University of Gdańsk

Subject card

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| Subject name and code | Monographic lecture - Medical biotechnology, PG_00080869 | | |
| Field of study | Chemical Business | | |
| Date of commencement of studies | February 2025 | Academic year of realisation of subject | 2025/2026 |
| Education level | Master's studies | Subject group | Obligatory subject group in the field of study<br>Optional subject group |
| Mode of study | full-time studies | Mode of delivery | at the university |
| Year of study | 2 | Language of instruction | Polish<br>During the course, elements in English are used (animations reinforcing the program content, scientific publications, excerpts from lectures/statements by experts in the field, and educational films). |
| Semester of study | 3 | ECTS credits | 3.0 |
| Learning profile | academic | Assessment form | credit |
| Conducting unit | Department of Molecular Biotechnology -> Faculty of Chemistry -> Rector | | |
| Name and surname of lecturer (lecturers) | Subject supervisor | dr hab. Agnieszka Żylicz-Stachula | |
| | Teachers | | |

**Lesson types**

| Lesson type | Lecture | Tutorial | Laboratory | Project | Seminar | SUM |
|---|---|---|---|---|---|---|
| Number of study hours | 30.0 | 0.0 | 0.0 | 0.0 | 0.0 | 30 |

E-learning hours included: 0.0

**Learning activity and number of study hours**

| Learning activity | Participation in didactic classes included in study plan | Participation in consultation hours | Self-study | SUM |
|---|---|---|---|---|
| Number of study hours | 30 | 5.0 | 40.0 | 75 |

**Subject objectives**

The aim of the course is to provide students with comprehensive theoretical knowledge, enabling them to understand and utilize the latest advancements in the field of biomedical chemistry and medical biotechnology. The course is designed to prepare students for conducting scientific research and working in the biotechnology industry, taking into account the ethical, economical and social aspects of this rapidly evolving field.

## Learning outcomes

| Course outcome | Subject outcome | Method of verification |
|---|---|---|
| [BCHMU2_K04] Is willing to properly assess the acquired knowledge, respect and disseminate it in order to solve specific cognitive and practical issues. | The student can critically evaluate and apply the acquired knowledge in the field of medical biotechnology, recognizing its significance and limitations.<br>The student understands the need for continuous education and the expansion of their knowledge and skills in the rapidly developing field of medical biotechnology.<br>The student is ready to independently acquire and analyze new information in the field of medical biotechnology.<br>The student understands the need to disseminate knowledge about contemporary medical biotechnology. | [SK2] presentation/project/paper/ report |
| [BCHMU2_W05] Knows and understands the main trends in the development of chemistry combined with economics as two interpenetrating scientific disciplines. | The student recognizes the significant role and wide range of issues related to contemporary medical biotechnology.<br>The student knows selected developments in medical biotechnology and understands their economic aspects. | [SW4] test/exam - oral or written<br>[SW2] presentation/project/paper/ report |
| [BCHMU2_U01] Is able to, on the basis of her/his knowledge, propose a solution to problems in chemistry, taking into account the economic aspect by using advanced measurement techniques. | The student can propose a solution to an example problem in chemistry and medical biotechnology, taking into account the economic aspect. | [SU1] oral statement/conversation/ discussion<br>[SU8] observation of student's independent or team work |
| [BCHMU2_W01] Knows and understands complex physicochemical processes and is able to analyse their course in connection with other fields of science. | The student provides examples of applications of recombinant nucleic acids, biomaterials and proteins in medical biotechnology.<br>The student knows and understands the relationship of medical biotechnology to other scientific disciplines. | [SW4] test/exam - oral or written |
| [BCHMU2_U02] Is able to define her/his interests, develop them within the chosen direction and in connection with the subject of her/ his master's thesis by implementing the process of self-education and planning her/his professional career. | The student can identify his interests regarding contemporary medical biotechnology.<br>The student can develop his interests in contemporary medical biotechnology, in connection with the topic of their master's thesis. | [SU2] presentation/project/paper/ report |

## Subject contents

Definition and history of medical biotechnology; Overview of biotechnology applications in medicine; Tissue engineering and regenerative medicine; Application of stem cells in medical biotechnology; Methods for obtaining new biomaterials; Pharmacogenetics, pharmacogenomics, and personalized medicine; Nanobiotechnology in medicine; Recombinant vaccines; Examples of gene and cell therapies; Examples of biotechnology applications in molecular diagnostics; Microarrays; Use of antibodies in biotechnology and immunotherapy; Future of medical biotechnology, ethical, economical and social challenges.

## Prerequisites and co-requisites

## Assessment methods and criteria

| Subject passing criteria | Passing threshold | Percentage of the final grade |
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| activity during scientific discussion | 0.0% | 20.0% |
| presentation | 0.0% | 52.0% |
| test | 0.0% | 28.0% |

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| Recommended reading | Basic literature | Kristiansen, B., Ratledge, C. Podstawy biotechnologii. Wydawnictwo Naukowe PWN, wyd. 1, 2011, Warszawa, 2024<br><br>Buckingham, M.L.; Molecular diagnostics: Fundamentals, Methods and Clinical Applications. F.A. Davis Company, 2019<br><br>Bal, J. Genetyka medyczna i molekularna. Wydawnictwo Naukowe PWN, wyd. V, Warszawa, 2023 |
| | Supplementary literature | Selected scientific publications and review papers in Polish and English (updated annually and available online), provided by the instructor during the semester in which the course is conducted. |
| | eResources addresses | |
| Example issues/ example questions/ tasks being completed | Stem cells capable of giving rise to cells of all types of embryonic and extra-embryonic tissues are called:<br><br>a) multipotent<br><br>b) pluripotent<br><br>d) totipotent<br><br>e) unipotent<br><br>Fill in the following sentence:<br><br>Genetically determined variants of the TPMT enzyme affect the bioavailability and toxicity of ..... . | |
| Work placement | Not applicable | |

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