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КАФЕДРА ІНОЗЕМНИХ МОВ ТА ЛІНГВОДИДАКТИКИ
ЛІНГВІСТИЧНИЙ НАВЧАЛЬНО-МЕТОДИЧНИЙ ЦЕНТР

МАТЕРІАЛИ

XVIII ВСЕУКРАЇНСЬКОЇ НАУКОВО-ПРАКТИЧНОЇ КОНФЕРЕНЦІЇ СТУДЕНТІВ, АСПІРАНТІВ ТА ВИКЛАДАЧІВ ЛІНГВІСТИЧНОГО НАВЧАЛЬНО-МЕТОДИЧНОГО ЦЕНТРУ КАФЕДРИ ІНОЗЕМНИХ МОВ ТА ЛІНГВОДИДАКТИКИ

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"TO MAKE THE WORLD SMARTER AND SAFER"

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To Make the World Smarter and Safer: Матеріали XVIII всеукраїнської науково-практичної конференції студентів, аспірантів та викладачів Лінгвістичного навчально-методичного центру кафедри іноземних мов та лінгводидактики СумДУ (25-26 квітня 2024 р.) / за заг. ред. професора Таценко Н.В. – Суми : СумДУ, 2024. – 168 с.

У матеріалах подані тези XVIII Всеукраїнської науково-практичної конференції студентів, аспірантів та викладачів Лінгвістичного навчально-методичного центру кафедри іноземних мов та лінгводидактики СумДУ. До збірника ввійшли наукові дослідження, присвячені актуальним проблемам сучасних інноваційних технологій та процесів у науці, техніці та різних сферах людської діяльності.

Для молодих науковців, викладачів і студентів усіх факультетів.

За зміст статей і правильність цитування відповідальність несе автор

3. Telemedicine and artificial intelligence-based diagnostics expand access to quality medical care, particularly in remote and underserved areas, while also enhancing the efficiency of diagnosis and treatment.

4. The COVID-19 pandemic has further highlighted the importance of medical innovations, accelerating their adoption and demonstrating their potential in responding to global health challenges.

5. Challenges associated with the integration of medical innovations include issues of privacy and data security, the need for regulatory adjustments, and the risk of a digital divide, which could limit access to innovative medical services for certain population groups.

6. Collaboration between governments, medical institutions, the scientific community,
and the private sector is key to overcoming these challenges and maximizing the potential of medical innovations for the benefit of society as a whole.

In thus, medical innovations are crucial for improving the quality of life and health of people worldwide. To achieve this goal, existing challenges must be addressed, and equitable access to innovative medical technologies and services must be ensured.

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INTERACTION OF COMPONENTS OF THE IMMUNE SYSTEM WITH NOVEL TWO-DIMENSIONAL MXENES MATERIALS

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Interaction of components of the immune system with novel two-dimensional MXenes materials has garnered an increasing

interest in the scientific community due to the potential applications of these materials in biomedical fields. MXenes are a group of nanomaterials composed of carbon, nitrogen, and other elements, possessing unique properties such as high conductivity, mechanical strength, and chemical stability. The recent studies [1] have shown that MXenes can interact with various cells of the immune system, including macrophages, lymphocytes, and dendritic cells. In this context, investigating the interaction of components of the immune system with novel two-dimensional (2D) MXenes materials is of strategic significance for understanding the biological properties of these materials and their potential impact on the human body. Based on this understanding, new diagnostic and treatment methods for various diseases can be developed, opening up new prospects in medical science and clinical practice.

It is hypothesized that contact with MXenes may activate the immune system and alter the phenotype of macrophages from M1 to M2. Additionally, we speculate that these changes may be accompanied by the production of specific cytokines that influence the immune response.

The research subject: the influence of MXenes on the functioning of the immune system.

The research object: MXenes molecules and their interaction with cells of the immune system.

The research goal: to study the interaction between the properties of MXenes and their impact on the immune response of the organism for further use in medicine or biotechnology.

The actuality of the research:

1. Activation of the immune system: there are studies confirming the ability of nanomaterials, such as MXenes, to activate the immune system. For example, their physicochemical properties may induce an immune response, prompting the production of cytokines and molecules that mobilize the immune cells.

2. Change in macrophage phenotype: macrophages are key cells of the immune system that can change their phenotype from M1 (anti-inflammatory) to M2 (pro-inflammatory) depending on the

microenvironment. This can be triggered by interaction with certain stimuli, including nanomaterials.

3. Production of cytokines: contact with MXenes can lead to the production of cytokines, such as interleukins and tumor necrosis factors, which may affect the immune response, including inflammation and modulation of the immune response.

High surface-to-volume ratio makes the 2D materials suitable for drug delivery systems, allowing them to load a large number of molecules (such as small molecule drugs, biomacromolecules, antigens, genes, and fluorescent probes) and demonstrate higher efficacy compared to controlled release at target sites [2]. The 2D materials have excellent advantages in the development of anti-tumor vaccines not only as delivery nanosystems. More importantly, they can elicit internal immune responses to induce immune-activating effects, which may lead to adjuvant-mediated immunotherapy. There is growing evidence that the 2D materials may play a crucial role in modulating the tumor microenvironment, including polarization of tumor-associated macrophages [3] and activation of dendritic cells, which activate the body's own defense to destroy the tumor [4]. Additionally, the 2D materials have great potential in regenerative medicine, as shown, for example, by promoting angiogenesis and neurogenesis using GBM and BP 3D scaffolds [5], as well as bone regeneration initiated by Nb2C 3D scaffolds. In this context, the inherent property of the 2D materials to suppress immunity may contribute to its application.

The research methods:

Using cellular models to study the response of the immune system cells to interaction with MXenes. Lymphocyte, macrophage, dendritic cell cultures, etc., can be utilized. Measurement of cytokine production, detection of changes in the cell cycle, analysis of MXenes' effects on the immune cell activation. To determine the impact of MXenes on living organisms and their cells. Investigation of biochemical indicators (enzyme activity, level of oxidative stress) to identify potential toxic effects of MXenes. Processing and analysis of cellular test results, measurement of biomarker production,

interpretation of experimental results using specialized programs and analytical tools.

We foresee that our research will help elucidate the mechanisms of interaction between MXenes and the immune system, as well as their potential impact on the immune response of the organism. As a result of our research, we anticipate that the influence of MXenes on the activity of the immune cells may lead to alterations in their phenotype and an increase in the production of cytokines and inflammatory mediators. These findings will underscore the importance of understanding the mechanisms of interaction between MXenes and the immune system for assessing their potential application in medicine. The data from our study could serve as a foundation for the development of new methods for treating diseases associated with changes in the immune system function or inflammatory processes.

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THE CORELATION OF THE PATIENTS' RESIDENCE PLACE AND THE RISK OF A CORONAVIRUS INFECTION

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Introduction. The mortality rate depends on many factors. One of those that increase the mortality of the population is the prevalence of infectious diseases among population. Infectious diseases have caused more than one epidemic. The most recent is the coronavirus, which was anounced by the WHO as a pandemic on March 11, 2022 due to the rapid spread and progressive severity of COVID-19. Which was occurred due to the emergence of variants of the SARS-CoV-2 virus due to the rapid mutation of the virus genome.

The main risk factors for coronavirus infection include modified (those that can be influenced and eliminated) and non-modified (those that cannot be eliminated).

In this work, we propose to investigate the residence place of the patient as risk factors for the development of the disease and the severity of the course of the corona virus infection.

Objective. To investigate the relationship between the place of patient's residence and the risk of contracting a coronavirus infection, as well as to determine possible ways to prevent infection and the severe course of the disease.

Materials and Methods. In the course of the study, 182 cases of deceased patients with severe coronavirus infection at the Sumy hospital were analyzed, in which, in addition to general clinical research methods, lung ultrasound and lung CT were used.