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Basic Information:

Course Title: Theory and practice of classical and contemporary histological techniques

Lecturer: Prof. Nina Nedeva Atanassova, PhD, DSci, Corresponding member of the Bulgarian Academy of Sciences
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Total Teaching Hours: 30 academic hours

Annotation (up to 150 words)

The specialized course aims to provide knowledge and training for PhD students on principles and practice of classical and advanced histological techniques that are widely applied in the field of experimental morphology and pathology and cell biology. The course program is designed according to the mission and priorities of the Institute of Experimental Morphology, Pathology and Anthropology with Museum. The training accentuates on the importance of the advanced techniques for fundamental achievements in the field of cell biology relating to elucidation of regulatory mechanisms of cell interaction mediated by hormones and growth factors. The course also focuses on the application and practical use of different techniques for clinical investigations in terms of development and improvement of diagnostic markers of various diseases. The course is addressed to PhD students in the field of experimental morphology and pathology, cellular and molecular biology.

Course content (brief description by topics or modules)

Topic 1: Principles of histological techniques. Preparation and processing of experimental material for light microscopy. Types of fixatives and stains. Preparation of permanent microscope slides. – 3 academic hours

Topic 2: General and special histological and histochemical methods. – 3 academic hours

Topic 3: Preparation of material for electron microscopy. Electron-microscopic immunohistochemistry. – 3 academic hours

Topic 4: Immunohistochemistry – types of visualization systems; single and double immunohistochemistry – 4 academic hours

Topic 5: In situ detection of apoptosis. – 3 academic hours

Topic 6: Principles of in situ hybridization – use of radioactive and non-radioactive probes. – 3 academic hours

Topic 7: Histometric and stereological methods. – 3 academic hours

Topic 8: Application of modern histological techniques in reproductive biology and medicine. – 3 academic hours

Topic 9: Immunohistochemical methods in neuromorphology. – 3 academic hours

Topic 10: Application of transgenic models in the study of the cellular and molecular mechanisms of action of hormones and growth factors. – 2 academic hours

Teaching and assessment methods
Lectures and exercises
Discussion

Competencies acquired as a result of training (3–5 points)
Developing practical skills for working in a histology laboratory.
Proficiency in basic and advanced histological, histochemical, and immunohistochemical methods for studying cellular and molecular processes.
Developing skills in the analysis and evaluation of morphological data in the field of biomedicine.

Literature:
1. Ross M. H., Pawlina W. (2011) Histology. A Text and Atlas. Lippincott Williams & Wilkins, Baltimor MD, USA.
2. В. Овчаров, Ц. Такева – Обща хистология: Обща ембриология, “Арсо”, 2023
3. Давидов М. (1982). Имуноцитохимични методи за изучаване на нервната система. – В: Съвременни проблеми на невроморфологията. Изд. на БАН, София.
4. Кръстев Х., Ковачев К. (1978). Ръководство за упражнения по цитология и хистология с основи на електронно-микроскопската техника. Земиздад, София.
5. Bancroft J., Stevens A. (1996). Theory and practice of histological techniques. Churchill Livingstone, London.
6. Bullock G.R., Petrusz P. (1985). Techniques in immunocytochemistry. Academic Press Inc., London.
7. Polak J.M., O’D.McGee J. (1990). In situ hybridization. Principles and practice. Oxford Univ. Press, Oxford.
8. Wreford N. (1995). Theory and practice of stereological Techniques applied to the estimation of cell numbers and nuclear volume in the testis. Micr. Res. Tech., 32, 423-436.
9. Гайер Г. (1974). Электронная гистохимия. Мир, Москва