaly, pituitary adenoma, IGF-1





## INSULIN-LIKE GROWTH FACTOR I RECEPTOR (IGFR1) -POTENTIAL TARGET FOR CANCER THERAPY

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#### Abstract:

INTRODUCTION: Strong mitogenic and antiapoptotic effect of elevated blood IGF1 levels are associated with increased risk of several common tumors, including non-small (NSCLC) and small cell lung cancer (SCLC). IGF1/IGFR1 system could be a target for cancer gene therapy.

PURPOSE: Inhibition of IGF1 signaling pathway by transfection using the plasmid encoding specific shRNA anti-IGF1 sequence to transfect NSCLC (A549) and SCLC (NCI-H82) cell line.

METHODS: NCI-H82 and A549 cells were transfected with the plasmid, containing anti-IGFR1 shRNA sequence. The transfection efficiency was examined by RT-PCR technique. The phenotype of transfected cells was examined by direct immunoflurescence staining followed by flow cytometry. The expression of CD80, CD86, CD83, CD120A and CD120B, CD178, CD221 (IGFR1) surface molecules was tested. Apoptosis rate was determined by flow cytometry.

RESULTS: Significant increase of apoptosis rate was found in transfected cells. Enhanced expression of costimulatory molecule CD86 was shown in A549 cells. Decreased IGFR1 expression in both cell lines after transfection was determined. Despite, phenotype of transfected NCI-H82 cells was not significantly changed.

CONCLUSIONS: The inhibition of IGF1/IGFR1 pathway effects in increasing superficial CD86 expression and intensive apoptosis, but mostly in NSCLC. Therefore, this method seems to be effective only in non-small cell lung cancer treatment.

## Keywords:

IGFR, lung cancer, shRNA





## EPIDERMAL GROWTH FACTOR RECEPTOR (EGFR) - POTENTIAL THERAPY TARGET FOR NON-SMALL CELL LUNG CANCER

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## A few words about the authors:

PhD students at the Faculty of Medicine of the CM UMK, conduct research on the use of modern gene therapy techniques and immunotherapy in the treatment of many diseases, e.g. cancer, rheumatic or interstitial lung diseases.

## Abstract:

INTRODUCTION: Lung cancer is one of the most common cancers and has poor prognosis and low survival rate. The Erb-B tyrosine kinase receptor family plays an important role in the development of epithelial tissue as well as in the process of tumor formation. Overexpression of EGFR and HER2 accelerates cell proliferation, increases patients' susceptibility to metastases. In addition, overexpression of EGFR and EGF in cancer cells is correlated with tumor size and clinical stage of the tumor.

PURPOSE: Inhibition of EGFR and HER2 expression by using a plasmid encoding anti-EGFR and anti-HER2 specific siRNA sequences, and to attempt to cause phenotypic and functional changes in cells of the NSCLC line (A549).

MATERIALS AND METHODS: The A549 cell line was transfected with plasmid encoded anti-EGFR and anti-HER2 shRNA molecules. The transfection efficiency was confirmed by RT-PCR. The level of apoptosis was examined using annexin V and propidium iodide staining. Expression levels of CD86, CD120A and CD120B were determined by flow cytometry.

RESULTS: Inhibition of EGFR and HER2 expression in transfected cells led to increased apoptosis. Inhibition of EGFR expression increased CD86 and TNFR - 120A expression.

CONCLUSIONS: Increased expression of CD86 and CD120A may facilitate the recognition of cancer cells by the immune system and promote apoptosis. Our results suggest that inhibition of EGFR expression may be promising for the treatment of non-small cell lung cancer.

## **Keywords:**

EGFR, NSCLC, siRNA, transfection





## ASSESSMENT OF NK CELL SUBPOPULATIONS IN PATIENTS WITH IMMUNODEFICIENCY

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## A few words about the author:

Kornelia Jankowska got master degree in medical biotechnology in 2019 year and is currently working in field related to cell culture.

## Abstract:

Natural killer (NK) cells belong to the cytotoxic elements of the immune system. Cytotoxicity and quantity of NK cells are modified in patients with immunodeficiencies, but quantitative abnormalities of NK cells subpopulations remain unclear.

Data obtained as a result of cytometric measurement of CD56 and CD16 expression in NK cells was analysed. Depending on the disorder, patients were divided into 5 groups: DiGeorge syndrome, selective deficiency of IgA, non-familial hypogammaglobulinemia, acute lymphoblastic leukemia (ALL) and solid tumors. Based on the expression level of CD56 and CD16 five subpopulations of NK cells were isolated: CD56dim CD16-, CD56bright CD16dim, CD56dim CD16bright, CD56- CD16bright.

The percentage of patients with reduced level of NK cells were more than twice as many in case of secondary immunodeficiencies compered to patients with primary immunodeficiencies (68.2% vs 30.8%, p=0.04). The highest percentage of cases with increased level of NK cells were found in DiGeorge syndrome patients, while the highest percentage of patients with reduced level of NK cells was found in cases of ALL and solid tumors.

The results indicate that levels of NK cells and their subpopulations differs in studied types of immunodeficiency. Patients with secondary immunodeficiency have more frequently reduced levels of NK cells than patients with primary immunodeficiency and DiGeorge syndrome patients are characterized by an increased number of NK cells.

## Keywords:

NK cells, immunodeficiency





## THE ATTITUDE OF SOCIETY TOWARDS PHYSICAL ACTIVITY

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## A few words about the authors:

Magdalena Jańczyk – a student of Bachelor's degree studies in electroradiology at the Medical University.

Ilona Samek – a student of Bachelor's degree studies in electroradiology at the Medical University.

Anna Wójcik – a radiographer.

#### Abstract:

INTRODUCTION: Physical activity is one of the elements of a healthy lifestyle. It is associated with several goals for which more and more people are reaching. It has a positive influence on the physical and spiritual sphere.

AIM: To present the attitude of society towards physical activity.

Material and methods: The research was conducted by means of a standardized questionnaire. 198 questionnaires were collected and analysed.

RESULTS: Men and women took part in the study. The analysis shows that 30.3% of the respondents participate in organized movement activities. On the other hand, 63.6% of all the respondents are involved in physical activity on their own. They most often choices are cycling (30.3%) and gym (30.3%), and the rarest are walking (2%) and yoga (2%). Nearly half of them participate in physical forms regularly. Seasonal activity is presented in a different way, as 70.7% of respondents do not undertake it. The analysis also showed 1/3 of the respondents admit that the most important goal is health. The respondents also indicated the following as very important: good mood, condition and shapely figure. They are convinced that the chosen goals are worth a lot of personal effort. Most of them are sure that their efforts will be fruitful.

CONCLUSIONS: The data suggest that society undertakes physical activity that varies according to individual preferences. However, most people among all the activity goals indicate health.

## **Keywords:**

activity, movement, society, goal





## SOCIAL EVALUATION OF PROFESSIONAL BURNOUT SYNDROME AMONG DOCTORS

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Ilona Samek – a student of Bachelor's degree studies in electroradiology at the Medical University.

Anna Wójcik – a radiographer.

## Abstract:

INTRODUCTION: Professional burnout syndrome affects a growing number of workers who have contact with other people. It is characterized by emotional exhaustion, lowered feeling of individual realization and dehumanization. Doctors are one of the most frequently associated professional groups with this syndrome.

AIM OF WORK: To present professional burnout syndrome of doctors in the assessment of society.

MATERIAL AND METHODS: The study was conducted with the use of author's questionnaire. 210 questionnaires were collected and analysed.

RESULTS: Men (29%) and women (71%) of different age groups took part in the study, of which nearly 40% studied or are studying medicine. The analysis showed that the majority of opinion leaders noticed the problem of professional burnout syndrome among doctors (65.2%). This opinion was confirmed by people from the medical community (72.4%). The research revealed that almost 60% of respondents with post-secondary or vocational education saw symptoms of this syndrome. It was also noticed by as many as half of the respondents in the group under 19. The respondents also pointed out the lack of a sufficient number of doctors (91.9%), which could contribute to their progressive professional burnout.

CONCLUSIONS: The data suggest professional burnout of doctors in public opinion.

## Keywords:

burnout, society, doctor, medicine, image





## DIABETIC NEUROPATHY – THE MOST COMMON CHRONIC COMPLICATION OF DIABETES MELLITUS. SYMPTOMS, DIAGNOSTICS AND TREATMENT

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## A few words about the authors:

We are PhD students of Wroclaw Medical University interested in various medical issues.

#### Abstract:

Diabetes mellitus is one of the most common chronic diseases. It is a health and economic problem. The incidence of diabetes has quadrupled worldwide since 1980. This problem also applies to our country - between 2013 and 2018 the incidence of diabetes increased by 13.7% among adults. Longstanding diabetes leads to serious organ disorders. The most common chronic complication is neuropathy – the presence of symptoms of nerve dysfunction. Due to the number of diabetes patients it is very important to interpret clinical symptoms correctly.

We can distinguish chronic sensorimotor polyneuropathy and autonomic neuropathy. The first one is characterized by symptoms such as pain, numbness, tingling, paresthesias, hypersensitivity to touch, weakness of muscle strength. In patients with such symptoms, superficial and deep sensation should be assessed. Autonomic neuropathy is connected with autonomic nerve fibres, which are responsible for organ innervation. We can distinguish cardiovasculary, gastrointestinal,optic and urogenital neuropathy and disorders of perspiration, taste and internal secretion. The prevention and treatment of diabetic neuropathy is based on the glycemic control. In the case of paintful polyneuropathy antiepileptic drugs, SSRI, opioids, alpha-lipoic acid are used. The treatment of autonomic neuropathy is associated with the control of tachycardia, orthostatic hypotonia, gastroparesis, neurogenic bladder, impotence, disorders of perspiration.

## **Keywords:**

neuropathy, polyneuropathy, diabetes mellitus





## CONSUMPTION OF CAFFEINE-CONTAINING DRINKS BY NURSING STUDENTS

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We are nursing students. We belong to an association of students "honorary blood donors and potential bone marrow donors".

#### Abstract:

Caffeine is an organic chemical compound found in coffee, tea and cocoa etc.. It is present in food from early childhood to old age. Everybody reaches for drinks containing this stimulating chemical every day, doing it consciously to increase the level of concentration or just for pleasure.

Drinks containing caffeine most often chosen by students are: instant coffee (35%), brewed coffee (26%) and black tea (23%). Respondents in 30% consume energy drinks during the week. The main reasons for reaching for drinks containing caffeine are: consuming them for pleasure (31%), willingness to increase concentration (21%) and taste values of drinks (21%).

Situations that increase the consumption of caffeine-containing products include: daytime sleepiness (32%), pre-exam/exams (18%) and tiredness (16%). A significant percentage of respondents (28%) believe that regardless of the situations they experience, they consume the same amount of caffeine drinks. Conscious consumption of increased amounts of caffeine achieves its desired effect in most situations (79%), however a significant percentage of respondents do not feel the assumed effect (21%).

## Keywords:

caffeine, students, coffee, tea, energy drink





## PASSIVELY SMOKED CIGARETTES AS AN EQUIVALENT OF THE AVERAGE CONCENTRATION OF PM 2.5 AND NO2 AND THEIR EFFECT ON LUNG CANCER INCIDENCE IN THE LUBELSKIE PROVINCE IN 2015-2017

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#### Abstract:

INTRODUCTION: Increased air pollution affects the development of many health disorders with an emphasis on the respiratory system. PM 2.5 and nitrogen dioxide ( $NO_2$ ) are main causes of respiratory and circulatory diseases resulting from epithelial destruction. Thanks to Saskia C. van der Zee publication, we could convert concentration of these pollutants into the number of passively smoked cigarettes. This allows an average person to easily realize seriousness of the smog.

MATERIALS AND METHODS: Microsoft Excel to analyse average year concentration of PM2.5 and  $NO_2$  (basing on database of the Polish Chief Inspectorate for Environmental Protection (2015-2017) and morbidity of lung cancer for Lubelskie province. Afterwards we compared them to WHO air quality guidelines global update 2005. To convert the concentration of pollutants to the number of passively smoked cigarettes, we used Microsoft Excel spreadsheet.

RESULTS AND CONCLUSION: We converted the data of PM 2.5 and NO<sub>2</sub> into the number of passively smoked cigarettes. We received the following results: in 2015- 5.7 cigarettes, in 2016- 5.2. in 2017- 5.4

In these years, the incidence of lung cancer was as follows: 2015-1011; 2016-1037; 2017-1053.

According to our data in these years national consumption of cigarettes was decreasing. This led us to a conclusion that an increase in the number of lung cancer patients must have been caused by different factors. The most obvious one seems to be pollution.

#### Keywords:

PM 2.5, NO<sub>2</sub>, lung cancer, air pollution





## SARS-COV-2 INFECTION IN CHILDREN

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All authors of this work graduated from Wrocław Medical University. This work was prepared as a part of their additional scientific activity associated with the current epidemiological situation.

## Abstract:

COVID-19 is the name of a respiratory disease caused by the SARS-CoV-2. There is currently a pandemic of this disease around the world. The aim of this work is to systematize knowledge about its course in pediatric patients.

Available publications on the course of the disease in children show that they are less likely to get infected with Covid-19 than adults. Patients under 19 constitute only 1.2-2% of infected.

The course of the disease is milder compared to adults, it is often asymptomatic or by very few symptoms. Children show less specific symptoms. The most common are: fever, cough, sore throat, pharyngeal erythema. Tachycardia and tachypnoe are moderately frequent. Rare symptoms include diarrhea, vomiting, fatigue, rhinorrhea, nasal congestion. The disease prognosis is better than in adults. Only about 2% of children suffer from COVID severely and may require intensive care. Deaths concern individual children, mainly in the course of other accompanying and severe diseases. In the majority of cases children get infected from other family members. All patients with symptoms of SARS-CoV2 infection require symptomatic treatment. There is no proven causative treatment supported by clinical trials. One of the possible therapeutic options presented by PTEiLChZ is the use of chloroquine in combination with azithromycin. Due to the fact that we are in the middle of a COVID-19 disease pandemic, we should keep track of emerging publications and recommendations updates.

## Keywords:

pediatrics, SARS-CoV-2 infection





## ENDOMETRIOSIS AND AN INCREASED RISK OF MALIGNANCIES

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## A few words about the authors:

I am a fourth year student of medicine at the Medical University of Lublin. Together with Magda, Anna, Ewa and Mateusz we are active in the epidemiological students association and create medical articles.

#### Abstract:

INTRODUCTION: Endometriosis is a common gynaecological disorder associated with pelvic pain and sub-fertility, affecting 10–15% of women of reproductive age . The disease is defined as the presence of endometrial-like tissue outside the uterine cavity, primarily on pelvic organs. Endometriosis may have a significant impact on a patient's quality of life. Moreover, several studies have consistently shown that endometriosis is associated with a higher risk of some types of malignancies.

MATERIALS AND METHODS: The aim of the study is to assess the increased risk of certain malignancies in patients with endometriosis. The available publications from the Google Scholar and PubMed were analyzed.

RESULTS: Endometriosis shares several molecular characteristics with invasive cancer, such as inflammation, tissue invasion, angiogenesis, dysfunction of immune cells and prosurvival features. Ovarian cancer, especially clear cell, endometrioid and serous histology, has been associated with endometriosis. The risk of cancer of the uterine cervix has shown to be decreased and the results on the risk of the uterine corpus or breast cancers vary. Of the non-gynecological cancers, melanoma of the skin, non-Hodgkin-lymphoma, brain, thyroid and kidney cancers have also been associated with endometriosis.

CONCLUSION: Women with endometriosis have an increased risk for some types of malignancies, therefore, they should be under strict gynecological control, even many years after menopause.

## Keywords:

endometriosis, risk, cancer





## THE CONFRONTATION OF PROTON BEAM THERAPY AND OTHER METHODS IN NON-SMALL-CELL LUNG CANCER TREATMENT

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## A few words about the authors:

Michał Szymoniuk, Krzysztof Lider, Bartłomiej Pastuszak – medical school, 2nd year. Karol Ciejka – dentistry, 2nd year; medical school, 1st year. Jan Błaszczyk – dentristy, 2nd year. Supervisior: Halina Piecewicz-Szczęsna, MD-PhD.

## Abstract:

INTRODUCTION: Ever since proton beam therapy (PBT) was technically improved and proper doses worked out, there is no significant side effects of X-ray radiotherapy. PBT has been used especially in cancer treatment localised in the most important organs and surroundings of essential anatomical structures due to considerably lesser irradiation of normal tissue. Non-small-cell lung cancer (NSCLC) is one of them.

AIM: This review presents PBT on the background of other NSCLC treatment methods in order to find the safest and the most effective one. A confrontation has been achieved after overview of PubMed base.

RESULTS: Sharp distal dose fall-off and sharp lateral dose fall-off make proton beam therapy safer than X-ray radiotherapy. The safety and effectiveness of PBT have been proved by researches in a juxtaposition of PBT and a surgery of NSCLC. Moreover, PBT is safe and effective for patients who are older than 79 years old, even in cases of inoperable lung cancer. On the other hand, the immunotherapy with pembrolizumab increases time of cancer progress inhibition, makes better health condition during term of a treatment and prelongates patient's life span. A monotherapy reduces side effects of a treatment compared with platinum-based chemotherapy.

CONCLUSION: PBT is safe and effective treatment method of NSCLC for patients in every age. Among other methods immunotherapy stands out, with less side effects than a chemotherapy.

## Keywords:

NSCLC treatment, proton beam therapy, immunotherapy





## **DEPRESSION IN ONCOLOGICAL PATIENTS**

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#### A few words about the authors:

We are a group of medical students, fascinated by science and its various aspects and faces.

#### Abstract:

Depression is a group of psychiatric disorders manifested by depressed mood, anhedonia or psychomotor slowdown. It often affects oncological patients. Its development among patients is significantly influenced by the method of treatment or its side effects, lack of support, physical suffering and fear of death. In many cases, depression is not diagnosed and therefore not treated, which reduces patients' quality of life. The purpose of this review is to analyze available research on depression in cancer patients. For this purpose, a review of the scientific literature, which appeared in PubMed. Patients with AML and depression showed shorter survival. In the case of AML, the presence of depression has an influence on management and prognosis. Studies on breast cancer patients suggest that education has a positive effect on depression and its symptoms. For patients with hepatocellular carcinoma, comprehensive care and education reduce depression, improve the condition, and be associated with longer survival. Studies in patients with non-small cell lung cancer suggest that depression has a negative effect on disease-free survival. Diagnosis and treatment of depression in oncological patients is important. This increases their quality of life, has an impact on the proceedings and prognosis. However, more long-term research is needed regarding the effects of neoplasms on mental aspects and which form of treatment gives the best results and causes the least side effects.

## **Keywords:**

depression, neoplasms, cancer





## SPECIFIC MARKERS IN THE DIAGNOSIS OF GASTROENTEROPANCREATIC NEUROENDOCRINE TUMORS

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I am a PhD student at Department of Medical Biology and Biochemistry. Medical biology is our passion.

## Abstract:

Gastroenteropancreatic neuroendocrine tumors (GEP NETs) are a heterogeneous group of tumors originating from diffuse neuroendocrine cells. They occur anywhere in the digestive tract and in the pancreas and constitute 50-70% of all neuroendocrine tumors. They are divided into functional and non-functional tumors. The concentration of tumor-specific hormones should be determined in patients with clinically manifest of GEP-NET secretive symptoms. Inactive tumors do not release enough hormones and/or biogenic amines to cause specific symptoms. Measurement of specific markers that are produced by GEP-NET cells enables reliable diagnosis, monitoring of treatment and in some cases prognosis of the disease. Somatostatin and gastrin exhibit the highest specificity for ancestors of the anterior pritaita, and for the middle intestine, serotonin and 5-hydroxyindole acetic acid. In the case of posterior prelate, YY peptide and somatostatin have average specificity. Measurements of gastrin, insulin, proinsulin, glucagon, somatostatin or vasoactive intestinal peptide are used to diagnose functional pancreatic tumors. For inactive pancreatic tumors, a specific marker appears to be a pancreatic polypeptide. Diagnosis of inactive GEP-NET can be delayed by up to 5-7 years, which is associated with the detection of cancer already in the metastasis process.

## **Keywords:**

gastroenteropancreatic neuroendocrine tumors, specific markers, 5-hydroxyindole acetic acid, somatostatin





## THE ROLE OF INFLAMMATION IN THE DEVELOPMENT OF GASTROENTEROPANCREATIC NEUROENDOCRINE TUMORS

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#### Abstract:

Gastroenteropancreatic neuroendocrine tumors (GEP NETs) constitute about 2% of all gastrointestinal cancers. Epidemiological data in the United States of America indicate a 500% increase in the incidence of neuroendocrine tumors over the past 30 years, which may be associated with the development and greater availability of modern imaging techniques. However, markers that would allow diagnosis at an early stage of GEP-NET are still being sought.

Inflammation plays a key role in carcinogenesis through the appearance of regulatory compounds in the tumor microenvironment that control proliferation, apoptosis and angiogenesis. An analysis of the literature and research to date suggests that chronic inflammation may contribute to the development of GEP-NET, mainly due to the strong vascularization and associated intensive production and release of growth factors and cytokines. However, research into determining the role of inflammation in neuroendocrine tumors is still ongoing. It is suggested that chronic inflammation, which probably together with other factors initiates, maintains or accelerates the growth of GEP-NET may be of interest as part of the discovery of effective therapy by appropriate modulation of the immune system.

## **Keywords:**

gastroenteropancreatic neuroendocrine tumors, inflammation, growth factors, cytokines





## ASSESSMENT OF THE RELATIONSHIP BETWEEN URINARY INCONTINENCE AND THE WAIST-HIP RATIO IN WOMEN AT THE NURSING HOME

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Magdalena Ptak and Agnieszka Turoń-Skrzypińska – Researcher's at Department Medical Rehabilitation and Clinical Physiothe.

#### Abstract:

INTRODUCTION: Urinary incontinence (UI) is a social problem affecting up to 423 million people worldwide. UI is associated with android and gynoid distribution of adipose tissue. The aim of the study is to assess the relationship between UI and the Waist-Hip Ratio (WHR) among women living in a nursing home (NH). The research hypothesis assumed that the android body type affects the occurrence of UI in older women who live in a NH.

MATERIAL AND METHODS: The study group consists of 50 women >60 years of age living in the NH in Szczecin. The study was conducted using a standardized Gaudenz questionnaire, supplemented by an original survey. The necessary anthropometric tests were performed to obtain body mass index (BMI) Waist-Hip Ratio (WHR).

RESULTS: 94% of respondents have UI symptoms. No statistical significance of the WHR index effect on UI was demonstrated. The largest group were subjects with stress urinary incontinence (SUI) with an android distribution of adipose tissue. Among the subjects with gynoid distribution of tissue the largest group were respondents with overactive bladder syndrome (OAB) of 5 people.

CONCLUSION: Although the results of all UI types were higher in women with the android body type, there was no significant difference to the gynoid body type. Women with an android body type more often declared SUI than women with a gynoid body type. It was not a statistically significant difference.

## **Keywords:**

urinary incontinence, distribution of adipose tissue, body type, older women





## ANTI-NUCLEAR ANTIBODIES AND THEIR ROLE IN THE DIAGNOSIS OF AUTOIMMUNE DISEASES

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## A few words about the author:

Sebastian Mertowski – PhD student at the Medical University of Lublin, I carry out my work at the Department and Clinical Immunology. My interests are non-specific immunity and its relationship with autoimmune diseases and kidney diseases.

## Abstract:

Autoimmune diseases are associated with immune response directed against the host cell is a challenge for modern medicine. Most autoimmune diseases have a complex pathogenesis, etiopathogenesis as well as a specific course in each patient. Therefore, timely diagnosis and initiation of treatment are important. In the diagnosis of autoimmune diseases, a so-called Anti-nuclear antibodies assay is used in the patient's peripheral blood, which, in combination with appropriate knowledge and other tests, can help in making a quick and correct diagnosis. In healthy people, low levels of these antibodies can be detected in peripheral blood, whereas in Lupus, Rheumatoid Arthritis or Sjögren's Syndrome, the titer is significantly increased. Therefore, in combination with other tests, they are an important diagnostic indicator in the case of autoimmune diseases. Positive ANA titres less than 1:160 occur in 20% of the healthy population, especially the elderly. However, positive titers of 1:160 or higher are strongly associated with autoimmune disorders. This type of research helps predict disease progression and a positive ANA test supplements clinical or laboratory data confirming the diagnosis, which allows faster application of correct treatment.

## **Keywords:**

antinuclear antybodies, autoimmune diseases, diagnostic





## COLORECTAL CANCER – NEW TRENDS IN DIAGNOSTICS, TREATMENT AND THEIR SURVIVAL PROGNOSTIC VALUE

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Jan Skarbimir Milanowski is a second-year student of pharmacy at Collegium Medicum, Nicolaus Copernicus University; since last year working at the Students Research Club of Medical Biology. Interested in rheumatic diseases and new tumor markers.

## Abstract:

Every year, colorectal cancer contributes to the deaths of millions of people around the world. About 90% of patients are 50 years old and older. To increase the patient chance of survival, several factors are necessary, including fast and accurate diagnostics, as well as properly selected treatment that will damage healthy tissue as little as possible and supports a quick recovery.

In addition to well known techniques as traditional colonoscopy or assessment of markers such as M2 pyruvate kinase isoenzyme (Tumor M2-PK) and carcinoembryonic antigen (CEA), scientists are trying to find newmarkers and increase access to non-colonoscopy diagnostics. Studies on the potential value of markers such as cyclin-dependent kinase 1 (CDK1) and celldivision cycle protein 20 (CDC20) are very useful, which contributes to a better understanding of colorectal cancer pathomechanism. The fecal immunochemical test (FIT) avoids colonoscopy problems. Research on the potential of the determination of serum vitamin D receptor (VDR) concentration as well as the correlation between VDR and calcium ions also seem very promising. To avoid complications from chemotherapy, radiotherapy and surgical interventions, the use of peptides and bacterial toxins, which in the future may form the basis in the fight against colorectal cancer, is becoming increasingly important.

Finding new diagnostic and prognostic markers for colorectal cancer will improve the quality of life and higher survival rate of patients.

## Keywords:

Bacterial toxins, colorectal cancer, FIT, oncology, tumor markers





## ANTIOXIDANT PROPERTIES OF VITAMIN D – ANALYSIS OF THE LATEST RESEARCH

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Jarosław Nuszkiewicz is a PhD student at Faculty of Medicine, Ludwik Rydygier Collegium Medicum in Bydgoszcz. Interested in oxidant/antioxidant balance, role of vitamin D and melatonin in homeostasis.

## Abstract:

Vitamin D is a group of organic chemical compounds belonging to secosteroids which show a pleiotropic spectrum of biological effects. Calcitriol (1,25-dihydroxycholecalciferol) is a hormonally active form of vitamin D and its main role is to regulate calcium and phosphate metabolism and maintain the correct structure of the skeletal system. Despite the supply with diet, in vivo synthesis plays the most important role in maintaining the proper concentration of this vitamin. Recent years have brought many advances associated with vitamin D – researchers indicate to the presence of nuclear vitamin D receptor (VDR) in almost all tissues and its influence on the expression of numerous genes.

The role of vitamin D as an antioxidant raises a lot of controversy and ambiguity. The results of conducted studies are not conclusive. Vitamin D, acting through VDR, can stimulate the expression of genes encoding for antioxidant enzymes such as superoxide dismutases and glutathione peroxidases. It has also been confirmed that calcitriol and its precursors after exposure of the skin to ultraviolet light increase p53 levels, which reduces intracellular reactive oxygen species (ROS) production. In addition, calcitriol has been shown to induce metallothionein - a ROS scavenger. Some research groups reported that the levels of malondialdehyde, lipid peroxidation marker, negatively correlated with serum vitamin D concentration. However, few studies negate the antioxidant properties of vitamin D.

## Keywords:

antioxidants, calcitriol, oxidative stress, reactive oxygen species, vitamin D





## THE EFFECT OF GINSENG ON THE TREATMENT OF TYPE 2 DIABETES

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#### A few words about the authors:

We are young and ambitious scientists. We are mainly interested in medicine and clinical dietetics. Doctor of Medicine – Damian Skrypnik is the author of many scientific studies in prestigious medical journals.

## Abstract:

Diabetes mellitus 2 (DM2) is a metabolic disease which primary cause is tissue insulin resistance. DM2 is diagnosed when fasting blood glucose is at least 126 mg/dl in two different measurements; or accidental glycaemia is  $\geq$ 200 mg/dl in the presence of symptoms of hyperglycaemia; or glucose in the second hour of the 75g oral glucose tolerance test is  $\geq$ 200 mg/dl. Treatment of diabetes mellitus 2 includes pharmacotherapy, diet therapy, exercise, as well as patient education. Herbs e.g. ginseng (lat. Panax ginseng) can also be helpful in DM2 therapy. It is grown mainly in the eastern subregion of Asia (China, Korea, Japan), New Zealand and North America (USA, Canada). Depending on the plant's age, harvesting time and storage process, different amounts of ginsenosides are obtained. Ginsenosides are bioactive ingredients dominating in ginseng, the supply of which reduces blood glucose. Ginsenosides may interact with metformin, resulting in increased antihyperglycaemic activity. The aim of the presentation is to discuss the use of ginseng in the treatment of type 2 diabetes.

## **Keywords:**

diabetes mellitus 2, Panax ginseng, phytotherapy





## **SLEEP DISORDERS IN PATIENTS WITH CANCER**

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#### A few words about the authors:

We are a group of medical students working mainly in the field of epidemiology.

## Abstract:

Sleep disorders are common yet still frequently omitted problems affecting patients with cancers. They appear as insomnia, interrupted sleep, trouble falling asleep or worsened sleep quality. They are mostly related with breast, prostate, lung and head/neck neoplasms but can also develop in other types of tumors. In this study we tried to show the relationship between neoplastic diseases and sleep problems and explain its possible explanations. As a material we used papers published in PubMed, Scopus and Google Scholar databases in years 2015-2020. Results indicate that breast cancer seems to have the strongest correlation with sleep disorders. Some studies state that they may begin even before the disease is diagnosed. One of them, focused on the treatment effects, revealed significant differences between tumor types and various forms of therapy. Despite all these findings, specific mechanisms of the phenomenon still remain unclear. Nonetheless we should still remember about other factors like higher risk of depression among these patients or frequent side effects of numerous therapies. In conclusion cancer and sleep disorders are undoubtedly linked and it should be taken into consideration when thinking about oncological treatment. This would not only enhance its effectiveness but will surely improve overall quality of life among patients as sleep is crucial for our physical and mental health.

## **Keywords:**

sleep, insomnia, cancer




# NON-ALCOHOLIC FATTY LIVER DISEASE - 21ST CENTURY EPIDEMIC. MODERN THERAPEUTIC OPTIONS

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#### Abstract:

Non-alcoholic fatty liver disease (NAFLD) is the most common cause of chronic liver disease in Western countries. NAFLD is defined as a finding of steatosis in >5% of hepatocytes in histological examination. It is not only associated with liver disease, but is a multi-systemic disease. For example, NAFLD increases the risk of type 2 diabetes mellitus (T2DM), cardiovascular disease (CVD), heart disease and chronic kidney disease (CKD). Although primary liver pathology in NAFLD affects the structure and function of the liver, causing morbidity and mortality from cirrhosis, liver failure and hepatocellular carcinoma, most deaths among NAFLD patients are caused by CVD. At present, there is no specific treatment. A lifestyle change is used as a first-line treatment. It is also possible to supplement vitamin D, omega-3 acids, but their effect is not proven. NAFLD with developed cirrhosis is one of the three most common indications for liver transplantation. It is important to know the essence of the disease and determine the treatment pathway for NAFLD, especially since it is such a common disease.

#### Keywords:

non-alcoholic fatty liver disease (NAFLD), NAFLD treatment, cardiovascular disease (CVD)





# DRUG AUTHENTICITY BY MEANS OF NMR RELAXOMETRY

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#### A few words about the author:

I am a PhD student in Medical University of Silesia. The purpose of research was assessment the physicochemical properties of selected drugs. The research was conducted in cooperation with Pellegrino Conte, Danuta Pentak and Anna Micalizzi.

#### Abstract:

Expiration date of pharmaceutical products is one of the most important information that determines the safety of their use. The suitability of drugs for consumption isn't limited only by the expiration date, but also depends on the storage conditions. Significant influence on the stability of the product have among others, high temperature, humidity and light radiation. Treating patients with partially degraded medications is associated with the likelihood of reducing the therapeutic response and in the worst case, it can even lead to death.

The use of UV-VIS spectrophotometry, spectrofluorimetry and circular dichroism spectroscopy enables, among others, determining the ability, type, location, strength of binding of a non-overdue and expired drug with human serum albumin. Supplementing studies by using FC NMR relaxometry gave the opportunity to study dynamical and structural differences between drugs depending on their expiration date.

For the study three non-expired (fresh) and expired pharmaceutical products were used Acard (exp 01.2020; 05.2015), Aspirin C (exp 08.2019; 04.2016), Aspirin Pro (exp 10.2019; 10.2014). In the composition of each medicine were acetylsalicylic acid and various excipients.

Based on the obtained results, it can be concluded that there are large differences distribution of relaxation time and longitudinal relaxation time between non-expired and expired drugs.

#### **Keywords:**

NMR relaxometry, drug, acetylsalicylic acid





# PHYSICAL REHABILITATION OF PATIENTS WITH COVID- 19, FULLY HEALTHY AFTER TREATMENT FROM THE POINT OF VIEW OF A PHYSIOTHERAPIST

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#### A few words about the author:

Future doctoral student.

#### Abstract:

In most cases, the infection is mild and the body is good at it. Symptoms similar to those found in the course of a cold or flu appear. They may go away after a few days. From the appearance of the first symptoms to clinical recovery in people with a mild infection, it is 2 weeks. If it affects the lungs, you have to reckon with a longer recovery period. Cure up to 6 weeks, people with very severe infection do not recover until after a few months. They are treathed in the intensive care unit, where their respiratory functions support lung ventilation devices. It can affect the heart and blood vessels. There are treathed in the intensive care unit, where their respiratory functions support lung ventilation devices. It can affect the heart and blood vessels. There may be an intense inflammatory reaction. Hong Kong doctors said that 2-3 out of 12 patients after recovery from COVID - 19 had a 20-30 percent decrease in lung function. Respondents can do aerobic exercise, swimming to improve lung function. The purpose of the work is to analyze the hypotheses. Review study and analysis of published findings. Review of articles allows analyzing questions whether the choice of Hong Kong doctors this form of movement is good for patients with COVID- 19. Aerobic training is an exercise recommended for people who are slimming and for those who want to increase their fitness. Everyone can swim, it can be a form of rehabilitation. Is the basis of weight loss for many people.

#### **Keywords:**

infection, ventilation devices, aerobic training, swim, rehabilitation





# INFLUENZA AS A DISEASE OF GENERATIONS - ANALYSIS OF KNOWLEDGE ABOUT SYMPTOMS, TREATMENT AND PREVENTION IN DIFFERENT AGE GROUPS

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#### Abstract:

Infections caused by RNA Influenza virus are still a serious health problem. Flu as a acute disease is often neglected and considered as benign. It affects millions of people every year and sometimes leads to the "post-influenza complications", including deaths. Among the numerous methods of disease prevention, the most important is annual vaccination, which is the best taken before the autumn-winter period. The aim of the study was to analyze the state of knowledge about symptoms, complications and prophylaxis of flu among people of different age groups. Materials and Methods: original questionnaire was filled by 204 people. The group has been divided: Group A - people between 18- 39 years (129); Group B- people in their 40's and older (75). Results and Conclusion: The analysis of the results allows to conclude that symptoms most commonly associated with influenza such as myalgia, headache, high fever or chills are recognized by most respondents of all ages. Only a few of them are aware of multiple complications of this disease. In both groups only 36% answered, that have been vaccinated at least once in a lifetime. An alarming issue is people still rarely reach for it despite of awareness of the possibility of vaccination. Knowledge about the influenza is varied, often incomplete, which relates the proportion of patients using specific and non-specific prevention. Thus there is a constant need to educate the society about symptoms, treatment and prophylaxis of influenza.

#### **Keywords:**

influenza, influenza virus, flu





# TOOTHBRUSHES AS A SOURCE OF MICROBES AND POTENTIAL OF DISINFECTION METHODS IN REDUCING MICROBIAL CROSS-CONTAMINATION

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#### Abstract:

Toothbrushes (TB) are used to maintain oral hygiene but daily contact of it with the oral cavity and the external environment, including toilet, hands, creates the risk of microbial transmission to the oral cavity. The aim of the study was to discuss current scientific reports of TB contamination and their disinfection methods. Methods: Review of available research papers. Results and Conclusion: Studies evaluate TB should be treated as a microorganisms habitat. Germs can live on TB and may show high pathogenic potential, eg. Pseudomonas spp., Klebsiella spp., Staphylococcus aureus, Streptococcus pyogenes; Lactobacilli spp. and yeasts. Scientists suggest possible routes of transmission: between upper respiratory tract and TB; between the toilet area and the TB. TB stored next to the toilet are often contaminated by Escherichia coli. Storing together many TB from different people can lead to crosstransmission. A significant reduction in the bacterial population of the dental plaque is observe in disposable TB use but frequent replacement is expensive. Rinsing the brush with clean water is not sufficient but using 3% H<sub>2</sub>O<sub>2</sub>, 2% NaOCl, Chlorhexidine and rinses with essential oils are effective one. As well exposure to a UV lamp designed for it. In summary toothbrushes can be the source of microbes especially fecal germs. Transmitted to the oral cavity create danger for predisposed patients. Storage environment and disinfection are essential in infection prevention.

#### **Keywords:**

toothbrush, cross-contamination, disinfection methods





# THE SYNERGISTIC EFFECT OF PELVIC FLOOR MUSCLES CONTRACTION ON TRANSVERSE ABDOMINAL MUSCLE ACTIVITY - SEMG OBSERVATION

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#### Abstract:

Many muscles in human body are in a cooperation with other components belonging to the same anatomic complex. This is also expected between pelvic floor muscle (PFM) and abdominal wall muscle activity, co-creating the abdominal press. The following research verifies if intentional PFM contraction affects the activity of transverse abdominal muscle (TrA) in surface electromyography (sEMG) observation. Fourteen nulliparous women between the ages of 19 and 32 were recruited for the reaserch and examined with sEMG method using a surface electrode placed on the TrA. The examination was performed during relaxation and intentional pelvic floor muscle contraction in standing and sitting position. The results received by the sEMG device were analyzed. The activity of TrA during PFM contraction increased in both positions, however only in the standing posture the result was statistically significant. More research on a bigger group is recommended to verify the hypothesis.

#### **Keywords:**

transversus abdominis muscle, pelvic floor, surface electromyography





# EFFECTS OF CAFFEINE ON HUMAN HEALTH

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All autors are studying in Medical University of Lublin, Faculty of Medicine, Poland. They are active member of of Student Research Circle at the Epidemiology and Clinical Research Methodology.

### Abstract:

Telemedicine is a branch of medicine that allows distant communication and consultation with a patient. It is a combination of IT, telecommunication and medicine. Appropriate telecommunication infrastructure is needed for the rapid development of telemedicine. The progress of teleinformatics will enable the creation of quick medical notification and consultation with an integrated laboratory diagnostic system. As a result of the implementation of the system of comprehensive medical diagnostics, doctors have the opportunity to monitor the treatment more effectively and and to control patients' therapy. Moreover, the efficiency of diagnosis and a patient's access to specialist tests will improve. The costs of treatment will decrease. The amount of paperwork which is now obligatory will also be reduced and thus the work of family doctors will become more satisfying. Nowadays, in the practice of a general practitioner, the use of e-prescription and e-referral is known. Telehealth proved to be an effective mode for the provision of diabetes care. The National Health Fund has started reimbursing remote services provided by specialized medical care and outpatient clinic. The refund of benefits will significantly contribute to the development of telemedicine as well as to the implementation of new technologies. Certainly, the development of further solutions has a huge potential in the future.

#### **Keywords:**

telemedicine, telecomunication, medicine, new solution, epidemy





# A PATIENT WITH ANOREXIA NERVOSA AND HYPOVITAMINOSIS D3 – CASE REPORT

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#### Abstract:

INTRODUCTION: In contrast to other mental disorders, eating disorders have significant medical complications which can adversely affect almost every body system. Eating disorders have been noted to have the highest mortality of all mental illnesses, with mortality in anorexia nervosa reaching 6% per decade.

CASE REPORT: A 17-year-old patient achieving very good academic results and maintaining good relationships with friends was consulted psychiatrically on an outpatient basis due to eating disorders. The beginning of disorders took place in November 2018, in the form of quantitative and qualitative restriction of food intake, intensive physical exercise, provoking vomiting and using laxatives. On the day of admission, 13.10.2019, the patient's body weight was 35 kg with a height of 163 cm and BMI 13. Moderate vitamin D3 deficiency was found in laboratory tests. The following pharmacological treatment was used: Devikap, Bebilon, Nutridrink, Flegamina, Cerutin, Faringosept and Lacidofil. On the day of discharge (1st of April 2020), the patient's weight was 43.26 kg. It was recommended to continue treatment, undertake individual and family psychotherapy and to lead a healthy lifestyle.

CONCLUSIONS: Basis of therapeutic process is individual and family psychotherapy in adolescents, compensation of food deficiencies and learning proper eating habits. A better understanding of pathophysiology of illness can provide a key for developing more beneficial treatment.

#### Keywords:

anorexia nervosa, hypovitaminosis D3





# REMDESIVIR – THE MOST PROMISING ANTI – SARS-COV-2 AGENT

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### A few words about the authors:

All authors of this work are the PhD candidates in 2nd and 3rd year of full-time doctoral studies at Wrocław Medical University. Zuzanna Sycz, a presenting person, performs PhD thesis experiments in the field of medical biology and microbiology.

### Abstract:

There is currently a world pandemic of COVID-19, which etiological factor is SARS-CoV-2. Unfortunately, there is no vaccine or any targeted treatment for COVID-19. Only symptomatic, supportive and experimental treatment according to local guidelines is used. Therefore, it is necessary to conduct research into chemical compounds that may prove to be potential agents against SARS-CoV-2 coronavirus.

Currently, the best promising drug against COVID-19 is remdesivir (GS-5734), developed by Gilead Sciences Inc. while looking for a medicine for the Ebola virus. The remdesivir's mechanism of action is hypothetical, however, it has been established that the drug competes with its ATP analogue and is instead incorporated into viral RNA by RNA-dependent viral RNA polymerases (RdRp), which results in inhibition of viral genome replication in patient cells. Remdesivir activity against various RNA-viruses was confirmed in pre-clinical in vitro and in vivo studies. Recent in vitro studies have shown that this drug works against SARS-CoV-2 in a human cell line. Remdesivir is currently at the stage of multicenter, randomized and controlled phase III clinical trials that will be completed in May 2020. Their goal is to evaluate the efficacy and safety of this drug in patients with COVID-19. Despite the lack of registration, remdesivir was already given to the first patient who was confirmed to have COVID-19 in the USA, and lead to a cure in the absence of side effects.

### **Keywords:**

remdesivir, GS-5734, coronavirus, SARS-CoV-2, COVID-19





# PUBLIC OPINION ABOUT INTRODUCTION OF MANDATORY VACCINATION AGAINST HUMAN PAPILLOMA VIRUS IN POLAND

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#### A few words about the authors:

Michał Szymoniuk, Krzysztof Lider, Bartłomiej Pastuszak – medical school, 2nd year. Karol Ciejka – dentistry, 2nd year; medical school, 1st year. Jan Błaszczyk – dentistry, 2nd year. Supervisor: Halina Piecewicz-Szczęsna, MD.

#### Abstract:

INTRODUCTION: HPV (Human Papilloma Virus) is highly-oncogenic virus and represents main cause of cervical cancer incidence. Countries where vaccination against HPV is a duty noticed 90% decrease of cervical cancer death rate after 10 years of vaccination programme. Therefore introduction of mandatory vaccination against HPV in Poland seems to be a good concept.

AIM: The aim of this research is to investigate public opinion about introduction of mandatory vaccination against HPV in Poland. For this purpose diagnostic survey was conducted, which was evaluated by polls questionnaire. 929 respondents took part in this research.

RESULTS: Among respondents only 9.3% was against mandatory vaccination. They mentioned risk of side effects as a main cause. Only 0.54% of respondents answered the knowledge questions correct. Furthermore 78.5% of answerers pointed incorrectly HPV transmission routes. 24.4% of respondents is vaccinated against HPV, mainly young people. 25% of investigated women use hormonal contraception, on the other hand 16.3% respondents is addicted to smoke cigarettes.

CONCLUSIONS: Presence of risk factors of cancers caused by HPV among respondents and low percent of vaccinated respondents suggest that introduction of mandatory vaccination against HPV is necessary. Contrarily minor knowledge about HPV transmission routes imply that more preventive activities is needed, especially among young people.

#### **Keywords:**

HPV, vaccination, cervical cancer





# DIABETES AND COVID-19: THE CLASH OF TWO GLOBAL EPIDEMICS

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All authors of the study are PhD students at Wroclaw Medical University. They conduct research in a wide range of subjects, but this study was prepared due to the current epidemiological situation.

#### Abstract:

Today, the world is struggling with the pandemic of severe acute respiratory disease, called COVID-19. The disease is caused by a previously unknown coronavirus SARS-CoV-2019. The clinical spectrum of COVID-19 is very broad, from no symptoms, moderate upper respiratory tract infection to severe pneumonia complicated by respiratory failure, multi-organ failure or sepsis. Hospitalization is usually required in people aged over 60 and those with significant underlying health conditions, especially cardiovascular disease and diabetes. Moreover, this group is at the highest risk of complications and death from COVID-19.

In our study, we present the current state of knowledge about COVID-19 in patients with diabetes. The aims of this paper are to (i) discuss risk factors for complications and deaths in the group of patients, and (ii) introduce the principles of prevention and management in case of illness. In addition to the general principles, there are a number of additional recommendations for diabetics. The patient should get detailed instructions about illness, treatment, self-control, how to cope with symptoms at home and what to do when his condition gets worse. Reliable and extensive education of both the medical staff and patients is essential for a successful outcome in the fight against pandemic. Early identification of high-risk patients, adequate preventive and therapeutic measures are key in achieving reduction in rates of complications and deaths.

### **Keywords:**

COVID-19, coronavirus, diabetes, pandemic





# EXPRESSION OF TRAIL IN ALVEOLAR LYMPHOCYTES IN SELECTED INTERSTITIAL LUNG DISEASES

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#### A few words about the authors:

PhD students at the Faculty of Medicine of the CM UMK, conduct research on the use of modern gene therapy techniques and immunotherapy in the treatment of many diseases, e.g. cancer, rheumatic or interstitial lung diseases.

#### Abstract:

The alveolar lymphocytes (AL) participate in pathogenesis of interstitial lung diseases (ILD) as sarcoidosis (PS), exogenous allergic alveolitis (EAA) and idiopathic pulmonary fibrosis (IPF). The system of tumor necrosis factor-related apoptosis-inducing ligand (TRAIL) and its death receptors also seems to participate in mentioned cases. The aim of the study was to evaluate the TRAIL/DR4 system in lower airways of EAA, PS and IPF. Results were related to BAL (bronchoalveolar lavage) cytoimmunological pattern and lung function tests to assess the potential role of AL-induced apoptosis in ILD lower airways. BAL material of 13 EAA, 35 PS, 9 IPF patients and 10 controls was examined for: standard cytoimmunology; AL staining for TRAIL, DR3, DR4, BCL-2 and Fas; TRAIL concentration (ELISA). TRAIL expression on AL was significantly higher in IPF and diminished in PS and EAA. Parallel results were obtained for BCL-2 expression. However, the highest soluble TRAIL levels were found in EAA and in IPF. In all groups DR3 and DR4 expression was extremely low, whereas near all AL were Fas+. Percentage of TRAIL+ AL but not soluble TRAIL, was correlated negatively with DLCO and vital capacity predicted values. In conclusion, TRAIL expression on AL does not seem to participate in their apoptosis, but may produce local lung tissue damage with subsequent pulmonary fibrosis.

#### **Keywords:**

TRAIL, interstitial lung diseases, bronchoalveolar lavage





# EVALUATION OF BRONCHOALVEOLAR LAVAGE FLUID FROM TOBACCO SMOKERS FOR SELECTED CYTOKINES AND THEIR RECEPTORS

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#### Abstract:

Cigarette smoking is the leading cause of lung tumors, due to induction of local mutagenesis. The aim of the study was to evaluate smoking impact on expression of selected cytokines and their receptors in bronchoalveolar lavage (BAL) fluid. BAL was harvested from patients with pulmonary sarcoidosis (PS), idiopathic interstitial pneumonitis (IIP) and control; subgroups of nonsmokers (NS) and smokers (S) were defined. The BAL supernatant levels of IFNγ, TGFβ, TNFα were tested with ELISA. Th and Tc cells were phenotyped for receptors expression: TGFβ, IFNy and CD120A, CD120B. In smoking patients, as compared to NS subgroups, significantly lower IFN $\gamma$  and TNF $\alpha$  levels were found. Increase of TGF $\beta$  level in IIP, as compared to PS and controls, was insignificant. Percentage of AL positive with TGFB and CD120A was higher in smokers; statistical significance (p<0,05) for expression of CD105 in IIP, CD120A in PS in IIP and in controls was shown. In conclusion, smokers, as related to NS groups, were characterized by lower expression of cytokines with potential anti-tumor role, IFN $\gamma$  and TNF $\alpha$ . Higher percentage of TGF $\beta$ + and CD120A+ AL in smokers suggests increased susceptibility for potential oncogenesis promoter, TGFB, as well as sensitivity to extrinsic apoptosis. As cytokines considered, the results do not confirm the view on Th1 response predominance in smokers and indicate unfavourable, in the context of carcinogenesis, local imbalance towards Th2 system.

#### **Keywords:**

bronchoalveolar lavage, smoking, cytokines, interstitial lung diseases





# THE USE OF INNOVATIVE TECHNOLOGICAL SOLUTIONS IN THE ASSESSMENT OF COLORECTAL CANCER IN CT COLONOGRAPHY

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#### Abstract:

INTRODUCTION: Computed tomography colonography (CTC) is an innovative, non-invasive radiological method that is gaining worldwide recognition in assessing colorectal pathology. Over the past 10 years, the mortality rate of colorectal cancer has decreased by more than 20% due to the rising developments in diagnostic techniques.

MATERIALS AND METHODS: The literature on the use of innovative technological solutions in CT colonography was analyzed. A review of the scientific literature indexed in the PUBMED database from the last 10 years was carried out.

RESULTS AND CONCLUSIONS: The introduction of dual energy computed tomography (DECT) clearly improved the diagnostic accuracy of CTC. The main advantage of DECT is the possibility of obtaining iodine maps and VNC. DECT allows you to monitor the results and extent of iodine capture on VNC and iodine map images, respectively, without using pre-recorded tomographic images. Pilot tests showed that DECT is an effective tool in CT colonography diagnostics and electronic colon loop cleaning after barium labeling. The use of the Computer Aided Diagnosis (CAD) algorithm in high energy tomography helps in the diagnosis and detection of intestinal tumors.

The development of modern technologies used in CT colonography proves that it is a safe and acceptable technique for patients. Lack of invasiveness, low radiation dose and high diagnostic efficiency of CTC may encourage more people to undergo colorectal cancer screening in the future.

#### Keywords:

CT colonography, colorectal cancer, DECT, CAD

# NATURAL AND TECHNICAL SCIENCES





# DAMAGE TO THE BEECH LEAVES (FAGUS SYLVATICA L.) IN THE CISOWSKO-ORŁOWIŃSKI LANDSCAPE PARK

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#### A few words about the author:

I am a fourth year biology student at the Jan Kochanowski University in Kielce. My research focuses on observing the occurrence of beech foliophages in the Świętokrzyskie Province. I am interested in zoology, botany and environmental protection.

#### Abstract:

One of the most important forest-forming trees on the European continent, including Poland, is the beech Fagus sylvatica L. Its leaves are a habitat for many organisms that can contribute to the deterioration of the development of this tree. We can observe in recent years that this tree is dying out. During research conducted in 2018 in the Cisowsko-Orłowiński Landscape Park, located in the Świętokrzyskie Province, 11 species of foliophages were found on beech leaves. They belonged to the orders: Diptera, Lepidoptera, Coleoptera, Hemiptera and Acari. Damaged leaves constituted 18% of the tested material. Understanding the biology of these foliophages is crucial in developing methods to work against these species to improve the condition of beech stands.

### **Keywords:**

beech, foliophages, plant pest, galls, mines





# DEEP LIFE - CHARACTERISTICS AND IMPORTANCE OF GEOMICROBIOLOGICAL RESEARCH

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#### A few words about the author:

I am a PhD student at the University of Warsaw. My research interest is environmental microbiology. I study the role of microorganisms in biogeochemical cycles of carbon, sulfur, nitrogen and other elements in the deep underground mine environment.

#### Abstract:

Exploring life in subsurface environments requires knowledge at the interface of microbiology and geology. Geomicrobiology is a research field that studies among others microbial activity in the deep biosphere. The subsurface biosphere of deep marine sediments and the basaltic ocean and continental crust is rich in bacteria, archaea and eukaryotes. Unfortunately, we still know little about subsurface microbial populations and we cannot culture most of the identified species, and we do not fully understand their survival strategies in severely energy-limited subsurface habitats.

This research topic is a review of current knowledge about subsurface microorganisms. Major growth limiting factors as scarcity of microbially degradable organic carbon sources, growing temperature and pressure, lack of space and water, etc. have been characterized. In addition, crucial conditions that enable microorganism to survive in deep subsurface habitant were indicated.

Several extraordinary and interesting environments have been selected for discussion to outline the activity and diversity of underground microbial life. A complex microbial community dependent on syntrophy, a single-species ecosystem and the discovery of 2 km underground eukaryotic organism - nematode have been described.

#### **Keywords:**

deep biosphere, subsurface environment, geomicrobiology





# MINERALIZATION OF SOIL SAMPLES BY MICROWAVE TECHNIQUE

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I am a PhD student at the University of Science and Technology, at the Faculty of Agriculture and Biotechnology. My research implements in the Laboratory of Soil Science and Biochemistry.

#### Abstract:

Mineralization is the decomposition of the sample with an oxidation mixture - wet mineralization or elevated temperature - dry mineralization. Digestion is carried out to determine concentration of elements in the sample. The experiment was carried out reduced using an oxidation mixture and microwave energy witch reduced that the time of the process. The aim of the research was to determine the mineralization parameters of soil samples using microwave technology which was a condition for the full mineralization of soil material. The process was performed for loam and sandy loam samples and two samples of certified materials. All samples was analyzed in 10 repetitions in two ways - crushed and uncrushed in a mortar. The concentration of zinc, cadmium, manganese, copper and iron witch was carried out after digestion was performed by atomic absorption spectroscopy. All soil samples was full mineralized. The grinding the samples in the agate mortar increased the homogeneity and influence positively on the value of standard deviation for the cadmium, cooper and iron. This element increased the standard deviation value of zinc, which contributed to the deterioration of the precision of the analytical process. It was also obtained a high standard deviation of the results of manganese determination which have revealed that this method is not suitable for the determination of that element in the soil.

#### **Keywords:**

mineralization, soil, microwave technique





# BIOLOGICAL SIGNIFICANCE OF SELECTED MICROELEMENTS IN DOMESTIC ANIMALS

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Students of the 5th year of veterinary medicine developing their interests in the field of toxycological sciences, as well as diseases of horses and companion animals.

#### Abstract:

Trace elements such as zinc, manganese, copper and iron are essential for the proper functioning of the body. They are part of many enzymes, are involved in the metabolism of various compounds, or the synthesis of hormones. Their appropriate level affects the provision of homeostasis, both at the cellular and systemic level. Deficiencies of these elements manifest themselves on the part of circulatory system, osteoarticular systems, they cause dermatological problems, reproductive disorders and also reduce immunity.

However, their excess originating, among other, from overdose of medicinal preparations or industrial contamination leads to poisoning, which, no less than their deficiency, has negative effects on organisms.

#### **Keywords:**

trace elements, poisoning, deficiencies, nutrients





# EFFECT OF PYRETHROIDS INSECTICIDES ON THE CONTENT OF ACYLGLYCEROLS IN THE ENTOMOPATHOGENIC FUNGUS B. BASSIANA

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#### A few words about the author:

My name is Anna Litwin. I am a PhD student at the Department of Industrial Microbiology and Biotechnology at the University of Lodz. My main research topic are interactions between pyrethroid insecticides and entomopathogenic fungi.

#### Abstract:

Neutral lipids perform many important functions including main reserve material, signaling molecules and also participation in the process of phospholipid biosynthesis. Monitoring changes in acylglycerols level in the cell allows to determine how the tested toxic compound affects the fungal strain.

The aim of our research was to determine the content of acylglycerols (triacylglycerols - TAG and diacylglycerols - DAG) in biomass of B. bassiana supplemented with the of pyrethroids:  $\lambda$ -cyhalothrin,  $\alpha$ -cypermethrin and deltamethrin at a concentration of 100 mg/L.

Fungal biomass was homogenized and extracted using method described by Stolarek et al. (2019). A mixture of methyl tert-butyl ether with methanol was used for the extraction. LC-MS/MS method was used to determine of acylglycerol content.

Thirteen TAG and nine DAG species have been identified in B. bassiana biomass. All tested pyrethroids reduced the total amount of TAG and DAG. Also, it was found that in the presence of  $\lambda$ -cyhalothrin and  $\alpha$ -cypermethrin at 100 mg/L, the content of saturated TAG and DAG increases, and simultaneously the content of unsaturated TAG decreases.

The presence of pyrethroids causes changes in the content of acylglycerols, which are responsible for the proper functioning of B. bassiana cells. Therefore, we can conclude a significant effect of these pyrethroids on B. bassiana.

The research was financed from the grant of the National Science Center in Krakow under the number UMO-2016/23/B/NZ9/00840.

#### **Keywords:**

entomopathogenic fungi, pyrethroids, insecticides, acylglycerols





# BOTH SIDES OF THE STORY HOW BACTERIA TRANSFER THROUGH THE BLOOD–BRAIN BARRIER?

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#### A few words about the author:

Student of Inter-faculty Individual Studies in Mathematics and Natural Sciences College at University of Warsaw with main faculty - Biotechnology. Interested mostly in microbiology (especially pathogens and mechanisms of their infections).

#### Abstract:

Infections of central nervous system (CNS) still represent an important cause of mortality although globally abundance of antibiotics usage. Sepsis, bacterial invasion and microbial transversal of the Blood–Brain Barrier (BBB) are required to infect CNS. The latest research showed up that bacterial translocation through the BBB includes cytoskeleton rearrangements. Three different mechanism were described: paracellular, transcellular and Trojan-horse mechanism (in phagocytes). The consequences may be dramatic – disruptions of structure and loss of functionality of the BBB causing increased permeability, inflammatory and encephalopathy. Further experimental research should lead us to gain complete understanding of the host-bacteria interaction within microbial transversal of the BBB.

#### **Keywords:**

blood-brain barrier, bacterial pathogens, infections, cell junction





# ANALYSIS OF RELATIONSHIP BETWEEN CEREAL YIELD AND NDVI FOR SELECTED REGIONS OF CENTRAL EUROPE BASED ON MODIS SATELLITE DATA

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#### A few words about the authors:

The authors work at the Warsaw University of Life Sciences in Department of Biometry, Institute of Agrictulture. They conduct research on precision agriculture and the analysis of satellite data on arable fields.

#### Abstract:

Earth observation satellite technologies allow the status of crops to be assessed at various geographical scales. The most popular vegetation index for analyzing this status is the Normalized Difference Vegetation Index (NDVI). This article studies the relationship between the NDVI and cereal-grain yield in selected regions (corresponding to NUTS2 levels) of four Central European countries: Poland, Germany, the Czech Republic, and Slovakia. In most regions of Poland, the relationships are quite strong, but in German regions they are weak and inconsistent. The obtained results are promising because they prove the possibility of forecasting cereal grain yield at the regional level, three–four months before the harvest, which is important for planning food policy.

#### **Keywords:**

Earth observation, vegetation index, NUTS2, arable land, correlations





# **PATHWAYS OF APOPTOSIS**

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### A few words about the author:

My name is Patrycja Rulak. I am student of Medical Biotechnology and I am widely interested in various issues related to molecular biology of cells.

### Abstract:

Multicellular organisms sometimes need to get rid of excess or abnormal cells which are potentially dangerous for example tumor cells. The process which helps to control the numer of cells is apoptosis. Apoptosis, also called programmed cell death, is a very complicated process. Cells have to decide if they want to die. This decision cannot be taken lightly, therefore apoptosis is strictly regulated. Maintaining the appropriate amount of cells is relevant to maintain homeostasis of the organism. Apoptic process can be induced in four main ways. This presentation shows four pathways that are used to activate this type of cell death under stress conditions.

### Keywords:

apoptosis, cell death





# TO BE OR NOT TO BE...? – A BRIEF REVIEW OF SALMONELLA TYPHIMURIUM INFECTION

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#### A few words about the author:

I have been studying Biotechnology with elements of Chemistry and Physics as a student of the Inter-faculty Individual Studies in Mathematics and Natural Sciences College. My main field of interest is bacterial genetics, cell and molecular biology.

#### Abstract:

Salmonella infections cause wide range of clinical manifestations. S. enterica subspecies typhimurium is one of the most common etiological factor of an inflammatory diarrhea and is considered to be a heavy burden for medical service worldwide. Although the research on its pathogenesis mechanism is in-depth and comprehensive, many issues are still unknown. Better understanding of Salmonella infection steps, regulation of virulence genes and interaction with host immune system are necessary to create a fast diagnosis as well as a successful treatment for salmonellosis.

#### Keywords:

Salmonella typhimurium, pathogenesis, virulence factors





# CHARACTERISICS OF OLEOGEL-IN-WATER EMULSIONS WITH ADDITION OF INULIN

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#### A few words about the author:

I am a PhD student at the 2st 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 this study was to analyze the physical properties of O/W model emulsions (30/70 wt/wt) influenced by the amount of inulin addition. Emulsions were obtained from oleogels (structured rapeseed oil with 4% wt/wt of candelilla wax) dispersed (ultrasounds, 4 min, 24 kHz) in the aqueous phase with 0, 6, 9 or 12% wt/wt of inulin content. The centrifugal stability (4000 rpm), thermal stability (100°C), destabilization kinetics (the LUMiSizer test), microrheological properties (MS-DWS method, Rheolaser Master) and microstructure of emulsions (optical microscope), were investigated. As the inulin concentration increased, the emulsions had greater values of macroscopic viscosity (MVI) and elasticity index (EI). MVI for the control sample (without the inulin) was 0.739.10-5 nm<sup>-2</sup>, and for the emulsion with the highest prebiotic content  $-2.380 \cdot 10-5$  nm<sup>-2</sup>. Emulsions with 9 and 12% of inulin content were characterized by the best thermal/centrifugal stability, i.e. over 90%. Furthermore, the emulsions with a higher inulin concentration presented smaller average particle size and greater resistance to destabilization (LUMiSizer test). It was found that the application of inulin (6, 9 or 12% wt/wt) in the composition of low-fat emulsions contributed to the improvement of their physical stability. Inulin is a potential component of emulsions with oleogels, both as a thickener and a prebiotic. Emulsions with inulin may provide a dietary fiber and support digestion.

#### **Keywords:**

oleogels, emulsions, inulin, LUMiSizer test, MS-DWS method, physical stability





# INFLUENCE OF UV AGING ON SURFACE CHANGES OF INJECTION MOLDING PARTS FROM SELECTED POLYMER MATERIALS

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#### A few words about the author:

I am a PhD student at the Czestochowa University of Technology. My interests are: polymer materials, UV aging, polymer degradation and stability, Design Thinking.

#### Abstract:

Aging of materials is a common phenomenon related to products in all sectors of industry. One example of the degradation of polymers is photodegradation, resulting from UV radiation, which can lead to numerous changes. Due to the increasingly common use of polymeric materials, it is necessary to understand the mechanisms and impact of degradation processes.

The presntation has presented an influence of accelerated UV aging on structural properties of selected polymer materials. In this study, 5 types of materials from a group of thermoplastics: ABS, PS, PP30T, PE, POM were used. The test samples were made by injection molding. In turn an accelerated UV aging process (600 hours) was carried in the UVTest chamber with fluorescent lamps characterized by a wavelength of 313 nm. Changes in the structure of the tested materials were observed with using an optical microscope. Measurements of gloss on the surface of primary samples and exposed to UV rays were also made. Conducted studies have demonstrated the impact of UV radiation on the change in the surface layer of tested materials.

#### **Keywords:**

UV aging, microscopic examination, amorphous materials, semi-crystalline materials





# STUDY OF THE EFFECT OF SELECTED SAPOGENINS ON THE PROPERTIES OF MODEL BIOLOGICAL MEMBRANES

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#### A few words about the author:

I am a PhD student of Chemistry at the University of Bialystok. The group, in which I work, deals with research in the field of surface physicochemistry of model lipid membranes and study the effect of natural compounds on these membranes.

#### Abstract:

The proposed studies aimed to investigate the effect of selected sapogenins (diosgenin, diosgenin acetate, oleanolic acid, asiatic acid) on the properties of artificial cell membranes, such as Langmuir monolayers, spherical bilayers, and liposomes. Model membranes were created from lipids present in every living cell, i.e. phosphatidylcholine or cholesterol. The proposed sapogenins come from the saponin group, which has many therapeutic properties, including anti-cancer properties.

The research was based on the measurement of necessary physicochemical quantities: surface pressure, surface area per molecule, the surface charge density of model liposomal membranes and interfacial tension of lipid bilayers. To obtain a full interpretation, the equilibria between membrane components, as well as between membrane components and the environment was described. Also Brewster angle microscopy (BAM) visualization of lipid monolayers and lipid - sapogenin mixed monolayers were obtained.

Interactions between the tested compounds in mixed monolayers were described. The formation of complexes in a 1:1 ratio, characterized by high stability constants, has been proven in all studied systems. Thanks to the use of BAM, phase transitions occurring during the formation of monolayers composed of pure components and mixed monolayers have also been described. Besides, a significant effect of the tested compounds on the surface charge density values of liposomal membranes has been demonstrated.

### **Keywords:**

lipids, sapogenins, Langmuir method, interfacial tension, microelectrophoresis





# INVESTIGATION OF THE EFFECT OF BIOLOGICALLY ACTIVE COMPOUNDS ON THE PROPERTIES OF BIOLOGICAL MEMBRANES

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#### A few words about the authors:

Dr hab. Aneta D. Petelska, prof. University in Bialystok is a head of Bioelectrochemistry laboratory in the Department of Physical Chemistry and Paulina Laszuk is a PhD student in the same Department.

#### Abstract:

The monolayer consists of amphiphilic molecules with a polar "head" and non-polar hydrocarbon chains. Substances with this structure show a certain orientation in a definite environment. These monomolecular layers reduce surface tension, cause density and viscosity changes. They can have phase transitions from gas to solid, taking into account intermediate states. Due to their properties, the monolayer can be analyzed through research based on microscopic measurements that will provide key information on the chemical structure, density and other characteristics of the monomolecular layers. The BAM technique is based on changing the refractive index on the water / air interface as a result of creating a Langmuir monolayer on it. This angle at the water / air interface is 53°. Depending on the degree of packing of particles, a particular image is saved, corresponding to a specific phase transition, while recording the  $\pi$ -A isotherm. Research was carried out using lipoic acid, phosphatidylcholine and a mixture of substances in a ratio of 1:1. On this basis, a suitable solvent was selected and sample images recorded with the BAM technique. Microelectrophoresis was used to determine the effect of lipoic acid on the surface density of phosphatidylcholine membrane charge. The electrophoretic mobility of liposomes measured using a Zetasizer Nano ZS apparatus. As a result, it was found that lipoic acid affects the properties of artificial membranes.

#### **Keywords:**

monolayer, Brewster Angle Microscopy,  $\pi$ -A isotherm, microelectrophoresis





# NUMERICAL ANALYSIS OF TENSILE AND COMPRESSION TESTS OF POLYETHYLENE REINFORCED WITH CARBON FIBRES WITH USING OF ADINA SOFTWARE

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#### A few words about the author:

I am a PhD student at the Czestochowa University of Technology and vice- president in SSC Design Thinking Space. My interests are: biomedical engineering, medical diagnostics, numerical modeling, biomaterials, Design Thinking, project management.

#### Abstract:

The presentation has been devoted to one of the grades of polyethylene, which is essentially applied in bioengineering, e.g. for elements of endoprostheses and spinal discs implants. Numerical analysis concerns, however, a modified version i.e. reinforced with carbon fibres. At the beginning the issues connected with requirements for biomaterials and composites have been outlined. Furthermore, the basic information about properties of matrix and reinforcement of studied material have also been presented. In turn, the issues related to the preparation of the model of tested modified polyethylene have been described in experimental part of presentation. Finally, the research results, carried out in the ADINA program, illustrating the distribution of stress and strain in the material resulting from tensile and compression have been discussed in detail.

#### **Keywords:**

polyethylene, carbon fibres, ADINA software, mechanical testing





# MG-BASED MATERIALS FOR HYDROGEN STORAGE APPLICATION – PROBLEMS

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### A few words about the author:

Hydrides for solid hydrogen storage are my main research area. I mainly deal with magnesiumbased hydrides with the addition of various other elements and study their effect on absorption properties.

### Abstract:

Magnesium hydride has for a long time appeared to be one of the best candidates for the solid state hydrogen storage material. It is mainly associated with its wide availability, low costs, fairly good capacity and reversibility of the absorption and desorption process. However, Mg-based materials also have properties that can be a barrier to their commercial use. High enthalpy of decomposition requires the use of high temperatures and very low hydrogenation kinetics are serious problems for large-scale implementation of this material. This problem will be discussed in this work.

### **Keywords:**

Mg-based materials, hydrogen storage, solid-state hydrogen storage, magnesium hydride





# MAIN PROBLEMS IN HYDROGEN ENERGY

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### A few words about the author:

I am a PhD 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:

Hydrogen is one of the alternative energy sources. Its use and application is increasing every year. Researchers, politicians and environmental activists have many hopes for this green source of energy. It is said that in a few decades, hydrogen can replace oil and other fossil fuels. Before this happens, however, many serious problems need to be solved related to the use of hydrogen as an ecological energy source - not only for mobile or home applications, but also for large-scale power applications (power stations). About what problems engineers, society and government have to face are described in this paper.

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

### **Keywords:**

hydrogen, hydrogen energy, hydrogen storage, transport of hydrogen, H2 production





# ARCHITECTIONICAL CHALLENGES IN AUGMENTED REALITY GLASESS APPLICATIONS DEVELOPMENT

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#### A few words about the author:

Research Manager, CEO of VEO, a company that develops first Augmented Reality glasses navigation application.

#### Abstract:

The article discusses the classification of augmented reality glasses and the approach to creating application architecture for these devices. The actual process of making architectural decisions leading to the construction of a working production application such as mobile outdoor navigation is presented. The optimal method of making this kind of decision was formulated, giving its real effectiveness in the context of design errors. The case report is supplemented with a comparative table of features of 13 Augmented Reality glasses as of February 2020.

#### **Keywords:**

Augmented Reality, AR, glasses, applications, navigation





# TESTING OF 5 - HYDROXYMETHYLFURFURAL (HMF) CONTENT IN SELECTED MILK POWDERS, ROASTED AND UNROASTED BEANS, COCOA LIQUOR AND CHOCOLATE MILK MASSES CONCHED AT DIFFERENT TEMPERATURES

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#### A few words about the author:

I am in the 3rd year of my Ph.D. studies at the Warsaw University of Life Sciences. My research focuses on cocoa beans and the production of chocolate milk masses, especially the process of conching.

#### Abstract:

5 - Hydroxymethylfurfural (HMF) is a widespread heat-induced food contaminant. It is an indicator of the degree of heat treatment of food products. It is attributed with genotoxic and carcinogenic effects, therefore monitoring its presence in raw materials and products is very important. It has been analyzed: 5 milk powders, 5 chocolate liquor from different producers and obtained from cocoa beans harvested in different seasons. Due to the high roasting temperature of cocoa beans at about 150°C, it was decided to investigate the differences in the HMF content of roasted and unroasted beans. In order to fully trace the influence of process parameters on the quality of chocolate, own produced chocolate milk masses and market milk chocolate were also compared. The HMF content in milk powders was at a similar level with the exception of one of the milks which was produced by the cylindrical method. It was characterized by more than seven times higher HMF content due to the presence of sugar in its composition, which is a precursor of this compound. Unroasted bean contained significantly less HMF content in cocoa liquor obtained from roasted and unroasted bean were shown.

Additionally, the analysis of the effect of increasing time and temperature of chocolate milk masses conching showed that higher process parameters favour the formation of higher amounts of this genotoxic compound.

#### **Keywords:**

5 - hydroxymethylfurfural, milk powder, cocoa beans, cocoa liquor, chocolate milk masses





# MICROELECTROFORETIC STUDIES OF THE INTERACTIONS OF PHOSPHATIDYLCHOLINE-PHOSPHATIDYLSERINE LIPOSOMES WITH CINNAMIC ACID

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#### A few words about the author:

I am a chemistry student at the University of Bialystok.

#### Abstract:

Studies on the interaction of phospholipid membranes with phenolic acids are very important, enabling us to understand cellular processes. Cell membranes are extremely complex structures, therefore many models of syntetic biological membranes, e.g. liposomes, are formed in the laboratories.

Phenolic acids have undergone many studies recently. The phenolic acids are used to inhibit or delay carcinogenesis. Most of them, e.g. cinnamic acid, possess additional antioxidant properties.

We analyzed the effect of cinnamic acid on the surface charge density of liposomes. The liposomes were obtained from pure phosphatidylcholine and phosphatidylserine or their mixtures in 8:2 and 9:1 ratios. The lipids were dissolved in chloroform and then the solvent was evaporated. Liposomes were obtained by sonication in 0.9 % sodium chloride.

Electrophoretic mobility was determined with the Zetasizer Nano ZS apparatus and then converted into surface charge density.

We had proven that the value of the surface charge density changes as a result of modification of the membrane structures with cinnamic acid. These changes are caused by interactions between components of membrane and the environment or between membrane forming components.

The scientific activity was carried out from the funds of the National Science Center - Poland awarded as part of the Miniatura 2 competition (2018/02/X /ST4/02153).

#### **Keywords:**

liposomes, surface charge density, phosphatidylcholine, phosphatidylserine, caffeic acid





# MICROPLASTICS – SOURCES OF OCCURRENCE AND IMPACT ON HUMAN HEALTH

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I am a chemistry student at the University of Bialystok.

### Abstract:

Microplastics are called plastic particles with a diameter smaller than 5 millimeters. They are composed mainly from polypropylene, polyethylene and polystyrene and formed as a result of plastic degradation that takes place over time. The plastic degradation can occur, e.g., as a result of UV radiation or mechanical abrasion. Microplastics can accumulate in living organisms, including human body.

The presence and accumulation of microplastic waste in the natural environment is of growing concern, becoming the subject of interest for many researchers. The scientists claim that microplastic accumulating in the digestive system can interfere with its work and transfer toxic compounds to other systems. Fighting with microplastics is challenging. To stop the spread of microplastics, it's sources should be investigated.

The main sources of microplastics and the impact on human health were discussed. The major problem is the occurrence of microplastics in the marine environment. Occurrence in the natural environment is a symptom of continuous and rapid increase in plastic production.

### Keywords:

microplastic, plastics, UV pronation, natural environment





# INFLUENCE OF LEAD GLASS ON THE STRUCTURE OF FAST CRYSTALLIZED 5083 ALUMINIUM ALLOY

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#### Abstract:

The work contains research on the plastic consolidation of fast crystallized 5083 aluminum alloy and lead glass powder.

The presentation touched on issues related to composite materials, characteristics of aluminum series 5xxx, methods of rapid crystallization, plastic consolidation and methods of producing composites on the example of hot extrusion and the characteristics of the glass phase.

As part of own research, two rods were produced in the process of plastic consolidation. One of them was a rod made of quick-crystallized 5083 aluminum alloy and the other was a metal-glass composite with the addition of 10% lead glass powder from the PbO-B<sub>2</sub>O<sub>3</sub>-SiO<sub>2</sub>-ZnO-Al<sub>2</sub>O<sub>3</sub> system. Then, light and scanning electron microscopy tests were carried out to confirm the integrity of the components being connected and the glass phase distribution.

#### **Keywords:**

plastic consolidation, extrusion, aluminium alloys, lead glass
# **HUMANITIES SCIENCES**





## BECOMING A PARENT OF A CHILD WITH INTELLECTUAL DISABILITY - AN INTERACTIVE PERSPECTIVE. INFORMAL PATH OF ACQUIRING KNOWLEDGE

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#### Abstract:

The aim of the lecture is to present the informal strategy and informal tactics adopted by parents of children with intellectual disabilities. We will present how parents gain knowledge about the specifics of functioning and the needs of their child. Analyzing empirical material from free interviews with parents of children with intellectual disabilities, we have selected the analytical category of lifelong learning, i.e. seeking and acquiring knowledge about the needs of your child with intellectual disability. In the whole project was emerged two types in which parents adopted different strategies for acquiring knowledge, i.e. formal and informal. One path is implemented on a formal (institutionalized) path, and the other on an informal (non-institutionalized) path. I am going to discuss informal path. Regardless of the strategy chosen, the process of professionalization and specialization is recognized in parents' biographies.

#### **Keywords:**

parenthood, intellectual disability, lifelong learning, interactive perspective; informal path of acquiring knowledge





## WHAT CAN FMRI STUDIES TELL US ABOUT THE CHRONOTYPE?

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I am a PhD student at the Faculty of Psychology at the University of Warsaw. My main scientific interest is the phenomena of chronotype, its neuronal as well as personality and temperamental correlates.

#### Abstract:

The vast majority of biological functions express rhythmic fluctuations within 24 hours. Many physiological processes such as body temperature, heart rate, multiple hormone activity and many more are associated with it. The basic circadian rhythm is the sleep-wake rhythm, in which diversity is considered an elementary indicator of the chronotype. The concept of chronotype is associated with individual differences in the circadian rhythms, which are a manifestation of the human biological clock. Authors often distinguish three types of chronotypes: morning-type, neither-type, and evening-type and they describe people who have a slightly different way of functioning during the day.

Based on the latest neuroimaging studies, it can be concluded that brain activity also fluctuates throughout the day in selected areas of the brain. This was demonstrated as differences in regional glucose metabolism in the brain between performing fMRI scans in the morning and evening. There are also studies that indicate that the chronotype can affect patterns of functional connections in the default mode network or brain activity while performing cognitive tasks.

The results of these studies indicate that the chronotype should be included as a modulating factor in all types of brain imaging experiments. However, the question of whether we can tell something about person's chronotype based on fMRI research remains open.

#### **Keywords:**

chronotype, fMRI, morningness-eveningness





## CONSUMERISM AS A PHENOMENON CONSTITUTING AN IMPORTANT FOUNDATION FOR CONTEMPORARY ART

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PhD student of humanities at the University of Lodz.Research interests:In 2017, research on the perception of Western art by people from Tanzania.In 2018, research on the perception of Makonde sculpture by the Warsaw society.

#### Abstract:

Popular art, which can be considered by us as a result of economic changes that have been going on since the 1950s, has found its certification to this day on the friendly ground of the reality that surrounds us. The modern culture of industrial societies is the so-called culture of consumption. At the same time, the consumer appears here as a lively vivid subject, having his own opinion, which I want to present to those willing to enter the dialogue with recipients. On the one hand, the addressers of popular art are perceived as having a slightly refined aesthetic taste but on the other hand, some of them are undoubtedly characterized by a distance from a critical look. An interesting issue is certainly artists who consciously fit into the trend of consumerism often using this procedure as a deliberate creation of an auto ironizing attitude, indicating a sense of humor. Naturally, these are rather sporadic cases that tip the scales of popular art towards critical art, which is characterized by the ability to look at the world from a broader perspective.

The main goal of this work is to show certain trends in the art of consumption, which from the 1950s to the present day are still noticeable in the reality that surrounds us. The presented examples have cross-sectional features emphasizing the main trends occurring within this phenomenon, and therefore will point to both the cases of the art of consumerism at its worst and its best.

#### **Keywords:**

consumerism, contemporary art, culture, popular art





## YOUTH QUALITY OF LIFE - QUALITY OF LIFE CRITERIA, FACTORS DETERMINING QUALITY OF LIFE, METHODS OF MEASURING QUALITY OF LIFE

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#### Abstract:

The concept of quality of life changed over time, which did not make it easier to develop a uniform position on the definition, concept or methods of measuring this variable. The need to recognize the quality of life in relation to the individual's value, satisfaction with the situation, possibilities and life priorities is emphasized. Based on the available literature on the subject, the speaker will try to discuss the perceived quality of youth life. In terms of "Self-sense": selfconfidence is expressed in confidence, perseverance in overcoming obstacles and achieving goals; being yourself includes positive feelings and self-satisfaction; mental health - the ability to cope with stress and a good mood, and physical health - is a sense of energy to act; the spiritual sphere includes personal beliefs as a source of strength and sense of meaning in life. In the presentation, the model of youth quality of life will be presented, which covers the most important areas of quality of life of the adolescence period. Criteria for assessing the quality of life change with age, which is significantly associated with the level of emotional, cognitive and social development, with the roles that appear with age, and tasks assigned to specific stages of life, and the specificity of needs at each stage of childhood and adolescence.

#### **Keywords:**

youth, quality of life, factors determining quality of life, methods of measuring quality of life





## THE RELATIONSHIP OF SOCIAL SUPPORT BETWEEN RESILIENCE AND THE SENSE OF QUALITY OF LIFE OF ADOLESCENTS - CHILDREN FROM ORPHANAGES

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#### Abstract:

Quality of life is a very broad and diverse concept. Many concepts have emerged, theoretical models trying to explain what quality of life is and what determines it. Many measurement tools have also been developed, which on the one hand indicates a great interest of researchers in this issue, but on the other hand makes it difficult to compare and generalize obtained results. In the social sciences, and especially in psychology, the subjective approach to the quality of life dominates. It is connected with the assumption that the key role for the quality of life is played by subjectively understood psychological well-being, identified with satisfaction, life satisfaction or happiness. Based on the available literature on the subject, the relationship between social support and its impact on the quality of life of orphanage adolescents will be discussed. Staying in an orphanage is treated as a threat to the normal development of the individual, which can lead to symptoms of maladaptation and pathology. There is therefore no doubt that the process of adapting adolescents to the life-unfavorable situation of staying at an orphanage requires, on the one hand, mental resilience, revealed in the form of resilience and support from the closest relatives, including the caretakers of the facilities in which the charges reside. The impact of support on the lives and functioning of young people from orphanages in later life will be discussed.

#### **Keywords:**

youth, quality of life, social support, life satisfaction





## PROBLEM OF TRANSLATING COMPOUND COLOUR ADJECTIVES

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The author is a PhD student at Adam Mickiewicz University in Poznań who investigates the translation of German compound adjectives into Polish. This problem is analyzed on the basis of Elfriede Jelinek's novels and their translations into Polish.

#### Abstract:

Translation of colour names often poses semantic problems, as they are words that are directly related to the perceptional impressions determined by individual as well as cultural factors. As Umberto Eco notes, colour names vary in different languages in terms of specification. Compound adjectives are a very common word-formation class in German and they are also very illustrative. In Polish, however, compound adjectives are much less productive, which makes it difficult to convey the full meaning of the original terms in the target language. Regarding the colour names, complex adjectives primarily specify a given shade. In the presentation, we analyze the translation of such adjectives based on examples from Elfriede Jelinek's novel "wir sind lockvögel baby!" and its translation into Polish. The aim of the analysis is to examine the linguistic means by which these terms are translated, as well as to determine which factors are the most important in the translation process. The analysis included 32 examples, which were divided according to the word structure. Word structure of the German adjectives was described and compared with their Polish equivalents. Subsequently, it was assessed whether the Polish translations correspond to the type of shade specification in the original colour names. Based of the analysis, the most effective ways of translating such adjectives will be demonstrated.

#### **Keywords:**

translation, colour names, Elfriede Jelinek, compound adjectives





## SLASH. THE PRELIMINARY ANALYSIS OF THE MEDIA IMAGE

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Anna Małoszewska PhD student at the Journalism Department at the Faculty of Political Science and Journalism at the Maria Curie Skłodowska University, Lublin. Writes a doctoral dissertation: Life and work of Krzysztof "Grabaż" Grabowski in 1965-2018.

#### Abstract:

Guns N'Roses' Slash is an interesting person to carry out scientific research. He uses social media effectively in order to create his own image while at the same time he stays in frequent contact with fans. He has comic scenic appearance and a very inter-esting media image, which has changed during last 30 years. He even has his own place in the pop culture, for instance as the main character of the Internet memes. Not everyone knows pseudonym, behind which the guitarists of Guns N' Roses is hiding. It is enough to mention about curly hairs, sunglasses and a top hat and it all explains itself. The aim of this article is to analyze the media and stage image of a legendary guitarist on the basis of theoretical background and examples.

#### **Keywords:**

Slash, media image, scenic image, Guns N'Roses, analysis





## BECOMING A PARENT OF A CHILD WITH INTELLECTUAL DISABILITY - AN INTERACTIVE PERSPECTIVE. FORMAL PATH OF ACQUIRING KNOWLEDGE

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#### Abstract:

The aim of the lecture is to present the formal strategy and formal tactics adopted by parents of children with intellectual disabilities. We will present how parents gain knowledge about the specifics of functioning and the needs of their child. Analyzing empirical material from free interviews with parents of children with intellectual disabilities, we have selected the analytical category of lifelong learning, i.e. seeking and acquiring knowledge about the needs of your child with intellectual disability. In the whole project was emerged two types in which parents adopted different strategies for acquiring knowledge, i.e. formal and informal. One path is implemented on a formal (institutionalized) path, and the other on an informal (non-institutionalized) path. I am going to discuss formal path. Regardless of the strategy chosen, the process of professionalization and specialization is recognized in parents' biographies.

#### **Keywords:**

parents of children with intellectual disabilities, lifelong learning, formal strategy of acquiring knowledge





## UNITED STATES OF AMERICA AND THE EUROPEAN UNION

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Przemysław Mirosław Pazder – second year master's degree student, graduate of first degree studies in political science. His research interests include cooperation of individual institutions and countries, as well as the subject of the Great Famine.

#### Abstract:

Undoubtedly, the United States and the European Union should be qualified as one of the most important actors in international relations who significantly affect various processes and phenomena taking place in the modern world. Both the USA and the EU affect virtually all spheres of social and economic life (the EU and the US account for a total of 2/3 of the world's GDP), as well as foreign policy, social affairs, security and culture. Due to current relations on the Brussels-Washington line and prospects for the development of mutual relations between these players are an extremely important factor determining the state of international relations. The assessments of EU-US relations made by analysts and politicians vary widely.

#### **Keywords:**

USA, European Union, economy, cooperation, Donald Trump





## POLYARCHY AS A DEVELOPMENT OF STATE-CENTRIC THEORIES

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Kinga Roszkowska – second-year student of international relations at the University of Bialystok. The main goal currently chosen is to obtain a bachelor's degree in international relations, and additional self-developing initiatives.

#### Abstract:

Polyarchy as a development of state-centric theories" In all my work I will refer to the authenticity contained in the title. Starting from explaining the concept of polyarchy and state-centric theory. Then I will put them together briefly.

Then I will describe what the main research problems touch on these terms, and list the basic elements that make up these terms. He will illustrate in turn how the definition of polyarchy develops state-centric theory. I will liken the set to the social phenomenon, I will describe whether these terminology can be considered equal. The next summary will also illustrate the political system. I will also describe the nature of the political science discussed along with the theory. An interesting aspect for this topic will be taking into account terms such as: anarchy, monarchy, sovereignty, strength, power and balance of power. I will answer if these concepts fit into the specific definition. As a curiosity, I will also consider the issue of linking political existence with it. I also want to take into account the subject of interest of these two theories. I will refer to the content of the above information based on the theory of polyarchy defined by R. Dahl. I will describe the grouping process important for polyarchy and the most important information related to it. In order to diversify my work, I will counterargumentally refer to two other theories of polyarchy, defined by J. Lijphart and J. Schumpeter.

#### **Keywords:**

polyarchy, state-centric theories, teory R. Dahl





## ECONOMIC AND SOCIAL DETERMINANTS OF HUMAN CAPITAL DEVELOPMENT

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PhD student at the Doctoral School of Social Sciences at the University of Bialystok, discipline: economy and finance. My research concerns the intellectual capital in socially responsible companies, with particular emphasis on human capital.

#### Abstract:

In the era of economy 4.0, to meet the challenges of the future, it becomes necessary to use knowledge, skills and competences of human resources as the most valuable capital of the 21<sup>st</sup> century. The main purpose of the work is to present the key conditions for the development of human capital in Poland in 2014-2018. The paper uses literature studies. Source materials for the empirical study were obtained from the data of the Central Statistical Office. Descriptive analysis, universal research methods such as analysis and synthesis, and inference methods such as deduction and induction were used to process them. The conducted research indicates that two main groups of determinants of human capital development are distinguished - economic and social. The economic conditions include the expenditure of the state budget and local government units on higher education, education and upbringing, health care and science, costs of education, expenditure on innovative activities and R&D. Whereas social determinants include access to education and work, working conditions and so-called social cohesion.

#### **Keywords:**

human capital, development, determinants





### BETWEEN TWO GENDERS: INDIAN THIRD SEX AND ITS NO MAN'S LAND IN THE "MINISTRY OF UTMOST HAPPINESS" BY ARUNDHATI ROY

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Adriana Simoncelli graduated from the Jagiellonian University of Cracow with a degree in Indian Philology (specialization in Sanskrit), PhD scholar in interdyscyplinary research on the third gender in India.

#### Abstract:

Anjum, main character of the latest book by Arundhati Roy: The Ministry of Utmost Happiness, does not make it easy for us to know who (s)he is, when (s)he says, at the very first page of the book: "Who says my name is Anjum? I'm not Anjum, I'm Anjuman. I'm a mehfil, I'm a gathering. Of everybody and nobody, of everything and nothing." Anjum, born as a hermaphrodite in a Muslim family and grown up as a boy, is then reborn as a hijra, and only that indeterminate make-up gives him/her the full sense of his/her own being.

The hijras: transgenders or intersexed people occupy until our days a singular posiition within Indian (and not only) society. After more than 1000 years of being an ingrained part of this culture, they are presently considered social outcasts. This socially excluded group can serve as a perfect illustration of the existential dimension of precariousness. The hijras, with their indeterminate self-sense which shapes their experience of life, with their vulnerability, marginalization and displacement, live in the midst of society that does not understand them and hardly tolerates them.

This paper is an attempt to focus on the literary representation of the hijras in contemporary Indian society, as it is exemplified in the person of Anjum, who lives in a "no man's land". The no man's land, the metaphorical space in-between, which is ruled by no one and is in no one's possession seems to adequately represent Anjum's existential situation of displacement.

#### **Keywords:**

Arundhati Roy, gender, third sex, hijra, precarity





## ANTINOUS OR DEIFIED EROMENOS

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#### Abstract:

Publius Aelius Hadrianus Augustus, commonly known as Hadrian, successor of Trajan, was one of the "best rulers" (optimus princeps) of the Roman Empire. A devotee of Greek culture, he traveled around the entire empire and cared for all the attached provinces, focusing not on expansion and conquest but on consolidation of borders and their defense. Of his more than 20 years of rule, he devoted half to private travel, gaining the fame of the ruler-traveler and the herald of universal peace.

During one of his trips to Bithynia, Hadrian met Antinous, a young man who became his favorite companion and inseparable member of his personal entourage during the long, exhausting travelers around the Empire, until when, in 130, during the flotilla along the Nile, Antinous died in mysterious range. Their relationship was one of the most famous example of pederasty, so common in ancient Greece and Rome. Hadrian's love, hypotheses about Antinous's death and his deification, will be the claim of this paper.

#### **Keywords:**

Antinous, Hadrian, eromenos, pederasty, deification





## PIERRE BOURDIEU'S STRUCTURAL CONSTRUCTIVIST THEORY OF POLITICS AND RALF DAHRENDORF`S CONFLICT THEORY IN THE RESEARCH ON LOCAL SELF-GOVERNMENT

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#### Abstract:

The aim of the article is to show Pierre Bourdieu's structural constructivist theory of politics and Ralf Dahrendorf's conflict theory in the analysis of selected aspects of the functioning of the local self-government. This article focuses on the results of the author's own research that has been carried out in several rural communes from the Lesser Poland voivodeship. These theoretical concepts have been used to explain a range of relationships between officials and residents of local communities. Bourdieu's structural constructivist theory of politics has found application in the analyzis of self-assessments of commune heads, opinions of residents regarding local government authorities as well as characteristics of commune heads and voters. The method of explaining social reality adopted in Dahrendorf's conflict theory was used to study election campaigns, reasons for the victories of current commune heads and to assess the chances of other candidates for their position.

#### **Keywords:**

commune head, electorate, commune, structural constructivism, conflict theory





## A PICTORIAL BIOGRAPHY OF JOHN PAUL II AS AN EXAMPLE OF PRESENTING THE HISTORY OF IMPORTANT PEOPLE IN COMICS

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PhD student of history at the University of Częstochowa. His doctoral thesis is about historical narration in American and Latin American comics. He is interested in history of USA, Spain, Latin America and pop culture.

#### Abstract:

Biography is a description of the life of an authentic figure, which can be scientific, literary or popularizing. In the current era, dominated by shortcuts, the image becomes as important as the text. Therefore, the importance of the comic and its pictorial content increases. The aim of the paper is to present in what form comics can present historical content so that it preserves the framework of biographical work. Analysis is based on the comic about the life of Pope John Paul II from Marvel.

#### **Keywords:**

history, Marvel, comics, pope, pop culture





## INCLUSIVE LANGUAGE - A TOOL FOR CREATING EGALITARIAN SOCIETY? SPANISH AND ENGLISH WAYS OF AVOIDANCE OF LANGUAGE-BASED DISCRIMINATION

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#### Abstract:

The language is a tool for creating the reality. The way of how we name components of the world that we live in, may show our attitude towards it, our values, motivations and emotions. This way of thinking is one of the key elements of the linguistic relativity, known as well as the Sapir-Whorf hypothesis. And, bearing in mind, how significant is the importance of words being used to describe the world, languages – as a constantly changing construct – are changing with societies using them.

The subject of the presentation is one of the changes noticeable in modern languages – its conversion in an egalitarian way, to possibly avoid words and grammar constructions based on gender, race, sexual orientation or any other difference that might indicate the discrimination on any field. Referring to the linguistic relativity, the presentation will show the construct of a language as a tool for forming the reality based on the lack of stereotyping and discrimination – mainly the gender-based one. Those modifications will be presented on the example of two languages – Spanish and English. In addition, the presentation will include statements of official institutions on inclusive language and its grammar rules.

#### **Keywords:**

Spanish, English, inclusive language, discrimination, linguistic relativity





## THE STRUCTURE OF BOTANICAL NOMENCLATURE. A POLYCONFRONTATIVE STUDY

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Agnieszka Jolanta Urniaż graduated from the Wrocław University.She is a PhD student at the Erasmus Chair of Dutch Philology, University of Wrocław and she specialises in the polyconfrontative studies in linguistics (Dutch, English, Polish ad Czech).

#### Abstract:

In the presentation the author concentrates on the analysis of Latin botanical plant names in comparison to the common names in other languages, first of all taking into consideration the ways of realisation of so called specific epithet, which makes part of the species names in the system of binomial nomenclature.

The author presents the analysis of the way of realisation of the specific epithet in selected plant families native to the Netherlands and Poland. The polyconfrontative analysis of phytonyms in Dutch, Polish, English and Czech has been carried out to find the answers for the following questions: whether it is possible find any naming tendencies in the selected languages and to what extent the morphology of the specific epithet is compatible with the international Latin name. The analysis of the specific epithet takes into consderation the most common elements, i.e. shape, size, provenance, colour, animal, etc.

#### **Keywords:**

onomastics, specific epithet, binomial nomenclature, phytonyms, polyconfrontative studies





## A NON-HUMAN ANIMAL PERSPECTIVE ON THE CORONAVIRUS PANDEMIC

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Ines Załęska-Olszewska is a PhD student of literary studies at Jan Dlugosz University in Częstochowa. Her academic interest focuses mostly on animal studies and 19<sup>th</sup> century literature. She is the author of several scientific articles.

#### Abstract:

Nowadays the coronavirus, dubbed Covid-19, is affecting the human-animal world. The first infections are linked to the Huanan Seafood Wholesale Market in the Chinese city of Wuhan. There are plenty of animals commonly sold there: bats, civets, pangolins. Undoubtedly it is a real danger. Despite there is no direct evidence of possible transmission of disease between pets and their owners, people have raised concerns about the future. The virus spreads via the fecal-to-oral route and the best way to stop it is to stay isolated in quarantine. Bearing in mind that Covid-19 is a zoonotic disease, different species of animals are tested for precautionary reasons after noticing the symptoms of disease. The coronavirus affects the animal beings all over the world: stray cats and dogs are exterminated, crowded zoo's directors admit that some animals might have to be fed up to others, the experiments with animals are conducted (they are closed in cages). Another problem is that pets are abandoned at home, and they are at the risk of dying. Their owners were evacuated and some of them did not return home. There are some associations which try to resolve this problem. The aim of the paper is to present what impact does the coronavirus have on humans and animals.

#### **Keywords:**

animal studies, coronavirus, animals, disease, slaughter





## HAND THERAPY AS A METHOD OF SUPPORTING LEARNING THE WRITING SKILL BY YOUNGER SCHOOL CHILDREN

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#### Abstract:

Achieving the readiness to learn the writing skill is a long-lasting and multi-stage process. Esthetic, legible delineation of letters requires great effort and systematic graphomotor training of a child. Mastering the technique of writing apart from a child's individual development depends on many factors, i.a. general motor skills, fine motor skills, hand-eye coordination, core control, visual and auditory perception, laterality, orientation in the scheme of body and space.

Year by year there is a noticable upward tendency of pupils showing problems in learning the writing skill. This phenomenon causes numerous school failures. To counteract the abovementioned difficulties a programme of hand therapy has been created as a method to stimulate the overal development of a child.

The aim of the paper is to present a model of hand therapy and schowing the effects of the therapy in improving perception and motor functions of younger school children.

#### **Keywords:**

hand therapy, writing skill, school, children







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