UNIVERSITÀ DI PAVIA

Anno Accademico 2021/2022

ADVANCED MICROSCOPY

Enrollment year	2020/2021
Academic year	2021/2022
Regulations	DM270
Academic discipline	BIO/06 (COMPARATIVE ANATOMY AND CYTOLOGY)
Department	DEPARTMENT OF BIOLOGY AND BIOTECHNOLOGY "LAZZARO SPALLANZANI"
Course	EXPERIMENTAL AND APPLIED BIOLOGY
Curriculum	Scienze biomediche molecolari
Year of study	2°
Period	1st semester (01/10/2021 - 14/01/2022)
ECTS	6
Lesson hours	48 lesson hours
Language	Italian
Activity type	ORAL TEST
Teacher	BIGGIOGERA MARCO (titolare) - 3 ECTS MILANESI GLORIA ANGELA - 3 ECTS
Prerequisites	=
Learning outcomes	Knowledge of basic and advanced microsopy techniques and of cytochemical methods
Course contents	Microscopes: bright field, dark field, polarization, interference, DIC, fluorescence (with basic notions), confocal, trasmission electron microscope, scanning electron microscope, energy filtering electron microscope. Resolution and contrast. Preparative methods of biological samples for light and electron microscopy: fixation, dehydration, embedding in resin and paraffin. Staining for for light and electron microscopy. Immunocytochemistry: mono- and polyclonal antibodies; direct and indirect reactions; elctrondense and fluorescent markers. In situ hybridization: different probe types, stringency limits and specificity;

	applications. Cytochemical reactions: concept of reaction specificity or preferentiality: Reactions for DNA: Feulgen reaction; osmium ammine; specific fluorochromes. Flow cytometry: basics and applications. Some examples of application of cytochemical and microscopical techniques for the detection of apoptosis and necrosis. New dynamical techniques: FRAP, FLIP, iFRAP. Superresolution: scanning tunneling microscope and atomic force microscope. Stimulated Emission Depletion (STED), Photoactivated Localization Microscopy (PALM), Stochastic optical reconstruction microscopy (STORM). Electron tomography and 3D reconstruction of objects. Correlative microscopy. Enzyme histochemistry: basics and applications.
Teaching methods	Lectures and practical activity with fluorescence and electron microscopes
Reccomended or required readings	=Chandler & Roberson:BIOIMAGING. Jones & Bartlett Publishers
Assessment methods	Oral exam
Further information	Oral exam
Sustainable development goals - Agenda 2030	The goals