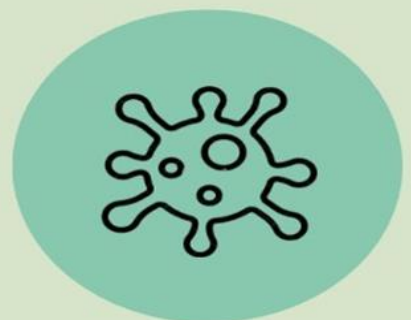


# Medicine. Ecology. Healthy lifestyle.

INTERUNIVERSITY STUDENT CONFERENCE



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**Participants:**

- **Dnipro State Medical University**
- **Municipal Institution of Education «Scientific Medical Lyceum «Dnipro» of Dnipropetrovsk Regional Council»**
- **Lviv Polytechnic National University**
- **Dnipro State University of Agriculture and Economics**
- **Dnipro University of Technology**

## 1. MEDICINE

1.	<b>Zlata ARTIUKHOVA, Valeriia REZUNOVA</b> <i>Use and toxicity of the colony-stimulating factors</i>	<b>5-6</b>
2.	<b>Dmytro ALEKSIEIEV, Olena TRETIAKOVA</b> <i>Pneumonia</i>	<b>6-7</b>
3.	<b>Sati BILA, Kateryna SARZHYNska</b> <i>Antihormones of sex steroids</i>	<b>7-9</b>
4.	<b>Alina BILOKHA, Valeriia REZUNOVA</b> <i>Pathology of bipolar disorder</i>	<b>9-11</b>
5.	<b>Maryna BONDARENKO, Kateryna SARZHYNska</b> <i>Antibiotic resistance</i>	<b>11-12</b>
6.	<b>Mariia BRIUKHANOVA, Kateryna SHUBKINA</b> <i>Stem cells</i>	<b>13-14</b>
7.	<b>Alina CHUIKO, Kateryna SHUBKINA</b> <i>The process of installing dental crown on teeth</i>	<b>14-15</b>
8.	<b>Daryna DIKHTIARENKO, Oksana PETROVA</b> <i>The role of single-nucleotide variants of the gene glucogono-like receptor type 1 in obesity</i>	<b>16-17</b>
9.	<b>Tetiana HERHEL, Olha NASHYVANKO</b> <i>The role of xenotransplantation in treatment of chronic kidney disease</i>	<b>17-19</b>
10.	<b>Valeriia HONCHAROVA, Kateryna SHUBKINA</b> <i>Modern methods of restoring the appearance of teeth</i>	<b>19-20</b>
11.	<b>Mariia HOROVA, Olha NASHYVANKO</b> <i>Evaluation of thyroid hormone levels in chronic kidney disease patients</i>	<b>20-21</b>
12.	<b>Elina HUDOVA, Kateryna SHUBKINA</b> <i>Fatal family insomnia</i>	<b>22-23</b>
13.	<b>Nadiia HUDYM, Alina HOMENIUK</b> <i>Doppler ultrasound of the vessels of the neck and head</i>	<b>23-24</b>
14.	<b>Sofiia KALMYKOVA, Kateryna SARZHYNska</b> <i>Migranes: causes and treatment</i>	<b>25-26</b>
15.	<b>Lika KARPINCHYK, Alina HOMENIUK</b> <i>Substantia nigra and Parkinson's disease</i>	<b>26-27</b>
16.	<b>Andrii KAVRATKA, Kateryna SARZHYNska</b> <i>Forgotten diseases and where to find them</i>	<b>27-29</b>
17.	<b>Yelyzaveta KOLOMIETS, Alina HOMENIUK</b> <i>Interesting facts about the thyroid gland and its diseases</i>	<b>30-31</b>
18.	<b>Iryna KONSTANTYNOVSKA, Oksana PETROVA</b> <i>The relationship between the historical and clinical view of art and medicine: porphyria</i>	<b>31-32</b>
19.	<b>Oleksandra KOTELEVYCH, Kateryna SHUBKINA</b> <i>Nitric oxide and its role in the regulation of vascular tone in normal and diseased state</i>	<b>33-34</b>

20.	<b>Kateryna LIEBIEDIEVA, Oksana PETROVA</b> <i>Etiological role and features of microorganisms causing complications of joint prosthetics</i>	<b>34-35</b>
21.	<b>Veronika LESHCHUK, Kateryna SHUBKINA</b> <i>Transforming healthcare</i>	<b>36-37</b>
22.	<b>Diana MENSHYKOVA, Oksana PETROVA</b> <i>Heart tamponade began picking up steam in Ukraine</i>	<b>37-38</b>
23.	<b>Oleksandr MINAKOV, Kateryna SARZHYNska</b> <i>The placebo effect</i>	<b>38-39</b>
24.	<b>Nataliia MYKHLYK, Alina HOMENIUK</b> <i>The impact of oral contraceptives on health</i>	<b>40-41</b>
25.	<b>Daria NIKOLENKO, Kateryna SHUBKINA</b> <i>Immunotherapy in the treatment of glioblastomas</i>	<b>41-43</b>
26.	<b>Tamara OBLONska, Oksana PETROVA</b> <i>Prognostic value of the determination of the tissue perfusion index in newborn with hypoxic ischemic encephalopathy at the rehabilitation period</i>	<b>43-44</b>
27.	<b>Alina PANCHENKO, Kateryna SARZHYNska</b> <i>Oncomarkers</i>	<b>44-46</b>
28.	<b>Mariia-Mahdalyna PELCHAR, Kateryna SHUBKINA</b> <i>Essential vitamins and supplements for enhanced well-being and vitality in everyday life</i>	<b>46-48</b>
29.	<b>Vasilisa PISAREVA, Oksana PETROVA</b> <i>Effect of electronic cigarettes on the intrauterine state of the fetus during pregnancy</i>	<b>48-49</b>
30.	<b>Pavlo RAKITA, Kateryna SHUBKINA</b> <i>Body dysmorphia and body image issues</i>	<b>50-51</b>
31.	<b>Mariia ROLDUHINA, Alina HOMENIUK</b> <i>Negative effect of statins on the human body</i>	<b>51-52</b>
32.	<b>Mariia ROMASHKA, Kateryna SHUBKINA</b> <i>Acute myocardial infarction complicated by cardiogenic shock in Ukraine: multicentre registry analysis 2021-2022</i>	<b>53-54</b>
33.	<b>Taras SHEVCHENKO, Olena TRETIAKOVA</b> <i>Diabetes, cardiovascular disease, and cancer: global perspective</i>	<b>55-56</b>
34.	<b>Anastasiia SYMONOVA, Olena TRETIAKOVA</b> <i>Clinical features of delirium</i>	<b>56-57</b>
35.	<b>Yevhen TEREKHOV, Olha NASHYVANKO</b> <i>Increase in the incidence in tick-borne diseases as a health hazard to people</i>	<b>58-61</b>
36.	<b>Andrii TITENKO, Kateryna SARZHYNska</b> <i>Epidural anesthesia</i>	<b>62-64</b>
37.	<b>Yelyzaveta YANHEL, Vitalina HRYTSIV</b> <i>Exploring the synergy between biotechnology and medicine</i>	<b>64-65</b>
38.	<b>Anna ZADOROZHNYA, Olha NASHYVANKO</b> <i>New methods of diagnostics of oncological diseases</i>	<b>66-68</b>

<b>2. ECOLOGY</b>		
39.	<b>Yelyzaveta CHOPOROVA, Oksana PETROVA</b> <i>Study of the ecological condition of soils in Dnipro City park area</i>	<b>69-70</b>
40.	<b>Taisiia PANCHENKO, Oksana PETROVA</b> <i>Adventization of the flora in floodplain biotopes of the northern steppe Dnipro region</i>	<b>70-72</b>
41.	<b>Bohdan TROFIMOV, Iryna KLYMENKO</b> <i>The impact of war on Ukrainian ecology</i>	<b>72-73</b>
<b>3. HEALTHY LIFESTYLE</b>		
42.	<b>Vladyslava DUDNYK, Iryna KLYMENKO</b> <i>How did the biorhythms of people in Ukraine change during war</i>	<b>74-75</b>
43.	<b>Anastasiia HVOZDENKO, Oksana PETROVA</b> <i>The influence of social networks on psycho-emotional state and self-esteem of teenagers</i>	<b>75-76</b>
44.	<b>Kateryna KRASYLNIKOVA, Alina HOMENIUK</b> <i>The link between alcohol and mental health problems</i>	<b>77-78</b>
45.	<b>Roman NASHYVANKO, Oksana KHAZOVA</b> <i>The impact of smartphones on our health</i>	<b>78-80</b>
46.	<b>Rymma PARATSII, Kateryna SHUBKINA</b> <i>Features of violence</i>	<b>80-81</b>
47.	<b>Kateryna REZUNOVA, Olena REZUNOVA</b> <i>Addressing the crisis of physical inactivity in the modern world</i>	<b>81-82</b>
48.	<b>Kateryna SMAHA, Alina HOMENIUK</b> <i>The detrimental effects of smoking</i>	<b>83-84</b>
49.	<b>Polina STAROSTENKO, Kateryna SARZHYNska</b> <i>Eating disorder as mental illness</i>	<b>84-85</b>
50.	<b>Viktoriiia TOPIEKHA, Alina HOMENIUK</b> <i>The modern dependency of society</i>	<b>86-87</b>
51.	<b>Artem VASYLIEV, Oksana PETROVA</b> <i>Microgreen – a green source of microelements for human health</i>	<b>87-88</b>

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## **USE AND TOXICITY OF THE COLONY-STIMULATING FACTORS**

Recent research has shed light on novel aspects of colony-stimulating factor (CSF) use and toxicity, offering insights that could shape future clinical practice. One significant discovery is the role of genetic variations in influencing individual responses to CSF therapy. Studies have identified specific genetic polymorphisms that may affect patients' susceptibility to CSF-induced toxicity, providing a potential avenue for personalized treatment approaches.

Advances in pharmacogenomics have highlighted the importance of genetic testing to identify patients at higher risk of adverse reactions to CSFs. By incorporating genetic data into treatment decision-making, clinicians can optimize therapy, minimizing toxicity while maximizing therapeutic benefit.

Furthermore, emerging evidence suggests a potential link between CSF therapy and immune-related adverse events, such as autoimmune disorders and immune-mediated inflammatory reactions. Understanding these immunological effects is crucial for predicting and managing toxicity associated with CSF administration, especially in patients with pre-existing autoimmune conditions or those receiving immunotherapy for cancer. Investigations into the underlying mechanisms of CSF-induced toxicity have revealed intricate interactions between CSFs and various signaling pathways, including those involved in inflammation and cell proliferation. These findings offer potential targets for pharmacological interventions aimed at modulating CSF effects and reducing toxicity.

Incorporating these new discoveries into clinical practice holds promise for enhancing the safety and efficacy of CSF therapy. By leveraging genetic insights, refining

risk stratification strategies, and unraveling the underlying mechanisms of toxicity, researchers and clinicians can work collaboratively to optimize CSF treatment regimens and improve patient outcomes.

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## **PNEUMONIA**

Pneumonia is an infection of the pulmonary parenchyma. Despite significant morbidity and mortality, it is often misdiagnosed, mistreated, and underestimated. Pneumonia has usually been classified as community acquired (CAP), hospital-acquired (HAP), or ventilator-associated (VAP). A fourth category, health care-associated pneumonia (HCAP) was introduced to encompass cases caused by multidrug-resistant (MDR) pathogens typically associated with HAP and cases in unhospitalized individuals at risk of MDR infection. Unfortunately, this category has not reliably predicted infection with resistant pathogens and has been associated with increased use of broad-spectrum antibiotics, particularly those employed for treatment of methicillin resistant *Staphylococcus aureus* (MRSA) and antipseudomonal  $\beta$ -lactams. Accordingly, use of the HCAP category should be discontinued. Rather than relying on a predefined subset of pneumonia cases, it is better to assess patients individually on the basis of risk factors for infection with a resistant organism. Risk factors for infection with MRSA and *Pseudomonas aeruginosa* include prior isolation of the organism, particularly from the respiratory tract during the preceding year, and/ or hospitalization and treatment with an antibiotic in the previous 90 days.

Pneumonia caused by macroaspiration of oropharyngeal or gastric contents, usually referred to as aspiration pneumonia, is best thought of as a point on the continuum that includes CAP and HAP. Estimates suggest that aspiration pneumonia accounts for 5–15%

of CAP cases, but reliable figures for HAP are unavailable. The airways or pulmonary parenchyma may be involved, and patients usually represent a clinical phenotype with risk factors for macroaspiration and involvement of characteristic anatomic pulmonary locations.

Pneumonia is the result of the proliferation of microbial pathogens at the alveolar level and the host's response to them. Until recently, it was thought that the lungs were sterile and that pneumonia resulted from the introduction of potential pathogens into this sterile environment. Typically, this introduction occurred through microaspiration of oropharyngeal organisms into the lower respiratory tract. Overcoming of innate and adaptive immunity by such microorganisms could result in the clinical syndrome of pneumonia.

Recent use of culture-independent techniques of microbial identification has demonstrated a complex and diverse community of bacteria in the lungs that constitutes the lung microbiota. Awareness of this microbiota has prompted a rethinking of how pneumonia develops.

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## **ANTI-HORMONES OF SEX STEROIDS**

Hormone-dependent cancers are type of cancer that require a certain hormonal influence for their growth or survival. Cancer cells have membrane receptors for hormones, for example, for sex steroids like estrogen or testosterone, and without these hormones the cells cannot continue to proliferate by cell division, so they die. Therefore, suppressing the action of these hormones leads to the regression of cancer. Currently, hormone therapy is a full-fledged method of treatment, because it shows its high



efficiency. The basis of its treatment are drugs that have the common name of antihormones.

Antihormones are substances that act against hormones and suppress their action. Numerous anti-hormonal medications have been formulated to disrupt the bond between the hormone and its receptor.

1) Tamoxifen (brand names: Nolvadex, Soltamox) — is the first anti-hormone of female sex hormones that received wide clinical use. According to its chemical structure, it is an analogue of estrogens and is a derivative of triphenylethylene.

The mechanism of action of this drug consists in inhibiting the action of estrogens by competitive binding to estrogen receptors, which leads to inhibition of the action of estrogens on body cells sensitive to them. The consequence of this is primarily inhibition of the growth of estrogen-dependent malignant tumors, since tamoxifen is more active against cells in which mitotic activity is more expressed, which is higher precisely in tumor cells. Therefore, Tamoxifen blocks the attachment of estrogen and thus prevents its effect on mammary gland cells, and especially on cancer cells. However, in clinical studies it was found that tamoxifen also affects estrogen-insensitive tumors, which gives reason to believe that the drug has other mechanisms of action on the tumor.

There are other anti-estrogen drugs that block the enzyme aromatase, which is used to synthesize estrogen, such as Anastrozole, letrozole, Eemestane.

Tamoxifen is used for breast cancer in both women and men, but its application in women who are postmenopausal with such breast cancer is less effective than aromatase inhibitors. Tamoxifen also has estrogen-like effects on bone tissue, the endometrium, and lipid metabolism.

Also, Tamoxifen is considered a potentially embryotoxic drug, and its using during pregnancy can lead to the birth of a child with multiple developmental anomalies, as well as to spontaneous termination of pregnancy or stillbirth, although during long-term observation there were cases of birth of healthy babies.

2) Flutamide is an antihormone of male sex steroids. The mechanism of action of the drug consists in blocking androgen receptors in the target cells of the prostate, which leads to the inhibition of the binding of androgens to the receptors, as a result of which the biological effects of androgens are blocked. One of this is the inhibition of tumor growth

in the prostate gland, as well as the prevention of the development of tumor metastasis. However, Flutamide does not have an inhibitory effect on the secretion of testosterone and on the sensitivity of the pituitary gland to the secretion of gonadotropin-releasing hormone, which even leads to an increase in the concentration of testosterone in the blood.

In conclusion, the goal of antihormone treatment is to slow the growth of hormone-dependent malignant tumors. The main advantage of the method is its systematic nature. When using this treatment option, both the primary tumor and all metastatic foci are effectively suppressed.

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## **PATHOLOGY OF BIPOLAR DISORDER**

Bipolar disorder (BD) is present in 1-2% of the world's population and is among the top 20 causes of disabilities worldwide.

Patients with bipolar disorder experience severe drastic changes in emotional and mental state with alternating periods of mania and depression, with some cases featuring psychotic episodes. In addition to this, patients often experience changes in cognitive abilities, circadian rhythms, and motor activity. Up to half of patients with bipolar disorder attempt suicide in the span of their life. Thus, understanding of pathogenesis and proper treatment of the disorder is essential for improving the quality of life and survival rate of the patients.

Studies show a strong genetic predisposition of up to 70-90% for developing bipolar disorder. However, no specific allele combinations were found to cause the development of the disorder. Recent studies suggest the primary role of the prefrontal-striatal-thalamic-limbic ("visceromotor") network in the development of bipolar disorder.

The amygdala is a part of the limbic system responsible for generating emotional responses and cognition, as well as taking part in circadian rhythm regulation. Its function is modulated by the ventral prefrontal cortex, which plays a role in the inhibition of emotional responses and decision-making, so its role is essential for the production of healthy emotional reactions. It was found that the amygdala is hyperactive during manic episodes. In addition, ventral prefrontal cortex regions are generally inhibited in patients with BD, with the right region being less active during mania and the left region being less active during a depressive state. During the euthymic period, in which bipolar patients do not experience pathological mood states, such limbic and prefrontal dysfunctions were not seen.

Such functional dysregulations found explanations on neuroimaging. After the onset of manic episodes in bipolar youth, amygdala growth first decreased, but then increased, resulting in greater amygdala size later in life compared to healthy individuals. The ventral prefrontal cortex was found to have reduced size, corresponding to its decrease in function. Even more, some studies found evidence of decreased myelination of white matter connecting such emotion-regulating regions of the brain.

Collected evidence suggests that the overactivation of the amygdala and failure of the prefrontal cortex to inhibit newly generated emotional responses due to decreased white matter connectivity results in exaggerated prolonged emotional states seen in bipolar disorder.

Such insight into the possible pathogenesis of bipolar disorder not only provides ground for future research on the development of the disease but also can be useful for implementing new treatment options for bipolar patients. Influence on amygdala and ventral prefrontal cortex growth before the onset of the symptoms in youth can potentially prevent BD progression.

The age of onset of bipolar disorder usually averages 12-25 years, which confirms the association of its pathogenesis with key periods of brain development. In addition, anxiety disorders, especially PTSD, often occur simultaneously with BD. The prevalence of bipolar disorder among individuals with PTSD ranged from 6% to 55% in different studies. The reason of such co-occurrence can be the fact that both BD and anxiety disorders cause changes to the same region of the brain – limbic system.

Research suggests that people who experience PTSD can have a higher risk of developing bipolar disorder. That means, in times of global crisis and wars, like the one that is happening in Ukraine right now, civilian youth and especially young soldiers who take part in highly traumatic situations and are at risk of developing PTSD, can also develop co-occurring bipolar disorder. That once again stresses the importance of mental health support to civilians and the military during and after military conflicts.

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## **ANTIBIOTIC RESISTANCE**

Antibiotics is one of the paramount discoveries of the 20th century, notifying not only the preservation of countless lives but also catalyzing remarkable achievements in medical and surgical advancements. They have effectively thwarted infections in a spectrum of patients undergoing chemotherapy, grappling with chronic ailments like

diabetes or rheumatoid arthritis, or recuperating from complicated surgeries such as organ transplants and cardiac procedures.

Despite the many benefits this therapeutic approach affords, the realm of antibacterial therapy faces controversy today. The misuse and indiscriminate dispensation of antibiotics by healthcare practitioners have emerged as principal reason for the proliferation of antibiotic resistance (AR) within populations.

This surge in resistance stems largely from the excessive and unregulated administration of antibiotics across medical, veterinary, and agricultural domains, coupled with their seepage into soil and water reservoirs. AR manifests as an evolutionary retort of bacteria, engineered to withstand therapeutic antibiotics. This phenomenon, in all its manifestations, is genetically determined, driven by the acquisition of new genetic material or alterations in gene expression.

Nowadays, the scientific community tries its best to devise efficacious strategies to combat AR. While antibiotic usage itself isn't the crux of the issue, the dwindling availability of first-line and subsequent antibiotic treatments may make healthcare providers resort to more potent but costlier and potentially toxic alternatives.

In response to this unfolding crisis, the World Health Assembly has ratified five strategic action plans aimed at mitigating AR. These plans include making more people aware of antimicrobial resistance, strengthening efforts to watch and research it, making sure sanitation and hygiene rules are strict, using antimicrobials better in hospitals and for animals, and investing in new treatments, tests, and vaccines that are good for the environment. Scientists are eagerly looking for different sources of antibiotics found in nature. Plants seem to be a hopeful option, as they contain substances that can fight microbes. Recent discoveries have found many useful compounds like polyphenolics and alkaloids in plants.

In essence, antibiotic resistance is becoming a bigger problem without a clear solution right now. But there are various ways to tackle it, and preventing infections in the first place is the most important way to stop antibiotic resistance from spreading worldwide.

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## **STEM CELLS**

Stem cells are special human cells that are able to develop into many different cell types. This can range from muscle cells to brain cells. In some cases, they can also fix damaged tissues. Researchers believe that stem cell-based therapies may one day be used to treat serious illnesses such as paralysis and Alzheimer disease.

Embryonic stem cells. The embryonic stem cells used in research today come from unused embryos. These result from an in vitro fertilization procedure. They are donated to science. These embryonic stem cells are pluripotent. This means that they can turn into more than one type of cell.

There are 2 types of adult stem cells. One type comes from fully developed tissues such as the brain, skin, and bone marrow. There are only small numbers of stem cells in these tissues. They are more likely to generate only certain types of cells. For example, a stem cell that comes from the liver will only make more liver cells.

The only stem cells now used to treat disease are hematopoietic stem cells. These are the blood cell-forming adult stem cells found in bone marrow. Every type of blood cell in the bone marrow starts as a stem cell.

These cells are used in procedures such as bone marrow transplants. These help people with cancer make new blood cells after their own hematopoietic stem cells have been killed by radiation therapy and chemotherapy. They may also be used to treat people with conditions such as Fanconi anemia. This is a blood disorder that causes the body's bone marrow to fail.

Stem cells may help your health in the future in many ways and through many new treatments. Researchers think that stem cells will be used to help create new tissue. For

example, one day healthcare providers may be able to treat people with chronic heart disease. They can do this by growing healthy heart muscle cells in a lab and transplanting them into damaged hearts. Other treatments could target illnesses such as type 1 diabetes, spinal cord injuries, Alzheimer disease, and rheumatoid arthritis. New medicines could also be tested on cells made from pluripotent stem cells.

**Umbilical cord blood stem cells: advantages** The main feature of cord blood stem cells is that they can be autologous. Parents who have preserved the umbilical cord blood (and often also the umbilical cord and placenta) of a born child provide him with life-long insurance in the event of a serious illness or injury.

One of the advantages of collecting umbilical cord blood is the complete safety and painlessness of the process. Obtaining stem cells from this biological material, as well as from the umbilical cord and placenta, does not contradict any ethical standards. From preserved stem cells, you can also get a biological preparation that is used for cosmetic purposes and in gerontology to rejuvenate the body.

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## **THE PROCESS OF INSTALLING DENTAL CROWNS ON TEETH**

Imagine you're tired of the pain in your tooth that requires restoration. You decide to seek help from a dentist. After consultation, the doctor explains the procedure of placing a crown on your tooth. He explains that a crown is a special cap, usually made of metal, ceramic, or a mixture of materials, that is placed on the top of a damaged tooth. This is a restoration method that restores the shape, size, and function of a tooth that may be damaged from decay, trauma, or other reasons.

The first step in the procedure is a detailed examination of your tooth by the dentist. He determines the condition of the tooth and decides if a crown needs to be placed. If

necessary, the doctor takes an impression of your tooth using special rubber or digital technologies to accurately reproduce its shape and dimensions.

Afterward, the impression is sent to the laboratory where craftsmen manufacture the crown. This process may take several days or weeks, depending on the type of crown and the lab's schedule. When the crown is ready, you return to the dentist for its installation. The doctor checks the fit of the crown and then applies special adhesive or cement to fix it to your tooth. He carefully aligns the crown with the other teeth, ensuring that it sits comfortably and securely. During the crown placement procedure, the dentist may also use local anesthesia to ensure your comfort. This helps avoid pain during treatment and crown placement.

Additionally, there are various types of crowns that can be installed depending on the patient's needs and the dentist's recommendations. For example, ceramic crowns look natural and are the most aesthetic option, while metal-ceramic crowns combine the strength of metal with the cosmetic benefits of ceramics.

It's also important to remember that there may be an adjustment period after crown placement. Some patients may experience temporary sensitivity or unusual sensations in the area of the new crown, but this usually subsides within a few days. Proper care for the crown is also essential to remember, including regular teeth cleaning and visits to the dentist for preventive check-ups. This will help ensure the longevity and effectiveness of the crown.

Overall, crown placement is an important and effective way to restore a damaged tooth, helping patients return to normal life without pain and discomfort.



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## **THE ROLE OF SINGLE-NUCLEOTIDE VARIANTS OF THE GENE GLUCAGONO-LIKE RECEPTOR TYPE 1 IN OBESITY**

**Background.** Overweight and obesity cause more than 1.3 million deaths worldwide each year. Glucagon-like peptide type 1 (Glucagon-like peptide type 1- GLP-1) is a peptide hormone from the incretin family that is produced by L-cells of the mucous membrane of the small intestine in response to food intake and regulates insulin secretion. Considering that one of the main functions of GLP-1 is the regulation of appetite, the formation of taste preferences for sweet food - a malfunction of the GLP-1/Glucagon like peptide 1 receptor (GLP-1R) axis, determined by single nucleotide variants (SNV) of the gene *glucagon-like receptor type 1 (GLP1R)* contributes to the development of obesity and metabolic disorders. Targeted molecular genetic monitoring of SNV *GLP1R* with the aim of timely detection of the fact of a decrease in the level of production or reception of GLP-1 in the body, violation of taste preferences for sweet food, can be a means of predicting the development of diabetes mellitus (DM) type 2 in obese children.

**Research materials and methods:** 100 children aged 15-18 years were examined. The main group (n=52) was represented by children with obesity. The control group (n=48) consisted of children with physiological body weight. 52 obese children underwent whole genome sequencing (CeGat, Germany). Taste preferences were assessed for all children using the *Food and Beverage Preference Questionnaire*. Static analysis included variational and correlational analysis, a method of assessing data dispersion. The critical value of the level of statistical significance (p) for all types of analysis was accepted at the level of  $p < 0.05$  (5%).

**The results.** The average level of sweet taste preference among obese children was  $3.38 \pm 0.06$  points, while in the control group it was  $3.74 \pm 0.05$  points,  $p=0.000013$ . 14 SNVs of the *GLPIR* gene were found among obese children: rs761386, rs1042044, rs1126476, rs2235868, rs3765468, rs61754624, rs6918287, rs6923761, rs10305420, rs10305421, rs10305457, rs103054 92, rs10305493, rs1472308929. The highest correlation between sweet taste preference was observed for SNV rs6918287 ( $r=0.61$ ,  $p<0.05$ ), when comparing 14 SNVs.

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## **THE ROLE OF XENOTRANSPLANTATION IN TREATMENT OF CHRONIC KIDNEY DISEASE**

Human organism is a complex biologic system and even not significant disorders can cause substantial complications. All the physiological processes are important to support homeostasis. There are several systems of organs in our organism which are divided corresponding to their specific functions.

The urinary system is responsible for excretion the products of metabolism. Considering the fact that the main organs producing urine are kidneys, their dysfunction is necessary to be cured. When a patient suffers from diabetes and high blood pressure [1], a risk of chronic kidney disease is developing. It means that kidneys can't filter blood properly, consequently there are two approaches that are widely used in these cases: dialysis and kidney transplantation. After end-stage kidney disease has stated, dialysis is the way to wait for the transplantation [2].

The statistics of this disease is frightening since the level of illness is extremely high. Nowadays about 10% people in the world are affected by chronic kidney disease [3].

Despite this situation, only over 2 million people that comprise 10% of patients have access to the treatment. In the USA there are 37 million adults who need dialysis or transplantation, whereas only 25,000 patients receive transplants each year [4].

In order to find the solution, the scientists needed to discover alternative material for this surgery such as genetically modified pig kidney. Although xenotransplantation includes some ethical problems, even veterinary surgeons agree with the necessity of these victims.

The first experiments have shown that transplanted pig kidney can effectively filter waste from the blood and it can function more than 1 month in the human organism. Pig kidneys produced urine and filtered creatinine into the organism of deceased human after brain dead. It is needed to point out that before the operation the level of creatinine was rather higher than after successful filtration by pig kidneys. This research has been conducted by the University of Alabama at Birmingham's Heersink School of Medicine. The team at New York University Langone Health shows that it is possible when pig kidneys have not been rejected by the human immune system. These researches have been conducted in the recipients with brain dead.

On 16 March 2024 a four-hour-long surgery [5] was being conducted [6] by Harvard Medical School physician-scientists at Massachusetts General Hospital during which a genetically-edited pig kidney was transplanted into the body of recipient. The patient was 62-year-old Richard (Rick) Slayman of Weymouth, Massachusetts who has already been discharged from the hospital in two weeks after the operation. The pig kidney was 'humanised' due to the commonly used CRISPR/Cas9 technique that helped to edit 69 genes [7]. As a result, pig carbohydrates have been removed and endogenous retrovirus has been inactivated, whereas human complement inhibitors, anti-coagulants and immune regulators have been added [6]. In general, the operation drew from its history, it was considered to have started in 1954 [5] when the first kidney was successfully transplanted, and the research was being conducted over the past five years.

On the other hand, some scientists are afraid of probability of organ rejection and transmission of animal viruses to recipients [7]. In addition, a stable mechanism of xenotransplantation does not exist because this surgery has not been explored well yet. At the same time, it is estimated that 17 patients die waiting for transplants each day in the

USA [5], so this problem is actual now. In conclusion, this step is really important and essential for future transplantations, however final results can't be estimated right now.

Resources:

1. [https://www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd#:~:text=Chronic%20kidney%20disease%20\(CKD\)%20means,family%20history%20of%20kidney%20failure](https://www.niddk.nih.gov/health-information/kidney-disease/chronic-kidney-disease-ckd#:~:text=Chronic%20kidney%20disease%20(CKD)%20means,family%20history%20of%20kidney%20failure)
2. <https://www.kidney.org/atoz/content/dialysisinfo>
3. <https://www.kidney.org/kidneydisease/global-facts-about-kidney-disease>
4. <https://www.medicalnewstoday.com/articles/pig-kidney-transplants-humans>
5. <https://www.bbc.com/news/world-us-canada-68710229>
6. <https://hms.harvard.edu/news/first-genetically-edited-pig-kidney-transplanted-human>
7. <https://www.sydney.edu.au/news-opinion/news/2024/04/10/first-pig-kidney-transplant-raises-hope--but-we-re-still-far-from-fixing-organ-shortages.html>

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## **MODERN METHODS OF RESTORING THE APPEARANCE OF TEETH**

Aesthetic dentistry in the modern world not only solves health problems of teeth, but also focuses on their appearance. Healthy and beautiful teeth have become an integral part of overall social success.

Aesthetic dentistry has deep historical roots. Already in Antiquity people used various materials, including wood and stone, for replacement of lost teeth.

The use of computer technologies, such as CAD/CAM systems, allows you to create accurate and individualized restorations, taking into account the smallest details of the structure of the teeth. New materials and technologies have opened up countless opportunities to restore the shape and color of the teeth. From ceramic veneers to composite restorations – doctors have a wide choice for the most accurate reproduction of natural look.

Aesthetic dentistry also includes implantation and prosthetics. Innovative implants and prostheses provide not only functionality, but also a harmonious appearance, reproducing natural anatomy.

Modern methods of aesthetic dentistry provide an individualized approach to each patient. Taking into account the physiology of the face, the features of enamel coating and choosing the optimal treatment method for the best results.

Aesthetic dentistry has become not only a medical field, but also an art aimed at creating beauty and health. Modern methods of restoring the appearance of teeth open up new opportunities for dentists in providing high-quality and aesthetic assistance to patients.

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## **EVALUATION OF THYROID HORMONE LEVELS IN CHRONIC KIDNEY DISEASE PATIENTS**

Chronic kidney disease (CKD) is a multifaceted non-communicable disease characterized by a progressive decline in kidney function ultimately requiring renal replacement therapy (RRT) in most patients. Due to the high cost and availability of a limited number of donors, the majority of patients depend on dialysis and conservative management. Thyroid hormones are indispensable for the growth, development, and homeostasis of our body. The kidney plays an important role in the metabolism, degradation, and excretion of thyroid hormones. Various studies have revealed significant dysfunction in thyroid hormone status in CKD patients, but the results are inconsistent.

Thyroid hormones are important for the development of kidneys and the maintenance of the internal environment of the body. The thyroid hormones and kidney function are interrelated with each other. The kidney not only participates in thyroid

hormone metabolism and elimination, but it also serves as an important site for thyroid hormone action. Thyroid hormone secretion is disturbed in CKD patients as the hypothalamic pituitary thyroid axis gets influenced. Alternatively, thyroid disturbance leads to altered kidney function by affecting water and electrolyte balance, GFR, kidney architecture, renal blood flow, and tubular function.

In this cross-sectional, case-control study, we studied 45 adult CKD patients who visited the Department of Nephrology, NRI Medical College and General Hospital; 26 patients were male and 19 patients were female, with duration of CKD < 5 years. Institutional ethics committee clearance was obtained prior to the study and informed consent was obtained from the subjects participating in this study.

Forty-five age and sex-matched healthy individuals were included as controls. Patients with clinically diagnosed chronic renal failure (on conservative management before dialysis) due to chronic

glomerulonephritis and other glomerular diseases, chronic pyelonephritis and obstructive uropathy with serum creatinine levels more than 3.0 mg/dL were included in the study. CKD with diabetes mellitus/essential hypertension/liver diseases/coronary artery disease/vasculitis/thyroid disorders on treatment/ other auto-immune disorders were excluded. The clinical history and other necessary details were obtained from the patients' medical records.

There was a significant difference between the study group and the controls with respect to serum TSH levels. Serum total T3 and total T4 levels were significantly less in the study patients compared with the controls. Serum potassium levels were not altered significantly in the CKD patients. Total protein, albumin and sodium levels were significantly decreased in the CKD patients.

**Conclusion:** Patients with CKD were at risk of thyroid hypofunction irrespective of their mode of treatment. This study highlights the clinically relevant interactions between renal and thyroid function, which may be helpful to clinicians for optimal diagnosis and management of CKD patients.

#### Resources:

1. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC10024800/>
2. [https://journals.lww.com/sjkd/fulltext/2015/26010/evaluation\\_of\\_thyroid\\_hormone\\_levels\\_in\\_chronic.15.aspx](https://journals.lww.com/sjkd/fulltext/2015/26010/evaluation_of_thyroid_hormone_levels_in_chronic.15.aspx)

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## **FATAL FAMILY INSOMNIA**

**Fatal familial insomnia (FFI)** is a rare genetic condition that affects your brain and central nervous system. It causes you to have insomnia, dementia and muscle twitching. FFI is degenerative, which means symptoms get more severe over the time. Symptoms of the condition are life-threatening and there's no cure. Studies are ongoing to find treatment options to reduce the progression of symptoms and extend the life of people diagnosed with this condition.

Fatal familial insomnia (FFI) targets your brain and central nervous system when proteins caused by a genetic mutation cluster on the part of your brain that controls body functions like to sleep (thalamus). The most severe symptom is insomnia, which affects your mental capabilities and your body functions. Symptoms are progressively get more severe over the time.

A mutation or change of the PRNP gene causes FFI. The PRNP gene is responsible for making the prion protein PrPC. Prion protein PrPC exists in your brain, specifically in the thalamus, which helps to regulate body functions like sleep. When there's a mutation on the PRNP gene, the amino acids that build the PrPC proteins don't have instructions to build the proteins correctly. This mutation is similar to folding your laundry. If you're unsure how to fold a T-shirt, you might ball up the fabric and put it in a drawer. Over the time, that drawer progressively becomes difficult to close because you collect several T-shirts that aren't folded correctly. Misfolded T-shirts are PrPC proteins that collect on your brain and become toxic to the cells in your nervous system, which creates symptoms.

Symptoms of fatal familial insomnia include: progressive insomnia, nervous system overactivity including high blood pressure, a faster-than-normal heart rate and anxiety, memory loss, hallucinations, myoclonus.

Symptoms of fatal familial insomnia (FFI) begin between the ages of 20 and 70. The average onset of symptoms is age 40. Early symptoms of FFI can look similar to those of dementia and Alzheimer's disease.

There's no cure for FFI. After a diagnosis, treatment is symptomatic to make you feel more comfortable, with palliative care. The life expectancy for a person diagnosed with FFI is poor – especially after symptoms start, where the life expectancy ranges from a few months to a couple of years. The condition is progressive, which means it gets worse with time.

Families are encouraged to participate in therapy to discuss care options not only for the person diagnosed with the condition but to emotionally support themselves and prepare for the sudden loss of a loved one.

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## **DOPPLER ULTRASOUND OF THE VESSELS OF THE NECK AND HEAD**

Doppler ultrasound of the vessels of the neck and head is a non-invasive diagnostic method used to study the trajectory of movement and speed of blood flow, the presence of atherosclerotic plaques, blood clots, the thickness of vessel walls, abnormalities in the structure of vessels, and intracranial pressure.

### **How is the Doppler of the vessels of the head and neck performed?**

First, the doctor applies the gel to the examined area. The gel provides good contact between the sensor and the skin. As a result, sound waves penetrate tissues better. The doctor places the ultrasound sensor on the skin and then moves the sensor over the examined area. When the sensor touches the skin, it sends pulses of inaudible high-frequency sound waves into the body, which allows you to measure the direction and speed of blood cell movement, which causes a change in the height of the reflected sound



waves (Doppler effect). The computer collects and processes information and creates graphs or color images on the monitor, thanks to which the diagnostician can see a complete picture of the state of the veins and arteries and the movement of blood along them.

### **What vascular pathologies does Doppler ultrasound detect?**

- atherosclerosis - the presence of tortuosity, bends, narrowing of the lumen of the vessel wall;
- stenosis - decrease in the diameter of veins, and arteries;
- thrombosis - detection of plaques, complete obturation (absence of lumen);
- vasculitis – change in the echogenicity of the layers of the vessel wall;
- aneurysm - expansion of a vessel with gradual thinning of its wall;
- anomalies in the structure of blood vessels: congenitally underdeveloped, congenitally absent, or pathologically "small";
- deformation, "squeezing" of vertebral arteries, abnormality of their development or entry into the spinal canal;
- Violation of venous outflow of blood from the brain;
- decrease in patency of main vessels.

The norm during the study includes vessels with a wide lumen and anatomically correct wall thickness.

Ultrasound examination of the neck and head vessels is a highly accurate, safe, painless, and minimally contraindicated diagnostic method. Regular ultrasound is recommended for the detection and prevention of vascular diseases. An ultrasound of the neck and head vessels can reduce the risk of ischemic stroke by up to 85%.

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## **MIGRAINES: CAUSES AND TREATMENT**

Migraine is a neurological condition characterized by recurrent episodes of severe headache, often accompanied by other symptoms such as nausea, vomiting, sensitivity to light, and sensitivity to sound. The exact cause of migraines is not fully understood, but it's believed to involve a combination of genetic, environmental, and neurovascular factors.

***Causes of Migraine:*** Genetics - migraines often run in families, suggesting a genetic predisposition to the condition; neurological factors - changes in the brainstem and its interactions with the trigeminal nerve, a major pain pathway, may contribute to migraine attacks;

imbalance in brain chemicals - serotonin levels drop during migraine attacks, which can trigger the trigeminal nerve to release neuropeptides, leading to inflammation and dilation of blood vessels in the brain; triggers - certain factors or triggers can precipitate migraine attacks in susceptible individuals. Common triggers include stress, hormonal changes in women (such as during menstruation or menopause), certain foods (such as aged cheeses, processed meats, and alcohol), sensory stimuli (like bright lights, strong smells, or loud sounds), changes in sleep patterns, dehydration, and weather changes.

***Treatment of Migraine:*** over-the-counter pain relievers like ibuprofen or naproxen can help alleviate mild migraines. For moderate to severe migraines, prescription medications such as triptans (sumatriptan, rizatriptan) or ergotamine derivatives may be prescribed. If migraines are frequent or severe, preventive medications may be prescribed. These include beta-blockers, anticonvulsants, antidepressants, and certain blood pressure medications. Keeping a migraine diary to track triggers can help in avoiding them. Stress reduction techniques such as relaxation exercises, meditation, or yoga may help. Regular

exercise, adequate sleep, and maintaining a balanced diet can reduce the frequency and severity of migraines. Biofeedback techniques can help in controlling physiological responses associated with migraines, such as muscle tension and heart rate. Certain herbs such as butterbur and feverfew may provide some relief, but their efficacy varies and should be used with caution.

Treatment approaches may vary depending on the individual's specific symptoms, triggers, and medical history. It's important for migraine sufferers to work closely with their healthcare providers to develop a personalized treatment plan.

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## **SUBSTANTIA NIGRA AND PARKINSON'S DISEASE**

The **substantia nigra** (SN) (also known as a black nucleus) is a basal ganglia structure located in the midbrain that plays an important role in reward and movement. *Substantia nigra* is Latin for "black substance", reflecting the fact that parts of the substantia nigra appear darker than neighboring areas due to high levels of neuromelanin in dopaminergic neurons.

**Anatomy.** The substantia nigra appears as a continuous band in brain sections, anatomical studies have found that it actually consists of two parts with very different connections and functions: the pars compacta (SNpc) and the pars reticulata (SNpr). The pars compacta serves mainly as a projection to the basal ganglia circuit, supplying the striatum with dopamine. The pars reticulata conveys signals from the basal ganglia to numerous other brain structures.

**Functions.** Being one of the main sources of dopamine in the brain and a crucial part of the basal ganglia pathways, the prime function of the substantia nigra is in the initiation

and control of movement. Movement is controlled in the basal ganglia loop via a direct pathway and an indirect inhibitory pathway. Both pathways are significantly influenced by dopamine released from the fibers of the pars compacta of the substantia nigra. The degeneration of dopaminergic cells in pars compacta leads to a condition known as Parkinson's disease.

The substantia nigra is part of the reward system circuitry of the brain. This system reinforces behaviors associated with rewards and prevents behaviors that lead to punishment. The changes in the reward system are connected to a number of psychiatric conditions such as substance abuse, alcoholism, impulse dysregulation and aggression.

**Clinical relations.** Degeneration of dopamine-producing cells in the pars compacta of the substantia nigra leads to a common clinical condition called Parkinson's disease. In Parkinson's disease, an individual has a lack of dopamine in the striatum which results in a lack of movement. Clinically, Parkinson's syndrome is expressed in the three classic main symptoms: Rigor - increased muscle tone Muscle tremor Akinesia - lack of movement The treatment is drug-based by administering L-DOPA (dihydroxyphenylalanine), a precursor of dopamine. L-DOPA can then be converted into dopamine by the cells of the substantia nigra and act on the striatum. Moreover, there are characteristic histologic changes in the substantia nigra that can be detected in patients with Parkinson's disease. They present in the form of small, round, eosinophilic inclusions called Lewy bodies. These structures are composed primarily of protein aggregates such as  $\alpha$ -synuclein.

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## **FORGOTTEN DISEASES AND WHERE TO FIND THEM**

One of the main activities of WHO, along with their associated organizations and independent private donors, is certainly that of funding the eradication of a vast majority

of diseases, such as polio, HIV, oncological diseases, etc. Thanks to their actions, two viruses are now considered completely eradicated. They are the smallpox virus (eradicated in 1980) and rinderpest virus (eradicated in 2011). Obviously, some of such cases receive larger donations and some are happy with what is left. They are popularized in the media and are well-known among regular people. But there are illnesses that, despite infecting millions and killing thousands of people, are hardly ever acknowledged in non-local media resources. Therefore, average people around the world have little to no chance of hearing about them. And, which is worse, the research of such diseases is poorly funded, so in most cases, the local governments are tasked with solving the issue themselves. These unfortunate cases are called Neglected Tropical Diseases (NTDs).

As the name suggests, NTDs are mostly common among poor communities in tropical and generally hot regions. However, they are not limited to the tropical regions alone, and different pathogens all around the world are gathered under the banner of NTDs. The main factors for their abundant growth are the lack of clean water, sanitary-hygienic capabilities and insufficient medical industry and treatment measures. Surely, the climate also plays a tremendous role in the progression of such diseases, so the hot and moist surfaces are just heaven-sent for them.

The most famous NTDs include: dracunculosis, echinococcosis, schistosomiasis, different filariasis, trematodes, trypanosomes, rabies, scabies. From that data, one can achieve the conclusion that NTDs are mostly about parasitic worms and it sure is due to the reasons stated above, them being the factors of the abundance of the diseases. The endemic disposition of these helminthes doesn't help either, both keeping the diseases in underdeveloped regions, catching people unaware and unable to create a proper response to the epidemic, and also preventing said illnesses from spreading into well-developed countries, which in turn discourages them to actively conducting research to eradicate such parasites. Furthermore, developing regions commonly have a large population that, firstly, helps in the transmission of the disease, and, secondly, causes a high death rate of the ill. Although most NTDs are relatively easy to treat in the early stages, they become nearly incurable and highly lethal as time advances, and, considering the socio-economic status and the level of diagnostic medicine of the countries these diseases are found in, early treatment is highly unlikely to be achieved.

So, would it even be possible to overcome such an issue, considering the global negligence and the lack of highlighting in the media? Definitely yes. Up to 90% of all NTDs come either from still natural water (dracunculosis, schistosomiasis, trematodes) or infected wild animals (echinococcosis, filariasis, rabies, scabies), so even just basic access to clean water and/or boiling devices would have a drastically positive effect. The most benefit would of course be achieved from, for instance, building a couple of wastewater treatment facilities and organizing a few campaigns on eradicating animals that are suspected of carrying harmful organisms. But even simple education about the importance of boiling water over the campfire or avoiding wild animals and their meat would also improve the situation by a mile. Local and volunteering foreign doctors also provide routine checkups to ensure the inability of the further transmission of said diseases. Agricultural and farming activities should also undergo regular revisions to ensure the safety of livestock and irrigation/water based technologies. Finally, improving the social standards and ensuring political sincerity would also grant people more access to the convenient measures of protecting themselves from different diseases both by boosting their income to allow possessing new forms of hygienic devices and high-end medical equipment, and by creating an opportunity for more medical and sanitary control personnel to actually stay in their country and not leave to others because of underpayment.

The WHO surely acknowledges the problem, and in the past 20 years, worldwide awareness and involvement in the movement against the NTDs greatly increased. For instance, in the 1980s, there were over 200, 000 cases of dracunculosis a year. Nowadays it is hardly a 20 people yearly and the number continues to drop. And, also, let`s not forget that the small amount of funding and acknowledgment is still money and awareness nonetheless, so step by step these problems become more and more highlighted and more and more people start to talk about them. And the more people talk, the more people know. The more people know; the more people try. The more people try, the more people overcome. And, at last, the more people overcome, the more they advance.

In conclusion, our most powerful weapon against NTDs right now is knowledge about how they form, what they cause and how humanity can get rid of them, and a word to spread about this knowledge so the neglected diseases would not be neglected anymore.

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## **INTERESTING FACTS ABOUT THE THYROID GLANDS AND ITS DISEASES**

The thyroid gland is an endocrine gland that is located on the front of the neck in front of the larynx and trachea and produces thyroid hormones. It produces two hormones (thyroxine and triiodothyronine), but only one of them is most active in the blood. In addition to iodized hormones, iron produces a non-iodized hormone - calcitonin. Each person has an individual structure of this organ, down to size and weight, and this is considered the norm. The thyroid gland controls the activity of almost all organs and systems and influences many processes in the body, for example, it supports energy metabolism in the body, affects human growth, the development of the central nervous system in children and many other processes. A person can live normally without a thyroid gland. This may seem strange, if this gland affects such important processes in the body, then how can a person live fully without it. But this is quite possible if you regularly see a doctor, take certain medications and follow a special diet.

The synthesis of thyroid hormones occurs in several stages and mainly for their secretion, iodine and the amino acid tyrosine are needed. But in addition to iodine, you need many other microelements: selenium, magnesium, zinc, copper, iron and vitamins E, D and group B. If a person has a deficiency of iodine, then hypothyroidism or hyperthyroidism may occur. Therefore, every person's diet should contain iodine-containing foods, for example, iodized salt, seaweed or seafood. The secretion of thyroid hormones is regulated by the hypothalamic-pituitary-thyroid system. It works on the principle of feedback: when a large amount of thyroid hormones is formed, the influence of the hypothalamus and pituitary gland on the gland itself decreases and, accordingly, less

hormones are produced. Also, increased production of thyroid hormones is affected by cold weather, and in women this can be observed during pregnancy.

Nodules may form in the thyroid gland, but they do not always mean thyroid disease. These are only age-related changes in the structure, however, an excessive amount of them can cause disruption in the functioning of the gland. Autoimmune thyroiditis occurs in 10-15% of people - it's like an allergy to TSH. That is, antibodies arise in the body that perceive its own thyroid gland as something foreign and attack it. This leads to early depletion of the gland and associated symptoms. Autoimmune thyroid diseases can occur when the body is overexposed to sunlight. Autoimmune thyroiditis can lead to the development of hypothyroidism.

Thyroid diseases can lead to negative consequences. Serious problems with the reproductive system in men and women may occur, for example, women may experience infertility, menstruation disorders and amenorrhea. Problems with the nervous system may also appear, sleep disturbances, changes in body weight, hair loss and other consequences.

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## **THE RELATIONSHIP BETWEEN THE HISTORICAL AND CLINICAL VIEW OF ART AND MEDICINE: PORPHYRIA**

The study develops reliable criteria for porphyria, a disease that was vividly represented by the English writer Stoker in the novel Dracula.

Porphyria is a group of hereditary diseases caused by impaired heme synthesis, with increased levels of its precursors in the blood and urine. The clinical manifestations of different types of porphyria are not the same.

Acute porphyria is caused by a change in a portion of DNA known as a gene; each of the different types of acute porphyria affects a different gene. Genes, which contain the



blueprint for all the components the body needs, usually occur in pairs. One of each pair is inherited from each parent. Sometimes a small error can occur when one of these genes is copied, resulting in a permanent change in the gene. When a variant of only one of a pair of genes causes the disease, as in the case of acute porphyria (AIP, HCP, VP), it is called autosomal dominant inheritance. If you have not inherited the altered gene, you cannot pass it on to your children. An extremely rare condition, ALA dehydratase deficiency porphyria, is inherited differently. The pathology occurs when there are two copies of a gene variant, one inherited from each parent, and is known as an autosomal recessive condition.

Since the symptoms of porphyria are nonspecific, i.e., characteristic of many other diseases, its diagnosis is often delayed. The comparative analysis of clinical and pathological data from autopsies allowed us to recommend that in the presence of depression, aggressiveness, severe abdominal pain, muscle weakness of the extremities, manifestations of neuropathy, and red urine color, a patient should consult a doctor to begin the process of examining the patient with a mandatory qualitative urine test for porphyrins, followed by a detailed biochemical and genetic analysis for porphyria.

Over the past 19 years, during pathological autopsies at the Municipal Enterprise "Dnipropetrovs'k Regional Pathological and Anatomical Bureau" of the Dnipropetrovs'k Regional Council", 7 patients with the main diagnosis of acute intermittent porphyria have been identified and registered, including 6 women and 1 man. According to the literature, the disease occurs in women 1.5 to 2.0 times more often than in men.

Attracting the attention of doctors is an important step towards the timely detection and implementation of sound pathogenetic therapy, a rare and prognostically unfavorable disease of intermittent porphyria.

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## **NITRIC OXIDE AND ITS ROLE IN THE REGULATION OF VASCULAR TONE IN NORMAL AND DISEASED STATE**

Nitric oxide is a common mediator released from endothelial cells under the influence of acetylcholine, and causes vasodilation due to relaxation of the muscular layer of blood vessels. As a result, peripheral vascular resistance decreases and blood pressure decreases. Nitric oxide is synthesized from L-arginine under the influence of the NO-synthase enzyme and is activated in response to a pathogenic factor.

Investigate the role of nitric oxide in the regulation of vascular tone in normal and pathological conditions, as well as the possibility of using drugs that affect the biosynthesis of nitric oxide, as well as its donors.

It is known from literary sources that under the influence of various mediators of vasodilation (acetylcholine, adenosine, 5-oxytryptamine, glutamate, bradykinin, histamine), the level of Ca<sup>2+</sup> increases in the cytoplasm of endothelial cells, which binds to calmodulin. This Ca<sup>2+</sup>-Calmodulin complex activates NO synthase. NO molecules activate guanylate cyclase, which activates protein kinase G, which dephosphorylates myosin light chains and prevents the formation of actin-myosin bridges. As a result, the sarcomere relaxes.

Normally, NO promotes vasodilation and regulates blood pressure. Experiments have shown that mutant mice that lack the gene encoding eNOS are hypertensive. There is also evidence that insufficient synthesis of nitric oxide in a pregnant woman's body leads to preeclampsia (late gestosis).

There are studies that indicate the role of nitric oxide in angiogenesis (the formation of new blood vessels) and in vascular remodeling, because it stimulates the synthesis of endothelial growth factor, which is important in the treatment of myocardial infarction.

Along with the beneficial effects of regulating vascular tone, metabolic disorders and/or nitric oxide release can cause severe human neurodegenerative diseases and septic shock. This is connected not only with the vasodilatory ability of nitric oxide, but also with the possibility of its binding with the superoxide anion of oxygen, with the formation of peroxynitrite anion ONOO<sup>-</sup>, which has cytotoxic properties.

Nitric oxide in physiological amounts (less than 0.1 μmol/l) is a powerful vasodilator, in high concentrations (above 0.4 μmol/l) it is a means of the body's fight against pathogenicity factors (microbes, malignant neoplasms), and can also be a factor of peroxide oxidation of cells.

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## **ETIOLOGICAL ROLE AND FEATURES OF MICROORGANISMS CAUSING COMPLICATIONS OF JOINT PROSTHETICS**

The problem of traumatism remains one of the most pressing in terms of the number of victims. Surgical treatment of patients with limb fractures involves the use of various osteosynthesis devices. From 3 to 67% of patients with osteosynthesis implants experience infectious complications that can lead to the development of chronic osteomyelitis. The absence of regulated treatment tactics in case of infection after osteosynthesis encourages specialists to further research and unify measures. Particular attention in this problem is paid to microbiological research. However, there is still no consistency in the choice of antibiotic therapy in the event of complications.

Thus, recently, the need to maintain "compliance" has been emphasized for the use of antibiotics. Therefore, the establishment of an etiologic diagnosis of an infectious complication, or the conclusion of an objectively conducted monitoring, in the absence of an isolated pathogen, is the key to the successful elimination of postoperative complications. Confirmation of the etiologic diagnosis of the infectious process, in addition to the identification of the microorganism isolated from the clinical material, is considered to be the establishment of its role in the development of the complication.

In the present research work, the study confirmed and substantiated the importance of timely microbiological examination in infectious complications of osteosynthesis and determination of pathogen sensitivity to antibiotics. Based on the results of microbiological examination of infectious complications of osteosynthesis, the local spectrum of pathogens and their sensitivity to antibiotics was determined and supplemented.

Novelty of the study and results. The microbial spectrum of pathogens that cause purulent and inflammatory processes in osteosynthesis complications has been significantly expanded. The study described and supplemented information on the local profile of chemotherapeutic sensitivity of pathogens associated with infectious and inflammatory complications of osteosynthesis. In the course of the research work, the knowledge about the adhesive potential of microorganisms associated with infectious and inflammatory complications of osteosynthesis was supplemented.

Practical significance of the results. We have confirmed the importance of microbiological examination of the tissue content in the area of osteoimplant with signs of infection. The results obtained in this study highlight the biological properties of pathogens that cause osteoimplantation infections. Data on the local profile of sensitivity to antimicrobial agents are used in the prescription of antimicrobial therapy by clinicians.

Keywords: infectious and inflammatory complications of osteosynthesis, multidrug resistance, microbiological profile.

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## **TRANSFORMING HEALTHCARE**

Artificial intelligence (AI) has brought about a profound transformation across various sectors, notably healthcare, where its impact on diagnosis and treatment is significant. Through the advancement of machine learning algorithms and data processing methods, AI has notably improved the precision of disease identification and the customization of treatment approaches.

AI's influence on medical diagnosis is principally manifested in its capacity to analyze extensive patient data and uncover patterns that may elude human healthcare providers. Machine learning algorithms swiftly and accurately interpret medical images like X-rays, MRIs, and CT scans, aiding in the early detection of anomalies or diseases. This early detection facilitates timely intervention, leading to better patient outcomes.

Furthermore, AI algorithms can assimilate and analyze diverse data types, including genetic profiles, electronic health records, and data from wearable devices. This holistic analysis provides a deeper understanding of a patient's health status and risks, enabling healthcare professionals to tailor treatment strategies according to individual factors such as genetics, medical history, and lifestyle.

Beyond diagnosis, AI plays a pivotal role in treatment planning and decision-making by mining large datasets of patient outcomes and treatment responses. This data-driven approach helps identify the most effective treatment options for specific conditions or patient groups, optimizing treatment outcomes and minimizing risks.

However, the integration of AI into healthcare presents challenges such as data privacy concerns, algorithmic biases, and regulatory barriers. Addressing these challenges is crucial to ensure the ethical and responsible use of AI in medicine. Additionally,

healthcare professionals require adequate training to effectively utilize AI tools and interpret their findings accurately.

In summary, AI technologies are reshaping medical practices by enhancing diagnosis precision and tailoring treatment plans. By leveraging machine learning and data analytics, AI has the potential to revolutionize disease detection, personalize treatment regimens, and improve patient care. Nonetheless, ethical, regulatory, and training considerations must be addressed to harness AI's full potential in healthcare.

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## **HEART TAMPONADE BEGAN PICKING UP STEAM IN UKRAINE**

Nowadays we can observe an increase in the level of injuries, in which one of the first place take chest injuries. They are often accompanied by heart injuries, which reveal death in 10-76% of cases. Also we can see that the frequency of independent traumatic injures of the heart without involvement of the chest wall and other organs of the chest cavity is increasing. This is connected both with natural cataclysms and with steady increase in the frequency of man-made emergency situations in peacetime (car, plane crashes, fires, etc.), and also in our conditions in Ukraine it is due to war, due to shelling. According to the MIEMMS study, 50% of patients with cardiac ruptures delivered to a specialized hospital by helicopter within 30 minutes of injury were in a state of clinical death. 87.5% of them had objective signs of cardiac tamponade with a clear clinical picture of severe hemodynamic disorders.

We investigated that heart tamponade most often occurs due to myocardial infarction, due to chest injuries. The most likely age at which tamponade occurs is 25-50 years.

Nowadays, we have many methods of treating cardiac tamponade, namely pericardiocentesis, pericardiotomy, surgical intervention, and further medical support.

If patient does not delay his condition and unusual symptoms, tamponade will not be fatal for him and he will return to his previous life.

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## **THE PLACEBO EFFECT**

Medicine has long been fascinated by the mysterious interplay between the mind and the body. One phenomenon that continues to captivate researchers and practitioners alike is the placebo effect. Often dismissed as mere trickery or deception, the placebo effect is a powerful testament to the mind's ability to influence physical health and well-being. In this article, we delve into the fascinating world of the placebo effect, exploring its mechanisms, applications, and implications for modern medicine.

The placebo effect refers to the phenomenon where a patient experiences improvement in their condition after receiving an inactive treatment or intervention. This improvement cannot be attributed to the physiological effects of the treatment itself, as it contains no active ingredients. Instead, the placebo effect is believed to arise from the patient's belief in the treatment's effectiveness, coupled with the psychosocial context in which it is administered.

There are certain mechanisms behind the placebo effect. Researchers have uncovered several mechanisms that contribute to the placebo effect. One key factor is the brain's response to expectation and anticipation. When a patient expects a treatment to be effective, the brain releases neurotransmitters such as dopamine and endorphins, which can lead to feelings of relief and well-being. Additionally, the placebo effect is influenced

by factors such as the patient-provider relationship, the ritual of treatment administration, and cultural beliefs surrounding healing practices.

The placebo effect has profound implications for clinical practice. While it cannot replace evidence-based treatments, harnessing the power of placebo can complement traditional medical interventions and improve patient outcomes. Placebo responses are commonly observed in clinical trials, where participants receiving inert substances often show significant improvements compared to those receiving no treatment at all. Furthermore, placebo interventions have been shown to alleviate symptoms across a range of conditions, including pain, depression, and anxiety.

Despite its potential benefits, the use of placebos in medical practice raises ethical questions. Is it ethical to deceive patients into believing they are receiving a genuine treatment? How can clinicians harness the placebo effect without compromising trust and transparency? These are complex issues that require careful consideration and ongoing dialogue within the medical community.

As our understanding of the placebo effect deepens, researchers are exploring innovative ways to optimize its therapeutic potential. From personalized placebo treatments tailored to individual beliefs and preferences to the development of open-label placebos that harness the power of suggestion without deception, the future holds exciting possibilities for integrating mind-body healing into mainstream medicine.

The placebo effect challenges our conventional understanding of health and healing, reminding us of the profound connection between mind and body. By embracing this connection and exploring new avenues for harnessing the power of placebo, we can unlock new frontiers in healthcare and empower patients to play an active role in their own healing.



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## **THE IMPACT OF ORAL CONTRACEPTIVES ON HEALTH**

Oral contraceptives, commonly known as birth control pills, have revolutionized reproductive healthcare and provided individuals with greater control over their fertility. However, their widespread use raises questions about their long-term effects on health. This essay explores the impact of oral contraceptives on health, focusing on both the benefits and potential risks associated with their usage.

To begin with, oral contraceptives offer numerous benefits beyond their primary function of preventing pregnancy. They are highly effective when taken correctly, with a failure rate of less than 1% when used consistently. Additionally, they provide relief from menstrual disorders such as dysmenorrhea and menorrhagia, leading to improved quality of life for many women. Moreover, oral contraceptives have been associated with a reduced risk of certain types of cancers, including ovarian and endometrial cancers, due to their ability to regulate hormone levels.

However, despite these advantages, there are also potential health risks associated with the use of oral contraceptives. One concern is the increased risk of cardiovascular complications, such as blood clots, stroke, and heart attack. While the absolute risk is low, especially among young, healthy women, certain factors such as smoking and pre-existing cardiovascular conditions can further elevate this risk. Therefore, healthcare providers must carefully evaluate individual risk factors before prescribing oral contraceptives.

Another area of concern is the impact of oral contraceptives on mental health. While research findings are mixed, some studies suggest a link between hormonal contraceptives and mood disturbances, such as depression and anxiety. However, it's essential to consider

individual differences in response to hormonal changes, as not all users will experience adverse psychological effects. Furthermore, the use of oral contraceptives may affect reproductive health in the long term. Prolonged use of hormonal contraceptives can lead to irregular menstrual cycles and delayed return to fertility after discontinuation. Additionally, there is ongoing debate about the potential impact of oral contraceptives on bone density and the risk of osteoporosis, particularly in younger women who use them during critical periods of bone development.

In conclusion, oral contraceptives have significantly impacted reproductive healthcare by providing a safe and effective method of birth control. While they offer various benefits, including menstrual regulation and cancer protection, they also pose potential risks, particularly in relation to cardiovascular health, mental well-being, and long-term reproductive outcomes. Therefore, individuals considering the use of oral contraceptives should weigh these factors carefully and consult with healthcare professionals to make informed decisions about their contraceptive choices.

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## **IMMUNOTHERAPY IN THE TREATMENT OF GLIOBLASTOMAS**

Gliomas rank as the most common primary malignant brain tumors globally, with glioblastoma emerging as the prevailing and highly aggressive subtype. The immune system does not automatically perceive glioblastomas as a threat. Immune cells usually do not target the tumor, allowing it to grow, because if the body mistakenly attacks its own healthy tissue, the effect on brain function can be catastrophic. Regrettably, advancements in immunotherapy for brain tumors have been less substantial compared to progress made in treating other forms of cancer.

One of the methods of treatment is immunotherapy. Four primary categories of immunotherapies exist for gliomas: immune checkpoint blockade, vaccines, and oncolytic viruses, T-cell therapy.

Immune checkpoint inhibitors are medications that obstruct proteins termed checkpoints, which are produced by specific immune system cells like T-cells, as well as certain cancer cells. These checkpoints modulate the strength of immune responses, sometimes impeding T-cells from eradicating cancer ones. The ineffectiveness of the approach in the case of glioblastoma is explained by the fact that the tumor changes the environment around it. It selectively lets immune regulatory T-cells into its environment and changes their work. Normally, their task is to make sure that other immune cells do not attack the body's own cells. But when they get to glioblastoma, they begin to attack the immune cells that have come to fight the tumor.

Tumor vaccines can act as either complementary therapy or enhance clinical effectiveness when used alongside other immunotherapies, such as immune checkpoint blockade and chimeric antigen receptor T-cell therapy.

Oncolytic virotherapy represents an emerging approach to cancer treatment, utilizing natural agents to specifically target and eliminate glioma cells. Numerous oncolytic viruses have shown promise in infecting and lysing glioma cells, either inducing apoptosis or eliciting an anti-tumor immune response. The primary classes of viruses employed in treating glioblastoma encompass adenovirus, herpes simplex virus (HSV), and poliovirus.

T-cell therapy involves the removal of immune T-cells from the patient's blood and their modification so that when they return to the body, they seek and destroy cells with cancer markers. It is currently the most successful type of immunotherapy against glioblastoma and has been successfully used in humans. There is a known case (described in *The New England Journal of Medicine*) when immunotherapy using the patient's altered T-cells overcame glioblastoma in a 72-year-old man, and it started to work in a few days. Only on the second day, MRI results revealed that the cross-sectional area of the tumor had decreased by 18.5%, and on the 69th day, the tumor had decreased by another 60.7% of its original size. As of the 150th day, there were no signs of the disease returning, nor any serious side effects of the therapy.

In conclusion, immunotherapy, given its current position and rapid development, is proclaimed to be a promising area of glioma treatment.

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**PROGNOSTIC VALUE OF THE DETERMINATION OF THE TISSUE  
PERFUSION INDEX IN NEWBORN WITH HYPOXIC ISCHEMIC  
ENCEPHALOPATHY AT THE REHABILITATION PERIOD**

Introduction. Caring for newborns with severe pathology poses many challenges to doctors in neonatal departments. One of the most important criteria for recovery is the ability to eat well, namely the presence of a sucking reflex.

Goal of the study was to determine the informativeness of the perfusion index in assessing the effectiveness of rehabilitation measures in newborn children with hypoxic ischemic encephalopathy after asphyxia during the rehabilitation period.

In order to achieve the goal it was conducted the research of 19 full-term children in the neonatal period after severe asphyxia, who were provided with rehabilitation assistance. These children made up clinical group I. The control group (clinical group II) consisted of 19 healthy full-term newborn children.

Perfusion index (PI) was measured three times: before the start of feeding - measurement #1, after 10 minutes of sucking - measurement #2, and after 10 minutes after the end of feeding - measurement #3.

The average gestational age was  $39.9 \pm 1.32$  weeks.

The perfusion index of children of group I was  $1.62 \pm 0.28$  before feeding ( $2.95 \pm 0.44$  - in group II), at the 2nd measurement in group I, it decreased to  $0.98 \pm 0.56$  and

almost did not change in group II  $-2.34 \pm 0.6$ , at the third measurement the indicators were  $1.45 \pm 0.24$  and  $3.03 \pm 0.34$ , respectively.

In 7 children with a perfusion index lower than  $0.65 \pm 0.13$ , significant signs of overload during feeding were observed: increased breathing rate, heart rate, cyanosis of the nasolabial triangle, apnea, which indicated the disruption of adaptation mechanisms and delayed recovery of the sucking reflex. Children of the I group who had higher RI indicators resumed full independent nutrition  $4 \pm 1.3$  days earlier, like the control group, which allowed them to be discharged home in a satisfactory condition.

As a result of the conducted research, the diagnostic significance of the perfusion index study during the recovery of the sucking reflex for increasing the effectiveness of rehabilitation care in newborn children after asphyxia was revealed. It is proposed to evaluate RI for predicting complications during the rehabilitation of newborn babies with asphyxia.

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## **ONCOMARKERS**

Nowadays, oncological diseases take the 2nd place in terms of mortality from diseases in the world, so early diagnosis and correct identification of the type of disease are the key to successful treatment and prolonging the patient's life. Oncomarkers are one of the types of diagnosis of oncological diseases. Tumor markers are biological compounds produced by tumor cells or healthy cells in response to the development of cancer. They circulate in the fluids of our body such as blood, urine and saliva. Tests for tumor markers help the doctor make the correct diagnosis, help plan treatment or check whether the current treatment is working. For example, a decrease in tumor markers indicates that the treatment is working. Tumor markers are not specific, that is, they can be

produced by normal cells of the body and a small concentration of tumor markers will be detected in a healthy human body, so diagnosis consists in determining the amount of these compounds.

Tumor markers are divided into several categories:

#### 1) Hormones

One of the types of cancer are hormone-producing tumors, such as pituitary or thyroid tumors. With this type of tumor, a person has an increased level of the hormone produced by the diseased organ. One of the indicators is the level of calcitonin in the blood, which is a hormone produced by the thyroid gland. Elevated levels of calcitonin indicate medullary carcinoma of the thyroid gland. Another example is human chorionic gonadotropin or pregnancy hormone. Its level increases during a woman's pregnancy, because the hormone is produced by the chorionic villi and its main function is to maintain pregnancy. But an increase in the level of the hormone in a non-pregnant woman indicates tumors of the uterus or ovaries, and in men it indicates a tumor of the testicles.

#### 2) Oncofetal antigens

These are antigens that are usually excreted during intrauterine development of the fetus, but after the birth of the child, the expression of the genes responsible for the production of these antigens is suppressed. Therefore, the detection of an increased number of oncofetal antigens indicates an oncological disease. One of the types of oncofetal antigens is alpha-fetoprotein. It is produced by fetal liver cells, and therefore an elevated level of this protein in adults indicates liver cancer or cirrhosis. Another example is the carcinoma-embryonic protein, which is produced by the cells of the mucous membrane of the large intestine, pancreas, and lungs. An elevated level of carcinoma-embryonic protein indicates such oncological diseases as: colorectal carcinoma, stomach or lung cancer.

#### 3) Specific proteins for certain types of tumor

These are proteins that are characteristic of a specific type of cancer, that is, they are synthesized only by individual cancer cells of the body. The determination of these proteins is one of the types of diagnosis of metastasizing tumors, namely when it is necessary to find the source of the primary tumor. Prostate-specific antigens are one of the

representatives of this species. It is produced by the epithelial cells of the prostate tubules. An elevated level of prostate-specific antigen indicates prostatitis or prostate adenoma.

#### 4) DNA markers

The cause of cancer is genetic mutations of DNA. These freely circulating damaged DNA fragments are detected in the bloodstream. One example is epidermal growth factor receptor mutations. Epidermal growth factor is a protein that plays a role in the growth and differentiation of epithelial cells, so mutation of the receptor leads to uncontrolled growth and the occurrence of cancer. Mutations of this receptor are detected in non-small cell lung cancer. Another example is a mutation in the KRAS gene, which codes for the K-ras protein, which stimulates cells to divide. Producing too much of this protein leads to cancer. This protein is a marker for the diagnosis of pancreatic and colon cancer.

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## **ESSENTIAL VITAMINS AND SUPPLEMENTS FOR ENHANCED WELL-BEING AND VITALITY IN EVERYDAY LIFE**

Incorporating essential vitamins and supplements into one's daily regimen can be pivotal in pursuing optimal health and vitality. With modern lifestyles often characterised by stress, inadequate nutrition, and environmental factors, ensuring adequate intake of vital nutrients becomes increasingly important. This essay explores the significance of essential vitamins and supplements for promoting well-being and vitality, outlining key nutrients and their benefits.

Vitamin D stands out as a cornerstone of overall health, known for supporting bone health, immune function, and mood regulation. Often deficient in individuals with limited sun exposure or those living in regions with long winters, vitamin D supplementation can bridge the gap and promote optimal well-being.

Vitamin E is a fat-soluble antioxidant crucial to maintaining overall health and well-being. It has several forms, with alpha-tocopherol being the most biologically active and commonly found in dietary supplements. As an antioxidant, vitamin E helps protect cells from damage caused by free radicals and unstable molecules that can contribute to ageing and various chronic diseases, including heart disease and cancer. Food sources of vitamin E include nuts, seeds, vegetable oils (wheat germ oil, sunflower oil, and olive oil), leafy greens, and fortified cereals. While vitamin E deficiency is rare in healthy individuals, certain medical conditions, dietary restrictions, or fat malabsorption disorders can increase the risk of deficiency. In such cases, supplementation may be recommended to ensure adequate intake of this essential nutrient.

Another crucial nutrient is omega-3 fatty acids, particularly EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), abundant in fatty fish like salmon and mackerel. Omega-3s are vital in cardiovascular health, brain function, and inflammation management. For individuals who don't regularly consume fish, omega-3 supplements offer a convenient way to ensure adequate intake of these essential fatty acids.

Vitamin B12 is indispensable for energy production, nerve function, and red blood cell formation. Food sources rich in vitamin B12 include animal products such as meat, fish, eggs, and dairy products. However, vitamin B12 is not found naturally in plant foods, making it a challenge for individuals following a vegan or vegetarian diet to obtain adequate amounts solely from dietary sources. In such cases, supplementation or fortified foods may be necessary to prevent deficiency.

Iron is essential for transporting oxygen throughout the body and preventing fatigue and weakness. While iron is abundant in red meat and leafy greens, certain populations, such as menstruating women and pregnant individuals, may require supplementation to meet their increased needs. Iron supplements can help replenish depleted stores and support energy levels and vitality.

Calcium is crucial for bone health, muscle function, and nerve transmission. While dairy products are a primary source of calcium, supplementation may be necessary for individuals with lactose intolerance or those who follow a dairy-free diet. Calcium supplements, often combined with vitamin D for enhanced absorption, can support bone density and overall well-being.



In addition to these key nutrients, multivitamin supplements can serve as a comprehensive solution to address potential gaps in one's diet. Multivitamins can support overall health and vitality by providing a balanced combination of vitamins and minerals, filling in the nutritional blanks and promoting optimal well-being.

It's important to note that while vitamins and supplements can complement a healthy lifestyle, they are not a substitute for a balanced diet rich in whole foods. Prioritising nutrient-dense foods such as fruits, vegetables, lean proteins, and whole grains remains essential for overall health and vitality.

In conclusion, essential vitamins and supplements are crucial in promoting well-being and vitality in everyday life. These nutrients are building blocks for optimal health, from supporting immune function to enhancing energy levels and maintaining bone health. By incorporating targeted supplementation alongside a balanced diet, individuals can unlock their full potential for vitality and thrive in all aspects of life.

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## **EFFECT OF ELECTRONIC CIGARETTES ON THE INTRAUTERINE STATE OF THE FETUS DURING PREGNANCY**

The problem is possible effect of electronic cigarettes on fetus during pregnancy is becoming more urgent due to their rapid spread in the world over the last 10 years. According to WHO information of the beginning of 2021 every fifth teenager in the world regularly uses electronic cigarettes. In absolute terms it makes up 180 mln people. This number is really impressive. Taking into account the fact that 50% of them are girls, who are potential mothers, one can see scale of the problem.

This issue has not been studied by Ukrainian scientists yet, so there are no statistical data provided by Ukraine's Ministering of Healthcare.

The development of obstetrics in recent years has been characterized by developing science-based ideas about physiology and pathology of pregnancy.

The main direction of scientific research is the study of the functional state of fetus using such highly-informative methods of ultrasound scanning, monitoring, biochemical analysis of anatomic fluid.

Purpose: Taking into account a great number of electronic cigarette consumers, the aim of the research was provide evidence of harmfulness of electronic cigarettes in the preconception period and during pregnancy as well as to debunk the myth about their harmless for a future baby.

In the process of retrospective analysis of individual pregnant cards, evidence of damage to their use in the random period and during pregnancy for the unborn child was obtained, which is convincingly illustrated by the data Ultrasound and CTG.

It was found that the nervous system of the foetus and the state of the mother's immunity have a special sensitivity to the action of electronic cigarettes. This is confirmed by the results of ultrasound diagnosis and an increase in the incidence of acute respiratory viral infections and urinary tract infections by 2.5 and twice, respectively, in our study. Our study convincingly shows that the only aetiological factor in the occurrence of intrauterine defects in the foetus was the regular use of electronic cigarettes during pregnancy by the mother. Intrauterine defects and two cases of intrauterine infection, which accounted for 20% of the total number of pregnant women in this group.

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## **BODY DYSMORPHIA AND BODY IMAGE ISSUES**

Body dysmorphic disorder (BDD) is considered to be one of the main causes of body image issues among teenagers and young adults.

BDD is Body dysmorphic disorder (BDD) is a DSM-IV disorder that is characterized by a distressing or impairing preoccupation with slight or imagined defect(s) in one's physical appearance. It is commonly considered to be an obsessive-compulsive spectrum disorder, based on similarities it has with obsessive-compulsive disorder.

The problematic nature of obsessions about one's body often forces people with BDD to engage in obsessive behaviors that take up a significant amount of time. For example, a person may repeatedly compare his body with the bodies of other people in public; repeatedly look at yourself in the mirror; engage in excessive grooming. The most frequent body areas of concern are skin (73%), hair (56%), nose (37%), and weight (22%).

**Diagnostic criteria.** 1. Preoccupation with an imagined defect in appearance. "Preoccupation" is often defined as thinking about the perceived appearance defect(s) for at least 1 hour a day. 2. The preoccupation causes clinically significant distress or impairment in social, occupational, or other important areas of functioning. 3. The preoccupation is not better accounted for by another mental disorder.

**Epidemiology.** BDD has been reported to occur in children as young as 5 and in adults as old as 80. Regarding gender ratio, there is a slight prevalence in female population (2.5% vs 2.2%, and 1.9% vs 1.4% in two largest population-based studies).

**Etiology.** Causes of BDD can be biological and psychological. The first are low serotonin levels, genetic predisposition, abnormalities in processing visual input leading to distorted body image. The latter can be bullying, criticism, neglect, traumatic events.

**Comorbidity.** BDD is commonly found in clinical settings, with studies reporting a prevalence of 9% to 12% in dermatology settings, 3% to 53% among cosmetic surgery patients, 8% to 37% in individuals with OCD, 11% to 13% in individuals with social anxiety disorder, 26% in trichotillomania (hair-pulling disorder), and 14% to 42% in atypical major depressive disorder. Rates of suicidal ideation, suicide attempts, and completed suicide appear markedly elevated.

**Treatment.** A majority of individuals with BDD (71% to 76%) seek and receive cosmetic treatment (surgical, dermatologic, or dental) for their perceived appearance flaws. However, such treatment appears to only rarely improve overall BDD symptoms.

There is no approved treatment of BDD, but citalopram and other SSRIs (selective serotonin reuptake inhibitors) showed decrease in compulsive behavior and BDD related distress. Antipsychotic medications such as Aripiprazone and Olanzapine can also help.

Cognitive-behavioral therapy (CBT) also may be efficacious for BDD. Studies have examined a combination of cognitive with behavioral components, consisting mainly of exposure and response prevention to reduce avoidance and compulsive behaviors.

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## **NEGATIVE EFFECT OF STATINS ON THE HUMAN BODY**

For half a century, a high level of low-density lipoprotein cholesterol (LDL) has been considered to be the major cause of atherosclerosis and cardiovascular disease, and statin treatment has been widely promoted for cardiovascular prevention.

Although in many countries including Ukraine continue to use statins for the treatment of atherosclerosis there are a number of facts that call into question the correctness of this decision. In connection with recent studies, now we have a deeper

understanding of statins' work mechanisms and clearly see that consequences of their use are not as bright as they were thought.

Statins not only lower low-density lipoprotein level, which in general is not all that good, due to the fact that low-density lipoproteins are not directly related to the appearance of atherosclerosis and more importantly these lipoproteins are vital to our body and cell membranes, but also cause a number of serious side effects.

The most common side effects are: impaired liver function – acute hepatitis; inflammation of the pancreas (pancreatitis), which can cause stomach pain; digestive system problems, such as constipation, diarrhea, indigestion, farting or anorexia; Quincke's edema; skin problems, such as acne or an itchy red rash; dizziness; feeling unusually tired or physically weak; low blood platelet count; sexual problems, such as loss of libido (reduced sex drive) or erectile dysfunction; memory problems; hair loss; pins and needles. It's rare, but statins can sometimes cause muscle inflammation (swelling), rhabdomyolysis - a condition in which damaged skeletal muscle breaks down rapidly and myopathy - disease of the muscle in which the muscle fibers do not function properly.

As for last side effects in a study of 22 statin-treated professional athletes, the authors reported that 17 (77%) of the athletes terminated treatment because of muscular symptoms, which disappeared a few days or weeks after drug withdrawal. The explanation for statin-induced adverse muscle effects is probably that statin treatment not only blocks the production of cholesterol but also blocks the production of several other important molecules, for instance, coenzyme Q10, which is indispensable for energy production.

Taking everything mentioned above into consideration I would recapitulate that millions of people around the world, including many without heart disease, take statins to further reduce LDL despite unproven benefits and serious side effects. Accordingly, the epidemic of heart failure and atherosclerosis that plague the modern world may paradoxically be exacerbated by the widespread use of statins. It is vital to know that now more and more scientists offer clinicians to abandon statins and discover the true causes of cardiovascular disease.

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**ACUTE MYOCARDIAL INFARCTION COMPLICATED BY  
CARDIOGENIC SHOCK IN UKRAINE: MULTICENTRE  
REGISTRY ANALYSIS 2021-2022**

A change in mental status is one of the signs of hypoperfusion in cardiogenic shock, the most severe form of acute heart failure. The aim of this study was to investigate the prevalence of altered mental status, identify factors associated with it, and evaluate the prognostic significance of altered mental status in cardiogenic shock.

In a multinational observational study, the mental status at the time of shock was assessed in 215 adult patients with cardiogenic shock. Clinical presentation, biochemical parameters, and short-term mortality were compared between patients with altered and normal mental status.

Altered mental status was found in 147 (68%) patients, while 68 (32%) patients had normal mental status. Patients with altered mental status were older (68 vs. 64 years,  $p=0.04$ ) and more often had an acute coronary syndrome than those with normal mental status (85% vs. 74%).

Change in mental status was associated with lower systolic blood pressure (76 vs. 80 mmHg,  $p=0.03$ ) and lower arterial pH (7.27 vs. 7.35,  $p<0.001$ ), as well as higher levels of blood lactate (3.4 vs. 2.3 mmol/l,  $p<0.001$ ) and blood glucose (11.4 vs. 9.0 mmol/l,  $p=0.01$ ). Low arterial pH (adjusted odds ratio 1.6 (1.1-2.2),  $p=0.02$ ) was the only factor independently associated with change in mental status. Ninety-day mortality was significantly higher (51% vs. 22%,  $p<0.001$ ) among patients with altered mental status.

Altered mental status is a common clinical feature of systemic hypoperfusion in cardiogenic shock and is associated with poor outcome. It is also associated with several

biochemical findings reflecting inadequate tissue perfusion, of which low arterial pH is independently associated with altered mental status.

There is a limited amount of data on the results and treatment strategies of patients with acute myocardial infarction complicated by cardiogenic shock (AMI-CH) in low- and middle-income countries (CIS). This misunderstanding of the situation partially prevents the development of effective programs for the treatment of cardiogenic shock in this region of the world.

The Ukrainian multicenter registry of cardiogenic shock was analyzed, which covers the data of patients for 2021-2022 in six major revascularization centers in Ukraine. The analysis was focused on the results, treatment, and predictors of mortality of patients with AMI-CHD.

The data of 221 consecutive patients with ACS from six hospitals across Ukraine were analyzed; causes of ACS were myocardial infarction with ST segment elevation (85.1%), myocardial infarction without ST segment elevation (5.9%), compensated chronic heart failure (7.7%) and arrhythmias (1.3%); total in-hospital mortality during ACS was 57.1%; the prevalence of ACS was 6.3% of all AMIs, and the level of revascularization in AMI-CS was 90.5%. 23.5% of patients developed CS after hospitalization. The use of mechanical circulatory support (MCC) only with the help of an intra-aortic balloon pump was 19.9%. Left leg occlusion, severe reperfusion, Charlson comorbidity index > 4 and cardiac arrest were independent predictors of in-hospital mortality in AMI-SS.

Despite the wide implementation of primary percutaneous coronary intervention as the main revascularization strategy for AMI, ACS remains a significant problem in low-income countries and is associated with high hospital mortality, equipped with modern equipment

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## **DIABETES, CARDIOVASCULAR DISEASE, AND CANCER: A GLOBAL PERSPECTIVE**

In contrast to tuberculosis, HIV infection, and malaria—diseases caused by single pathogens that damage multiple organs—cardiovascular diseases reflect injury to a single organ system downstream of a variety of insults, both infectious and noninfectious.

Some of these insults result from rapid changes in diet and labor conditions; others are of a less recent vintage. The burden of cardiovascular disease in low-income countries represents one consequence of decades of neglect of health systems. Furthermore, cardiovascular research and investment have long focused on the ischemic conditions that are increasingly common in high- and middle-income countries. Predictions of an imminent rise in the share of deaths and disabilities due to NCDs in developing countries have led to calls for preventive policies to improve diet, increase exercise, and restrict tobacco use, along with the prescription of multidrug regimens for persons at high level vascular risk. Although this agenda could do much to prevent pandemic NCDs, it will do little to help persons with established heart disease stemming from nonatherogenic pathologies. The misperception of cardiovascular diseases as a problem primarily of elderly populations in middle- and high-income countries has contributed to the neglect of these diseases by global health institutions, including regionally focused ones. Even in Eastern Europe and Central Asia, where the collapse of the Soviet Union was followed by a catastrophic surge in cardiovascular disease deaths (mortality rates from ischemic heart disease nearly doubled).



**DIABETES** The International Diabetes Federation reports that the number of diabetic adult patients in the world is expected to increase from 463 million in 2019—1 in 11 adults—to 700 million by 2045.

**CARDIOVASCULAR DISEASE** Because systemic investigation of the causes of stroke and heart failure in sub-Saharan Africa has begun only recently, little is known about the impact of elevated blood pressure in this portion of the continent. Modestly elevated blood pressure in the absence of tobacco use in populations with low rates of obesity may confer little risk of adverse events in the short run.

**CANCER** Low- and middle-income countries accounted for ~70% of the 10 million deaths due to cancer worldwide in 2017. By 2030, annual mortality from cancer is expected to increase to >13 million deaths—with developing countries experiencing a sharper increase than developed nations. “Western” lifestyle changes may be responsible for the increased incidence of cancers of the breast, colon, and prostate among populations in low- and middle-income countries, but historic realities, sociocultural and behavioral factors, genetics, and poverty itself already have a profound impact on cancer-related mortality and morbidity rates.

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## **CLINICAL FEATURES OF DELIRIUM**

*Delirium*, a term used to describe an acute confusional state, remains a major cause of morbidity and mortality, costing billions of dollars yearly in health care costs in the United States alone. Despite increased efforts targeting awareness of this condition, delirium often goes unrecognized in the face of evidence that it is usually the cognitive manifestation of serious underlying medical or neurologic illness.

A multitude of terms are used to describe patients with delirium, including *encephalopathy*, *acute brain failure*, *acute confusional state*, and *postoperative or intensive care unit (ICU) psychosis*. Delirium has many clinical manifestations, but it is defined as a relatively acute decline in cognition that fluctuates over hours or days. The hallmark of delirium is a deficit of attention, although all cognitive domains—including memory, executive function, visuospatial tasks, and language—are variably involved. Associated symptoms that may be present in some cases include altered sleep-wake cycles, perceptual disturbances such as hallucinations or delusions, affect changes, and autonomic findings that include heart rate and blood pressure instability.

Delirium is a clinical diagnosis that is made only at the bedside. Two subtypes have been described—hyperactive and hypoactive—based on differential psychomotor features. The cognitive syndrome associated with severe alcohol withdrawal (i.e., “delirium tremens”) remains the classic example of the hyperactive subtype, featuring prominent hallucinations, agitation, and hyperarousal, often accompanied by life-threatening autonomic instability. In striking contrast is the hypoactive subtype, exemplified by benzodiazepine intoxication, in which patients are withdrawn and quiet, with prominent apathy and psychomotor slowing.

The reversibility of delirium is emphasized because many etiologies, such as infection and medication effects, can be treated easily. The long-term cognitive consequences of delirium remain an area of active research. Some episodes of delirium continue for weeks, months, or even years. The persistence of delirium in some patients and its high recurrence rate may be due to inadequate initial treatment of the underlying etiology. In other instances, delirium appears to cause permanent neuronal damage and long-term cognitive decline. Therefore, prevention strategies are important to implement. Even if an episode of delirium completely resolves, there may be lingering effects of the disorder; a patient’s recall of events after delirium varies widely, ranging from complete amnesia to repeated re-experiencing of the frightening period of confusion, similar to what is seen in patients with posttraumatic stress disorder.

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## **INCREASE IN THE INCIDENCE OF TICK-BORNE DISEASES AS A HEALTH HAZARD TO PEOPLE**

Every year in the warm half-year period (usually from the beginning of March to mid-November), ticks in Central and Eastern Europe begin active stages of their life cycle, which is associated with a parasitic lifestyle. Active search for hosts begins at an outside temperature of 7°C. Around 900 species are known to date, including some vectors of zoonoses relevant to human medicine (Wendt, 2019). Ticks and tick-associated pathogens have colonized our planet for 50 to 250 million years and are likely to have accompanied the entire evolution of humans (Fingerle and Sing, 2021).

The tick-borne diseases include not only *Lyme borreliosis* (*Borrelia* (B.) *burgdorferi*, *B. garinii*, *B. afzelii* and *B. spielmanii*) and *tick-borne encephalitis* (TBE virus, Flavivirus), but also best known in Europe also numerous other bacterial, viral and protozoan infections: *rickettsioses* (e.g. typhus, Mediterranean tick fever (Boutonneuse fever), Rocky Mountain spotted fever, African and Queensland tick-borne typhus), *Q fever* (*Coxiella burnetii*), *tularemia* (*Francisella tularensis*), *tick-borne relapsing fever* (*Borrelia duttoni*), *Colorado tick fever* (coltivirus), *Crimean-Congo fever* (Orthonairovirus), *babesiosis* (*Babesia* spp.) and *human granulocytic anaplasmosis* (Ehrlichiosis, *Anaplasma phagocytophilum*). *Neurotoxic tick paralysis* (with symptoms similar to Guillain-Barré syndrome) occurs mainly in North America and Australia (Schön, 2022).

*Ixodes ricinis* is the most common tick. The habitat of *Ixodes ricinis* is ideal with humidity of 80-90% and air temperature of 14-23°C. The animals spread on the ground

and low-growing plants up to 1.5 m in height (Fingerle and Sing, 2021). The range of this species extends from Scandinavia via Morocco and Tunisia to the Caspian Sea.

These small creatures have to suck the blood of warm-blooded animals in order to ensure their nutrition and reproduction. Any host from which a tick sucks blood can transmit pathogens of various diseases that are common in the animal world to the parasite (transmissive transmission). The longer the tick lives, the more likely it is to acquire a pathogen from one of its hosts. In this way, ticks become a reservoir of infection, but do not become ill themselves.

During the life cycle of a tick, three phases are distinguished: first, larvae hatch from the eggs laid in the upper layers of the earth, which then mature into nymphs, and finally the nymphs become adults (sexually mature). At each stage of development, ticks must suck blood at least once. The entire tick cycle usually lasts two to three years, with a maximum of up to eight years (Hebisch, 1998).

The females during blood painting consume 100-200 times their weight in blood. Fertilization of females by males also occurs during suckling. Afterwards, females fall away from the host, lay up to 2000 eggs in the ground and die after laying eggs.

Ticks can transmit human pathogens with a wide range of clinical symptoms. The most common tick-borne diseases in Europe are Lyme disease and tick-borne encephalitis (TBE). The infections are usually mild or, in the case of bacterial infections, easy to treat. The most important preventative measures when staying in a risk area are protection against tick bites and, in the case of TBE, a timely vaccination that should be refreshed every 5 years is very effective - passive immunity (Wendt, 2019).

A distinction is made between viremic (vector-host) and non-viremic (between 2 or more vectors) and transovarial transmission (vertical transmission from one generation of vectors to the next) of pathogens (Rubel, 2019)

In Germany, the pathogens causing Lyme borreliosis can be detected in up to 35% of ticks. A tick bite leads to transmission in 1.5–6% of cases (Wendt, 2019). Lyme disease is the most common vector-borne disease in Europe (650,000–850,000 cases/year). Forest workers are particularly affected (Wendt, 2019).

Studies by Polish scientists confirmed the presence of the pathogen *Borrelia* spp. in 31.5% of *Ixodes ricinus* ticks in the area of Wrocław and Karkonosze National Parks.

Analysis of the dynamics of tick bites among the population in Poland confirms the interaction between people and ticks: in 2005, 4047 tick bites were registered, in 2016 already 9159, in 2019– about 18000 cases. Scientists of the Ternopil National Medical University studied ticks in the parks of Ternopil (2017-2019) and obtained the following results: 98.9% belonged to the *Ixodes ricinis* family, 19.2% were infected with *B. burgdorferi*, 14.7% - *A. phagocytophilum*, 1.7% - *B. izamotoi*, 0.3% - *Babesia spp.*, 3.8% - several bacteria at once (Kuzminov, 2022). This means that in Ukraine as well as in Germany and Poland, *Borrelia burgdorferi* is most often encountered as a tick-borne infection. The low transmission rate of this infection to humans can be explained by the fact that maximum transmission of *Borrelia burgdorferi* only occurs after at least 48 hours of sucking. Early removal of the tick minimizes the likelihood of transmission (Schön, 2022). Warmer temperatures increase tick reproductive ability, lengthening the season and promoting host search, while higher humidity increases survival rates. And conversely, the high temperatures and low humidity in Europe reduce the tick population (Petersen et. al, 2022).

The main contributors to the spread of ticks are climate change, careless urbanization and technological changes in agriculture (Mushynskyi and Levitska, 2018). In Europe, higher temperatures have led to ticks migrating north (Petersen et. al, 2022).

Mild winters, early spring and late autumn lead to better survival of ticks and, accordingly, the risk of their attack on humans (Kuzminov et. al, 2022). Based on this, the problem of the spread of ticks should receive more attention in order to be able to limit diseases transmitted to humans by ticks. Furthermore, vaccinations against tick infections, such as *Borrelia burgdorferi*, should be created. To avoid tick bites, lawn mowing should be carried out in places where people often find themselves. Registering in hospitals in the event of a tick infestation contributes to the early diagnosis of tick-borne infections.

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## **EPIDURAL ANESTHESIA**

Epidural anesthesia is a medical procedure involving the administration of anesthetic medications into the epidural space, aiming to block spinal nerve roots and alleviate pain in regions such as the thoracic, abdominal, pelvic, and lower extremity areas. This method finds utility in anesthesia for various procedures, managing chronic pain, or mitigating muscle spasticity, either independently or in combination with other pain management approaches. Its notable flexibility allows healthcare providers to tailor the medication and administration method, be it intermittent or continuous infusion, to suit individual clinical requirements. Furthermore, it has the potential to diminish the reliance on opioids during and after procedures, thereby reducing associated side effects, particularly significant in pediatric anesthesia due to concerns regarding potential effects on neurodevelopment. Additionally, epidural anesthesia holds significance in postoperative pain management within a comprehensive care framework. Particularly noteworthy is its role as an alternative to aerosol-generating general anesthesia amid the COVID-19 pandemic, underscoring its relevance and advantages.

Despite its benefits, epidural anesthesia carries certain risks and complications, necessitating healthcare professionals' proficiency in recognizing indications, contraindications, benefits, and drawbacks. This educational initiative aims to enhance learners' competence in these aspects and familiarize them with current techniques recommended for performing epidural anesthesia. Additionally, it emphasizes the interprofessional team's role in caring for patients undergoing the procedure to optimize outcomes.

Understanding the anatomy of the spinal cord and epidural space is pivotal for successful epidural anesthesia administration. The adult spinal cord, shorter than the spinal

canal by approximately 45 cm, terminates at varying levels, usually at the L1 or L2 vertebrae, while in neonates, it typically extends to the L2 vertebra. Below this level, lumbar and sacral nerves form the cauda equina. The spinal cord is surrounded by cerebrospinal fluid within the arachnoid mater and extends through the foramina intervertebral into the spinal nerves' epineural connective tissues.

The epidural space, extending from the foramen magnum to the sacral hiatus, comprises fatty and connective tissues, blood vessels, and lymphatics. Variations in blood vessel dilation, such as during pregnancy or ascites, may heighten the risk of traumatic or bloody puncture. This space is divided into anterior and posterior compartments housing distinct neural and vascular structures. Accurate identification of anatomical landmarks, including the ligamentum flavum and vertebral periosteum, is crucial for precise needle placement during epidural procedures.

Various techniques are employed to locate and access the epidural space safely and accurately. Traditional approaches rely on anatomical landmarks such as spinous processes and interspinous spaces for needle insertion guidance. The loss-of-resistance technique is commonly used to confirm needle placement within the epidural space by detecting resistance followed by a sudden loss upon entry.

The caudal epidural block, specifically targeting the sacral hiatus, involves injecting local anesthetics and is frequently utilized in pediatric anesthesia and certain adult procedures. Understanding the sacral region's morphometric parameters is critical for procedural success, as anatomical variations can affect needle placement and procedure outcomes.

Epidural anesthesia is indicated primarily for obstetrical anesthesia during labor and surgical anesthesia for thoracic, abdominal, or spine surgeries without the need for muscle relaxation. It may also be used for intraoperative or postoperative pain management, particularly benefiting high-risk patients by reducing complications such as postoperative pulmonary issues and promoting faster intestinal recovery. Despite these advantages, recent studies suggest a nuanced evaluation of epidural anesthesia's benefits compared to alternative methods, particularly outside obstetrical indications.

Epidural anesthesia is widely employed in obstetrics for pain relief during labor and delivery. Administered into the epidural space in the lower back, it effectively blocks



nerve impulses, offering pain relief from the abdomen to the perineum. Benefits include effective pain relief, controlled dosage adjustment, maintained mobility, reduced stress, and flexibility in both vaginal and cesarean deliveries. However, potential risks and side effects, such as decreased blood pressure and temporary loss of bladder control, warrant consideration.

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## **EXPLORING THE SYNERGY BETWEEN BIOTECHNOLOGY AND MEDICINE**

In the realm of healthcare, the intersection of biotechnology and medicine represents a powerful force driving innovation, revolutionizing treatment modalities, and offering new hope for patients facing various diseases and conditions. This symbiotic relationship between biotechnology and medicine holds the promise of personalized therapies, improved diagnostics, and breakthrough treatments across a myriad of medical fields.

Biotechnology, with its focus on harnessing biological processes and systems for practical applications, has opened up new avenues for understanding and combating diseases. One of the most significant contributions of biotechnology to medicine lies in the realm of genetic engineering and genomics. Advances in genome sequencing technologies have enabled researchers to decipher the genetic underpinnings of diseases, paving the way for personalized medicine approaches tailored to individual patients' genetic profiles. By analyzing genetic markers and mutations, clinicians can predict disease risk, optimize treatment strategies, and develop targeted therapies with greater efficacy and fewer side effects.

Furthermore, biotechnology plays a pivotal role in the development of novel therapeutic modalities, such as gene therapy and regenerative medicine. Gene therapy, for

instance, holds immense potential for treating genetic disorders by delivering functional genes or gene-editing tools to correct genetic defects. Similarly, regenerative medicine harnesses the body's innate regenerative capabilities to repair or replace damaged tissues and organs, offering hope for conditions ranging from spinal cord injuries to heart disease.

Moreover, biotechnology fuels innovation in diagnostic technologies, facilitating early disease detection and precision medicine. From advanced imaging techniques to rapid diagnostic tests, biotechnological advancements enable healthcare providers to identify diseases at earlier stages, allowing for timely intervention and improved patient outcomes. Additionally, the integration of artificial intelligence and machine learning algorithms with biotechnological platforms enhances diagnostic accuracy and prognostic capabilities, paving the way for more personalized and data-driven healthcare approaches.

In the era of precision medicine, the convergence of biotechnology and medicine is transforming the landscape of cancer treatment. Through molecular profiling and genomic analysis, clinicians can identify specific molecular targets driving cancer growth and metastasis, guiding the selection of targeted therapies tailored to individual patients' tumor profiles. Immunotherapy, another groundbreaking advancement in cancer treatment, harnesses the body's immune system to recognize and eradicate cancer cells, offering new hope for patients with previously untreatable malignancies.

Furthermore, biotechnology-driven innovations extend beyond therapeutics to encompass preventive and predictive medicine. From wearable biosensors that monitor physiological parameters in real-time to microbiome-based interventions that modulate gut health, biotechnological advancements empower individuals to take proactive control of their health and well-being, potentially averting the onset of chronic diseases and optimizing longevity.

In conclusion, the synergy between biotechnology and medicine heralds a new era of healthcare innovation, characterized by personalized therapies, precision diagnostics, and transformative treatments. As biotechnological advancements continue to accelerate, the boundaries of what is possible in medicine are continually expanding, offering renewed hope for patients and clinicians alike. By leveraging the power of biotechnology to unlock the mysteries of human biology and disease, we can usher in a future where healthcare is not only curative but also preventive, proactive, and profoundly personalized.

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## **NEW METHODS OF DIAGNOSTICS OF ONCOLOGICAL DISEASES**

Modern cancer diagnostics include a set of the latest medical technologies and methods, which allow to accurately determine the type of cancer, its stage, size, characteristic mutations in genes and many other characteristics.

The most popular and accurate methods of cancer diagnosis include:

1. **Magnetic resonance imaging**, which reveals the pathology at the earliest stages in cancer screening, accurately shows the size of the tumour, which tissues are affected and whether there are metastases. Modern generation MRI machines allow to "see" tumours from a few millimeters in size; they have special systems of image clarity correction, which ensure high accuracy of cancer diagnosis. This may include diagnosis of tumours of the brain and spinal cord, mediastinal organs, abdominal cavity, muscles, ligaments, etc.
2. **PET-CT** is a diagnostic method that combines positron emission tomography and computed tomography. During this examination, the patient is first injected with a special substance labelled with an isotope (e.g. glucose or oxygen). It is absorbed by the tissues of the body and then a scan is carried out, which allows specialists to detect small tumours and detect cancer even at stage zero.

It is the most often prescribed when diagnosing prostate tumours, lymphoma, lung cancer, head and neck tumours, breast cancer, skin cancer and before treating bowel tumours.

3. **Stereotactic biopsy** is the removal of tumour tissue for further examination in the laboratory. The biopsy can be excisional or incisional. In the first case, all pathological tissue is taken for examination. This is usually possible after surgery to remove the tumour. Incisional biopsy is usually scheduled before surgery. Depending on the method

of tissue collection, it may be a pinch biopsy, trepanobiopsy, loop biopsy or fine-needle biopsy.

Today, fine-needle biopsy is often used. Stereotactic biopsy is used for maximum accuracy and when accessing hard-to-reach areas, its peculiarity is that the procedure is performed under the control of ultrasound or CT. This makes it possible to increase the accuracy of manipulation, to take the desired section of tissue from a specific location and simultaneously obtain a sufficient amount of tumour tissue sample.

**4. Endoscopic diagnosis of cancer** in diseases of the abdominal cavity, pelvic organs and respiratory tract intraluminal is considered to be the most objective method of assessing the situation. During the procedure, a special device - an endoscope equipped with a camera and a light source - is inserted into the lumen of the organ (oesophagus, intestines, bronchi, etc.). With its help, the doctor can carefully examine each fragment of the internal walls of the organs, detect altered tissues, inflammation, erosions and detect neoplasms at early stages.

Modern endoscopes of the latest generation have high resolution, equipped with special filters and the possibility of multiple magnification of the image. This gives a "picture" of high clarity and contrast, which allows you to see even minor anomalies and small tumours. Popular endoscopic procedures are esophagogastroduodenoscopy and colonoscopy. Esophagogastroduodenoscopy allows you to diagnose the condition of the gastrointestinal tract upper part: oesophagus, stomach, duodenum.

**5. Molecular genetic testing of cancer**, which includes a series of specific laboratory tests that determine the exact characteristics of a particular tumour. Studies in recent years have shown that the main role in the development of various types of neoplasms belongs to mutations, which can be both inherited and transmitted from generation to generation, and acquired. The presence of such mutations can be determined by using PCR tests (this type of test is usually performed for specific mutations) and NGS-diagnostics (next-generation sequencing). Variant analysis using NGS is now considered the most effective method of detecting genetic changes. Molecular genetic testing can be used for many malignant diseases: breast cancer; ovarian cancer; pancreatic tumours; thyroid tumours; prostate cancer; melanoma; hereditary sarcomas.

In Ukraine, you can undergo molecular genetic testing for cancer in the LifeCode laboratory, where you will have the opportunity to create a so-called “tumour profile”.

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## **STUDY OF THE ECOLOGICAL CONDITION OF SOILS IN DNIPRO CITY PARK AREA**

The main purpose of creating parks in cities is to create appropriate conditions for organized mass recreation and health improvement for people living in them. The environmental condition of these areas directly affects the health and well-being of people who visit them. The condition of green spaces in parks directly depends on the quality of the soil on which they are located. Accordingly, the quality of the soil in city parks can also serve as a qualitative indicator of the level of anthropogenic pressure on the ecological state of the urban environment.

The condition of green spaces in recreational areas of urbanized territories directly depends on the quality of the soil on which they are located. We chose to assess the toxicity of soils in the park area located on Myrna Street, Shevchenkiivskyi district of Dnipro, as one of the examples of a site that is actively used by city residents for recreational purposes.

Using the "growth test" methodology, we monitored the intensity of germination and growth of the indicator plant in the soil samples under study and the control sample (boiled water), recording the following indicators: plant germination energy; seedling height; root length. After the experiment to determine soil toxicity, all results were calculated using the formulas.

The results obtained are significantly different from the control variant, which indicates that the processes of plant growth on the soil in samples 1, 2 and 3 with watercress are indeed inhibited, and therefore the soil is contaminated. The results of the experiment in samples 4 and 5 are statistically insignificantly different from the control. That is, the intensity of growth processes in this soil is at the same level as in the control water, which means that it is almost not polluted. Each bioindicator reacts differently to the soil, so the results may differ, i.e., some are more sensitive than others.

We have also analyzed a more promising way to restore toxic soils: the use of humic substances that prevent the migration of harmful substances in soils and help increase soil fertility. The introduction of humic substances into the soil reduces the transport capacity of pollutants and prevents their accumulation in organisms. In addition, the introduction of humic substances can increase soil fertility. But only humic acid compounds (sodium, potassium) are useful. These compounds are applied 1-2 times a year.

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## ADVENTIZATION OF THE FLORA IN FLOODPLAIN BIOTOPES OF THE NORTHERN STEPPE DNIPRO REGION

The invasion of alien species often leads to significant losses of the natural biological diversity of ecosystems and sometimes can cause significant economic damage and even pose a danger to human health. The processes of flora adventization are carefully analyzed by researchers from various countries. The detection, prediction, and neutralization of biological invasions are components of international agreements such as "Global Strategy for Prevention, Control, and Eradication of Non-Native Organisms" and "World Strategy on the Invasive Species Issue" and form the basis for sustainable development and national security of Ukraine. Therefore, addressing problems related to

adventive species of vascular plants directly stems from Ukraine's international commitments and goals of its state policy in the field of environmental security. Throughout the 21st century, an increase in the number and scale of invasions of alien species and introduced species is forecasted, which is particularly dangerous for areas with excessive anthropogenic-climatic transformation, including the steppe zone.

This work analyzes the phylodiversity of adventive flora in the floodplain territory: the large river Dnipro and the small rivers Bashmachka and Sorokova. The need for research on the chosen topic is determined by the lack of similar information in published materials.

The object of the research is the adventive species of vascular plants. The subject of the study is the characterization of adventive species of vascular plants in the floodplains of the Dnipro River and the minor rivers Bashmachka and Sorokova, and their comparative diversity. The aim of the research is to investigate adventive species of vascular plants in the floodplains of the Dnipro River and the minor rivers Bashmachka and Sorokova. The goal is to analyze their bioecological structure and distribution pathways.

The research is conducted using the route method in designated floodplain areas of the Dnipro River and the minor Bashmachka River. The list of adventive species of vascular plants is compiled using photographs of known species, as well as collections of some species.

It is found that the adventive flora of vascular plants in the floodplains of major (Dnipro River) and minor (Bashmachka River, Sorokova River) rivers is represented by 59 species, 44 species, and 40 species respectively. The floristic similarity index between the adventive floras of floodplains according to the Jaccard index is 0.38, indicating significant differences in floodplain floras. The adventive flora of the Bashmachka River floodplain comprises approximately 27% of the total species list (161) of vascular plants. Adventization of the Sorokova River floodplain is slightly lower than that of the steppe zone territory of Ukraine.

Two-thirds of the species in the adventive flora of minor rivers are ruderal segetal plants. The adventive flora of the Dnipro River floodplain and aquatorium differs in the presence of species that spread by water, both aquatic—*Cyperus serotinus*, *Zizania*



latifolia, Elodea canadensis, Vallisneria spiralis (habitat - flowing water biotope C2), and riparian, such as Parasites spurius, Amorpha fruticosa — coastal biotope C3).

The research results can be applied in the database of the adventive flora of the steppe zone of Ukraine and in the development of scientific justification for creating new objects of the natural reserve fund of the Dnipropetrovsk region.

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## **THE IMPACT OF WAR ON UKRAINIAN ECOLOGY**

Military operations in Ukraine have caused serious damage to the country's soil and environment, creating a long-term threat to the ecological balance and human health.

Explosions and munitions release heavy metals such as lead, mercury and depleted uranium, as well as various chemical toxins into the ground. These contaminants can persist for decades, poisoning the land and inhibiting plant growth. Landmines and unexploded shells pose a significant threat, contaminating the soil with harmful chemicals and making large areas unsafe for agriculture and development.

Military action and shelling have caused widespread forest fires, destroying valuable habitats and contributing to biodiversity loss. Destruction of natural habitats and contamination of water sources have negatively affected wildlife populations, leading to ecological imbalances. Leaks and spills of fuel, oil and other chemicals from military vehicles and equipment contaminate watercourses and groundwater, harming aquatic life.

Unsuitable soil and water pose a risk to agricultural production, affecting food quality. Exposure to contaminants in land and water can lead to a variety of health problems, including cancer.

Environmental damage will require extensive and costly remediation, making economic recovery and development difficult.

Addressing this problem requires a careful assessment of the extent of contamination, which is critical to developing effective remediation strategies. The clearance of landmines and unexploded ammunition is necessary to ensure public safety and restore land to productive use. Implementing effective technologies to remove or neutralize contaminants is vital to long-term environmental restoration. Addressing the environmental consequences of war requires the cooperation and assistance of the international community.

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## **HOW DID THE BIORYTHMS OF PEOPLE IN UKRAINE CHANGE DURING WAR**

During the war in Ukraine people's biorhythms underwent significant changes due to the stress, constant sirens and explosions caused by a full-scale invasion.

The ongoing conflict has led to increased levels of anxiety and fear among the population, affecting their ability to sleep. Many people have experienced sleep disturbances, including difficulty falling asleep, frequent awakenings, and a general decrease in sleep quality. The constant threat to life and uncertainty about the future disrupted circadian rhythms that regulate sleep-wake cycles, resulting in irregular sleep patterns among affected individuals.

Also, prolonged exposure to war-related stressors such as bombing, displacement, and loss of loved ones caused significant changes in the stress response systems of individuals. This has led to increased levels of cortisol, the primary stress hormone, which can disrupt the body's natural rhythms and contribute to a variety of health-related problems, including fatigue, irritability and impaired cognition.

Those people left behind in the war zone must face everyday challenges, including limited access to healthcare, inadequate nutrition, and exposure to environmental hazards, further intensifying the effects of war on people's biorhythms. Chronic stress and poor living conditions have weakened the immune system, disrupted metabolic processes and increased the risk of developing various diseases, thereby affecting the general biological rhythms of a person.

In some people the war caused psychological disorders, including post-traumatic stress disorder (PTSD), depression and anxiety, disorders which affect the biorhythms of people in Ukraine. Mental health problems related to exposure to trauma and disrupt sleep patterns, alter hormone levels, and disrupt the regulation of the autonomic nervous system, leading to disruptions in biological rhythms and general well-being.

Despite the challenges of the war, people in Ukraine developed adaptive mechanisms to cope with the stressors and uncertainties they face. Coping strategies may include social support networks, religious practices, and resilience-building activities. They play a critical role in mitigating the negative effects of war on biorhythms and promoting psychological well-being.

Consequently, the war in Ukraine had a profound effect on people's biorhythms, disrupting sleep patterns, changing the response to stress, and affecting physical and mental health. Understanding these changes is essential for designing effective interventions and support systems to meet the holistic needs of populations living in conflict-affected areas.

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## **THE INFLUENCE OF SOCIAL NETWORKS ON PSYCHO-EMOTIONAL STATE AND SELF-ESTEEM OF TEENAGERS**

Social media has become a significant aspect of the lives of today's teenagers, and it has the potential to affect both their mental and emotional states. This is a very relevant topic, as more and more teenagers spend a significant amount of time on social media, where they encounter various pressures, stereotypes, and influences.

The impact of social media on the psycho-emotional state and self-esteem of teens depends on various factors. For example, if a teenager uses social media to communicate with friends and maintain social connections, it can have a positive impact on their psychological state and strengthen their self-esteem. But it is also important to consider other factors that can affect the psycho-emotional state of teenagers when using social media. For example, negative comments, the length of time spent on social media, and constant comparison with others can lead to negative consequences for self-esteem and mental health. Also, teens who spend a lot of time on social media may feel disconnected from real life and have health problems.

So long-term and active use of social media can negatively affect the psycho-emotional state and self-esteem of teenagers, leading to the development of psycho-emotional problems such as aggression, anxiety, and low self-esteem, etc. In addition, the negative impacts of social media use can play a role in the formation of technology dependence and social isolation.

In addition, the impact of social media on teenagers' psycho-emotional well-being also depends on their psychological resilience, self-esteem, and ability to self-reflect. If a teenager has good self-understanding and can critically evaluate their own feelings and reactions to social media, they may be less vulnerable to the negative impact of social media on their psycho-emotional state.

All of these factors can interact with each other and shape the overall impact of social media on a teenager's psychological functioning. It is important to teach teens how to use social media with understanding, to be cautious about their own well-being, and to be able to seek support when needed.

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## **THE LINK BETWEEN ALCOHOL AND MENTAL HEALTH PROBLEMS**

Alcohol and mental health are closely linked. Drinking too much can affect your well-being. Some people may drink to try to relieve the symptoms of mental ill-health. Alcohol is well soluble in both water and fats, so there are practically no barriers for it in the human body. Ethanol molecules penetrate the membranes of nerve cells and change the activity of many receptors and ion channels. Emotional changes when drinking alcohol are determined by its effect on the neurotransmitter system. In small amounts (up to 10-20 g alcohol equivalent) alcohol activates the dopamine system, causing positive emotions and curiosity. In small amounts, alcohol does not cause motor impairment. In a dose of 10-60 g, alcohol affects the receptors of gamma-aminobutyric acid (GABA) - the level of anxiety is reduced, complex tasks are "simplified", a sedative effect is observed. With the use of a larger dose - 60-100 g - there is a failure of mediator systems. Clinically, this can manifest itself as pathological intoxication and loss of memory for current events.

Alcohol is a powerful depressant of the nervous system. It stimulates the release of dopamine, the brain's most important neurotransmitter, and ethanol initially induces relaxation, a rush of pleasure and a pleasant state of mild euphoria. However, this effect does not last long, an hour or two at most. When the euphoria passes, alcohol begins to show itself as a depressant - it suppresses the work of the central nervous system and cognitive functions of the brain. Thinking processes slow down, perception of reality becomes more difficult, emotional self-control decreases, coordination, memory and reaction speed deteriorate. People start to feel dissatisfied, tired and unhappy. This leads to a desire to drink more alcohol to improve their condition. Depression can manifest itself

in both behavior and health complaints. These include a depressed mood, feelings of fatigue, irrational anxiety and irritability. As the disorder progresses, emotional apathy, indifference, intrusive thoughts of possible failure or danger, and suicidal thoughts may appear. Further alcoholic depression is aggravated by physiological symptoms against the background of progressive addiction and gradual imbalance of the most vital systems and organs: increased insomnia and drowsiness, nightmares, nausea, loss or decrease in appetite, psychosomatic headaches, blood pressure spikes, irregular heartbeat, cardiac discomfort, swelling of the face and extremities. Alcohol has been linked to suicide, self-harm, and psychosis .

Alcohol can make people lose control and behave impulsively, which can lead to actions they might not otherwise take, including self-harm and suicide. Psychotic symptoms can also occur when heavy drinkers suddenly stop drinking and develop a condition known as delirium tremens, symptoms include body tremors and confusion.

Drinking alcohol to improve your mood or cope with stress is an unhealthy coping strategy. And it means that you are missing out on developing healthy coping skills. This can lead to more serious problems in the future.

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## **THE IMPACT OF SMARTPHONES ON OUR HEALTH**

In today's digital age, smartphones have become an indispensable part of our daily lives, revolutionizing the way we communicate, work, and entertain ourselves. However, along with their undeniable convenience, smartphones also bring about significant implications for our health. From physical to mental well-being, the influence of these pocket-sized devices is profound and multifaceted.

One of the most immediate concerns surrounding smartphone usage is its impact on our physical health. Prolonged use often leads to a sedentary lifestyle, as people spend hours hunched over their screens, whether it's for work, social media browsing, or gaming. This sedentary behaviour contributes to various health issues such as obesity, back and neck problems, and even cardiovascular diseases. Furthermore, the constant use of smartphones can strain our eyes, leading to digital eye strain and potentially causing long-term vision problems.

Moreover, smartphones have transformed the way we sleep. The blue light emitted by screens interferes with the production of melatonin, the hormone responsible for regulating sleep cycles. As a result, excessive smartphone usage, particularly before bedtime, can disrupt sleep patterns, leading to insomnia and poor quality sleep. Chronic sleep deprivation not only affects our physical health but also impairs cognitive function, mood regulation, and overall well-being.

Beyond the physical realm, smartphones exert a significant influence on our mental health. Social media platforms, which are accessible through smartphones, have been associated with increased levels of anxiety, depression, and feelings of inadequacy. The constant exposure to curated, often unrealistic, portrayals of other people's lives can foster feelings of comparison and inadequacy, leading to a decline in self-esteem and mental well-being. Moreover, the instant gratification provided by smartphones, such as likes and comments on social media posts, can create addictive behaviours and negatively impact self-control and attention span.

Additionally, smartphones have changed the way we interact with the world around us, affecting our social relationships and emotional connections. While smartphones facilitate instant communication and connection with others, they also have the potential to detract from face-to-face interactions. Excessive smartphone usage in social settings can lead to a phenomenon known as "phubbing," where individuals prioritize their devices over meaningful interactions with those around them, leading to feelings of isolation and disconnection.

However, it's important to acknowledge that smartphones are not inherently detrimental to our health. When used mindfully and in moderation, they can enhance productivity, facilitate communication, and provide access to valuable information and



resources. The key lies in finding a balance between utilizing the benefits of smartphone technology while mitigating its negative effects on our health.

In conclusion, smartphones have undoubtedly reshaped the way we live, work, and interact with the world. While their convenience and functionality are undeniable, it's crucial to recognize and address the potential health implications associated with their excessive use. By cultivating awareness, practicing moderation, and incorporating healthy smartphone habits into our daily lives, we can harness the benefits of technology while safeguarding our physical and mental well-being.

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## **FEATURES OF VIOLENCE**

In the modern world, families are experiencing a large aspect of social, psychological and economic problems, this affects the internal relationships in the family. Most often this manifests itself in domestic violence, which is often applied to the wife and child. The victim cannot easily leave such a relationship, because in the minds of many victims, domestic violence is not illegal or unacceptable; they find more than a hundred reasons justifying the aggression of their partners. The causes of violence are related to the economic situation, social norms and attitudes towards violence.

In our community, domestic violence should first of all be analyzed as a gender problem based on the irrational, patriarchal and unacceptable attitudes of post-Soviet society. That is why the problem does not disappear, is reproduced and is often kept silent.

At all times, psychologists have tried to describe various types of violence. In accordance to the currently accepted classification, the following main types of violence are distinguished: physical violence; financial exploitation; sexual violence; mental violence. One of the most common types of violence is physical.

Although the characteristics of the concept of “psychological violence” both in professional and public spheres are quite different (mental violence, psychological influence, psychological pressure, emotional violence, verbal aggression, coercion, etc.). They all are collectively united by one common concept – “psychological violence”. It is also important to emphasize that the concept of “psychological violence” is exclusively negative.

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## **ADDRESSING THE CRISIS OF PHYSICAL INACTIVITY IN THE MODERN WORLD**

In an era dominated by technological advancements and sedentary lifestyles, the issue of physical inactivity has emerged as a significant public health concern globally. This report delves into the multifaceted problem of physical activity deficit in the modern world, exploring its causes, consequences, and potential solutions.

Causes of Physical Activity Deficit:

- **Sedentary Jobs:** The proliferation of desk-bound occupations and advancements in technology have led to a decrease in physical activity levels during work hours.
- **Urbanization:** Rapid urbanization has resulted in environments that prioritize motorized transportation over walking or cycling, discouraging physical movement.
- **Technological Dependency:** The prevalence of electronic devices and entertainment options has led to a decline in outdoor activities and recreational sports among individuals, particularly children and adolescents.

- Socioeconomic Factors: Limited access to safe and affordable recreational facilities, coupled with disparities in income and education, contribute to lower levels of physical activity in certain demographic groups.
- Cultural Shifts: Changing societal norms and values often prioritize convenience and comfort over physical exertion, further perpetuating the sedentary lifestyle trend.

Physical inactivity has many serious consequences. Lack of physical activity is associated with a higher risk of obesity, cardiovascular diseases, diabetes, certain cancers, and mental health disorders. The healthcare costs associated with treating diseases related to physical inactivity impose a substantial economic burden on individuals, communities, and healthcare systems. Sedentary lifestyles can lead to decreased productivity and increased absenteeism in the workforce due to health-related issues. Also, physical inactivity may contribute to social isolation, diminished quality of life, and disparities in health outcomes across different population groups.

But, people have some potential solutions for this problem. For example, encouraging walking, cycling, and public transportation can help incorporate physical activity into daily routines and reduce reliance on motorized vehicles. Besides, implementing workplace initiatives such as standing desks, walking meetings, and fitness challenges can promote physical activity among employees. Increasing public awareness about the importance of physical activity through educational campaigns and community outreach efforts can motivate individuals to adopt healthier lifestyles. Implementing policies that support active living, such as urban planning strategies, school-based physical education requirements, and incentives for employers to promote physical activity, can create an environment conducive to regular exercise.

Addressing the problem of physical inactivity requires a comprehensive approach that encompasses individual behavior change, environmental modifications, and policy interventions. By prioritizing physical activity promotion and creating supportive environments, societies can mitigate the adverse health effects associated with sedentary lifestyles and enhance overall well-being in the modern world.

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## **THE DETRIMENTAL EFFECTS OF SMOKING**

Smoking remains a significant public health concern worldwide, exacting a heavy toll on both individuals and society as a whole. This report delves into the multifaceted harm caused by smoking, encompassing various health, economic, and social implications. First and foremost, smoking is a leading cause of preventable death, responsible for millions of premature deaths annually. The most well-known consequence of smoking is its association with lung cancer, with smokers being at significantly higher risk of developing this deadly disease compared to non-smokers. Additionally, smoking is a major contributor to cardiovascular diseases such as heart attacks, strokes, and peripheral vascular disease. The harmful chemicals in tobacco smoke damage the blood vessels and heart, increasing the likelihood of these conditions.

Furthermore, smoking adversely affects respiratory health, leading to conditions such as chronic bronchitis and emphysema, collectively known as chronic obstructive pulmonary disease (COPD). COPD is characterized by progressive airflow limitation and respiratory symptoms, significantly reducing quality of life and contributing to morbidity and mortality.

Beyond the direct health consequences, smoking imposes a substantial economic burden on society. Healthcare costs associated with treating smoking-related illnesses are staggering, straining healthcare systems and diverting resources that could be allocated to other pressing healthcare needs. Moreover, smoking-related productivity losses, stemming from illness-related absenteeism and premature death, further compound the economic impact.

Moreover, smoking not only harms the individual smoker but also endangers the health of non-smokers through exposure to secondhand smoke. Passive smoking is associated with a range of adverse health outcomes, including respiratory infections, asthma exacerbations, and cardiovascular diseases. Children exposed to secondhand smoke are particularly vulnerable, facing an increased risk of sudden infant death syndrome (SIDS), respiratory infections, and impaired lung function. In addition to its health and economic ramifications, smoking also has social implications, contributing to health inequalities and perpetuating social disparities. Certain demographic groups, such as those with lower socioeconomic status, are disproportionately affected by smoking-related diseases, exacerbating existing health disparities.

In conclusion, smoking poses a grave threat to public health, with far-reaching consequences for individuals, communities, and economies. Efforts to curb smoking must be comprehensive, encompassing tobacco control policies, public health campaigns, and smoking cessation interventions. By addressing the multifaceted nature of the tobacco epidemic, we can mitigate its harmful effects and create healthier, more equitable societies.

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## **EATING DISORDER AS MENTAL ILLNESS**

Eating disorders can manifest in individuals regardless of their age, gender, ethnicity, or body composition. These disorders encompass a range of physical, psychological, and emotional symptoms that vary among individuals and across different types of eating disorders.

What constitutes an eating disorder? It's a complex mental health issue that profoundly impacts both emotional and physical well-being. Those affected develop unhealthy relationships with food, weight, or body image. Anorexia nervosa, bulimia

nervosa, and binge eating disorder represent some common types. Left untreated, these disorders can lead to severe, even life-threatening complications.

On a global scale, it's estimated that at least 9% of the population experiences eating disorders at some stage of their lives. However, obtaining accurate national prevalence rates can be challenging, as many countries lack official statistics. Nonetheless, experts believe that factors such as stress and anxiety, particularly in regions affected by ongoing conflicts like Ukraine, may contribute to an increase in eating disorder cases.

There's a variety of eating disorders, and individuals may experience more than one type. These include:

**Anorexia nervosa:** Distinguished by extreme limitation of food intake and an overwhelming fixation on weight loss, frequently resulting in self-induced starvation.

**Bulimia nervosa:** Entails episodes of excessive eating followed by purging actions, such as vomiting or intense exercise, aimed at expelling consumed calories from the body.

**Binge eating disorder (BED):** Marked by compulsive overeating episodes without subsequent purging, often accompanied by feelings of shame or guilt.

Symptoms of eating disorders can differ depending on the type, sometimes resembling ordinary dieting behaviors. Signs may include mood swings, fatigue, fainting, hair thinning or loss, frequent bathroom visits after meals, unexplained weight fluctuations, or engaging in food rituals like secretive eating or prolonged chewing.

Diagnosis typically involves a comprehensive assessment by healthcare professionals like physicians and mental health specialists. This may entail physical examinations, blood tests, and psychological evaluations to understand eating behaviors and beliefs.

It's crucial to recognize that eating disorders are serious conditions that impact both mental and physical health. If you suspect you or a loved one may be struggling with an eating disorder, seeking help is essential. With proper medical intervention and mental health support, recovery is possible. Disregarding or overlooking symptoms of eating disorders can adversely impact physical health and elevate the likelihood of developing life-threatening complications in the long term.

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## **THE MODERN DEPENDENCY OF SOCIETY**

Anything non-natural to man is negative. Any doctor will tell you that. If the human organism is adapted to certain conditions, adding something to these conditions is unnatural.

The harm of smoking has been studied over the past decades, so the danger of tobacco products people realized not so long ago. Electronic cigarettes are much more harmful and dangerous than ordinary cigarettes, because there is vaporization of nicotine, and this causes burns of the oral mucosa, cancer, damage to the respiratory system, atherosclerosis of the brain vessels, because when they are used, nicotine enters the lungs and blood faster.

Refillable and disposable e-cigarettes containing nicotine are as harmful as tobacco products. Nicotine is a neurotoxin, so in whatever form it enters the body, it is addictive to the smoker. Experiments in scientific laboratories, conducted at the cellular level, showed what happens to the body after switching to electronic cigarettes. And the same processes occur as when smoking tobacco.

Nicotine e-cigarette liquid side effects, which are similar to tobacco nicotine, carries concentration and attention disorders, makes blood vessels stiffer, increasing the chances of developing a stroke, and causes damage to mucous membranes.

Today, novice vapers notice side effects, the causes of electronic cigarettes. They are expressed in dry mucous membranes of the mouth, pain and perspiration in the throat, coughing, headache. After an electronic cigarette it is difficult to breathe, there is pain in the chest, which are accompanied by fatigue, nausea and drowsiness. This is due to the

base components: glycerin and propylene glycol. In the preparation of the product, they act as moisturizers, but when consumed, hygroscopic properties play a cruel joke with the vaper, as they cause dehydration. Such side effects of e-cigarettes appear due to poor quality flavorings, propylene glycol and nicotine.

Generally speaking, definitely smoking electronic devices is very likely to cause cancer, lung and heart disease individually. As far as society is concerned, common use of one device can lead to hepatitis and tuberculosis infection.

That's why it's up to you to decide whether to start, continue smoking e-cigarettes, or stop using anything that can be addictive and damaging to your health.

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## **MICROGREEN - A GREEN SOURCE OF MICROELEMENTS FOR HUMAN HEALTH**

To maintain the human body in a healthy state and improve well-being, doctors recommend consuming an adequate amount of macro- and micronutrients. The main property of microgreens is their antioxidant effect. Substances found in such plants eliminate free radicals from the body, which damage cell membranes, DNA, and cartilage components. Additionally, with a high content of polyphenols, they prevent the development of cardiovascular diseases. However, each type of microgreen has its own characteristics and beneficial properties. To accelerate the growth of pea microgreens, two types of fertilizers were used: Humifpend - a complex fertilizer based on potassium humate with microorganisms, and STIMUL - a balanced nitrogen-phosphorus-potassium fertilizer. Atomic absorption determination of elements in microgreen samples, seeding material, and frozen pea seeds was carried out. Complete mineralization of the



investigated samples was performed in concentrated nitric acid. Microwave treatment of mineralizers with subsequent boiling was used to accelerate the sample preparation stage. Atomic absorption spectrophotometer C-115 PKS with flame atomization in an acetylene-air mixture was used to determine the specified elements in the investigated solutions. The research results showed that soaking the seeding material was carried out in water with the addition of H<sub>2</sub>O<sub>2</sub>. This allows to disinfect peas from bacteria and stop mold formation. It was established that the use of mineral fertilizer leads not only to accelerated pea growth but also increases the amount of certain elements, in particular sodium and potassium, which are important for the functioning of the human cardiovascular system. The use of microwave influence at the sample preparation stage of plant materials allows to reduce decomposition time by 2 times and more fully decompose the samples. Comparison of the results of element content in mineralized pea microgreens, seeding material, and frozen peas showed that the amount of certain elements in microgreens is significantly higher. This emphasizes the importance of consuming microgreens to increase the amount of essential elements in the human body and improve well-being (Table1).

Table 1 - Results of atomic absorption determination of elements (mg/kg) in mineralized samples of various plant specimens

	Na	K	Ca	Sr	Mn	Fe	Zn
Seed material	861,7	2176,7	2994,3	6,6	11,0	62,8	3,4
Frozen peas	1001,9	2432,7	3508,5	5,0	18,6	14,0	3,7
Microgreen peas	1066,5	3062,9	3734,5	7,5	18,9	20,4	1,7
MPC					20	50	10