

Advances in Clinical Biochemistry and Molecular Pathology

Code: 42886
ECTS Credits: 9

Degree	Type	Year	Semester
4313794 Biochemistry, Molecular Biology and Biomedicine	OT	0	A

Contact

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Teachers

Francesca Canalias Reverter

Francisco Rodríguez Frías

Josefina Mora Bruges

Use of Languages

Principal working language: catalan (cat)

External teachers

Alvaro García Osuna

Edgar Zapico Muñoz

Joan Carles Escolà Gil

José Luis Sánchez Quesada

José Manuel Soria Fernandez

Mireia Tondo Colomer

Prerequisites

- 1) Having the Degree, preferably in Life Sciences and Health (Biomedicine, Biochemistry, Genetics, Medicine, Veterinary Medicine, Pharmacy, etc.)
- 2) Good level of Catalan or Spanish and English. Most classes will be in Catalan but Spanish will be used if a student does not understand Catalan. If necessary and for the same purpose, English will be used instead of Spanish. English will be used for sure for reading and analyzing scientific papers.

Objectives and Contextualisation

The main objective of the module is reviewing the progress made recently in the area of Clinical Biochemistry and Molecular Pathology. It is intended, therefore, that students understand and visualize this using examples, that are not intended to be exhaustive, so they understand how what is the way in which the applications in the area of Laboratory Medicine (specialty Molecular Pathology and Clinical Biochemistry) are generated and applied. The contents will be selected among those advances which, although recent, have proven practical importance. The theoretical instruction is supplemented by expert seminars, discussion of articles and resolution of clinical cases.

Competences

- Analyse and correctly interpret the molecular mechanisms operating in living beings and identify their applications.
- Analyse and explain normal morphology and physiological processes and their alterations at the molecular level using the scientific method.
- Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
- Continue the learning process, to a large extent autonomously.
- Develop critical reasoning within the subject area and in relation to the scientific or business context.
- Identify and propose scientific solutions to problems in molecular-level biological research and show understanding of the biochemical complexity of living beings.
- Identify and use bioinformatic tools to solve problems in biochemistry, molecular biology and biomedicine.
- Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
- Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
- Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
- Use and manage bibliography and IT resources related to biochemistry, molecular biology or biomedicine.
- Use scientific terminology to account for research results and present these orally and in writing.

Learning Outcomes

1. Communicate and justify conclusions clearly and unambiguously to both specialist and non-specialist audiences.
2. Continue the learning process, to a large extent autonomously.
3. Develop critical reasoning within the subject area and in relation to the scientific or business context.
4. Evaluate and implement improvements or changes, either in methods or parameters, in the clinical laboratory.
5. Identify the main new trends within clinical biochemistry and molecular pathology and understand how these depend largely on the application of new methods and technologies.
6. Identify, from examples, the practical applications of new methodological and interpretative advances in laboratory medicine.
7. Integrate knowledge and use it to make judgements in complex situations, with incomplete information, while keeping in mind social and ethical responsibilities.
8. Interpret results from clinical analyses on different groups of pathologies and their sequential implementation following pre-established algorithms.
9. Recognize and explain the special characteristics and requirements of the biochemical and genetic analyzes carried out in clinical laboratories.
10. Solve problems in new or little-known situations within broader (or multidisciplinary) contexts related to the field of study.
11. Use acquired knowledge as a basis for originality in the application of ideas, often in a research context.
12. Use and manage bibliography and IT resources related to biochemistry, molecular biology or biomedicine.
13. Use bioinformatic tools to process genome data for research or laboratory diagnosis of human diseases.
14. Use scientific terminology to account for research results and present these orally and in writing.

Content

CONTENT M MASTER IN BIOCHEMISTRY, MOLECULAR
9 BIOLOGY AND BIOMEDICINE

Room Place

Monday	Introduction. Academic and job oportunities in Clinical Biochemistry and Molecular Pathology	F. Blanco	04-nov	Unitat Docent Sant Pau
Wednesday	INVITED CONFERENCE: Molecular basis of complex diseases	J.M. Soria	06-nov	Unitat Docent Sant Pau
Monday	STANDARDIZATION AND QUALITY (tema I)	F. Canalias	11-nov	Unitat Docent Sant Pau
Wednesday	Standardization and quality	F. Canalias	13-nov	Unitat Docent Sant Pau
Friday	Standardization and quality	F. Canalias	15-nov	Unitat Docent Sant Pau
Monday	SEMINAR 1. Mass spectrometry: basis and clinical applications	E. Zapico	18-nov	Unitat Docent Sant Pau
Wednesday	LIPIDS, LIPOPROTEINS AND ARTERIOSCLEROSIS (topic II): Familial Hipercholesterolemia	F. Blanco	20-nov	Unitat Docent Sant Pau
Friday	SEMINARS 2-3. Animal models of arteriosclerosis. Cellular and molecular biology of arteriosclerosis	J.C. Escolà / J.L. Sánchez	22-nov	Unitat Docent Sant Pau
Monday	Discussion of papers related to seminar 1 (first part) and topic II and seminars 2 and 3 (second part)	E. Zapico / F Blanco	25-nov	Unitat Docent Sant Pau
Wednesday	VIRAL HEPATITIS (topic III). Discussion clinical cases and/or papers	F. Rodriguez Frias	27-nov	Unitat Docent Sant Pau
Friday	CONGENITAL ERRORS OF METABOLISM (topic IV)	M. Tondo	29-nov	Unitat Docent Sant Pau
Monday	PRENATAL SCREENING (topic V)	J. Mora	2 dec	Unitat Docent Sant Pau
Wednesday		J. Mora	4 dec	

	TUMOR MARKERS (topic VI). Discussion of clinical cases and/or papers			Unitat Docent Sant Pau
Monday	BIOCHEMICAL MARKERS OF HEART DAMAGE (topic VII). Biochemical diagnosis of acute myocardial infarction. Biochemical diagnosis of heart failure	A. García Osuna	9 dec	Unitat Docent Sant Pau
Wednesday	BIOCHEMICAL DIAGNOSIS OF ALZHEIMER DISEASE (topic VIII) (first part). Discussion of papers and clinical cases related to topics III and VII	M. Tondo /F. Blanco	11 dec	
Friday	Presentation and defense of papers or clinical cases by the alumni	J. Mora /F. Blanco	13 dec	Unitat Docent Sant Pau
Monday	Presentation and defense of papers or clinical cases by the alumni	J. Mora / F. Blanco	16 dec	Unitat Docent Sant Pau

Methodology

Methodology includes autonomous activities (studying: 106.5 h), supervised activities (study of clinical cases and reading scientific papers for class discussion: 67.5 h) and directed activities (theoretical lessons, seminars, aula practicum: 50 h).

Activities

Title	Hours	ECTS	Learning Outcomes
Type: Directed			
theoretical lessons, seminars, aula practicum: 50 h	5	0.2	4, 3, 5, 6, 8, 7, 10, 2, 9, 11
theoretical lessons, seminars, aula practicum: 50 h	15	0.6	4, 5, 6, 8, 7, 10, 1, 2, 9, 13, 11, 12, 14
theoretical lessons, seminars, aula practicum: 50 h	25	1	4, 5, 7, 2, 9, 11
Type: Supervised			
Study of clinical cases and reading scientific papers for class discussion: 67.5 h	67.5	2.7	4, 3, 5, 6, 8, 7, 10, 1, 2, 9, 13, 11, 12, 14
Type: Autonomous			
Study: 106.5 h	106.5	4.26	4, 3, 5, 6, 8, 7, 10, 2, 9, 13, 11, 12, 14

Assessment

The continuous evaluation process must include a minimum of three evaluation activities, of two different types, distributed throughout the course, none of which can represent more than 50% of the final grade

The evaluation will be based on: oral presentation of projects or clinical cases analysis (40% of the grade), presentation of small works and reports, as well as the answer to short exams (30% of the grade) and attendance to class and active participation (30 % of the grade)

Students who do not perform both theoretical and practical tests will be considered as "not presented", therefore exhausting the rights of the registration.

If plagiarism is detected in any of the works delivered, this may mean that the student suspends the entire module or subject.

PROOF OF RECOVERY AND QUALIFICATION OF NOT EVALUABLE

To participate in exam recovery, students must have been previously evaluated in a set of activities, whose weight equals a minimum of 2/3 parts of the total grade of the subject or module. Therefore, the students will obtain a "Not Evaluable" qualification when the evaluation activities carried out have a weight lower than 67% of the final grade.

Assessment Activities

Title	Weighting	Hours	ECTS	Learning Outcomes
Attendance and active participation in classes	30%	0	0	4, 3, 5, 6, 8, 7, 10, 1, 2, 9, 13, 11, 12, 14
Oral presentation of projects or clinical cases	40%	4	0.16	4, 3, 6, 8, 7, 10, 1, 2, 9, 11, 12, 14
Presentation of homework and reports, small exams of short questions (in writing)	30%	2	0.08	3, 6, 8, 7, 10, 1, 2, 11, 12, 14

Bibliography

TEXTBOOKS:

1) Tietz textbook of Clinical Chemistry and Molecular Diagnostics. Burtis CA, Ashwood ER, Bruns DE eds. Elsevier, 2012.

2) Molecular Basis of Inherited Disease. Valle, Beaudet, Vogelstein et al. Saunders 2001 (hi ha una edició digital que es va actualitzant periòdicament: www.ommbid.com).

SCIENTIFIC JOURNALS:

- 1) Clinical Chemistry
- 2) Clinica Chimica Acta
- 3) Clinical Biochemistry
- 4) Circulation
- 5) Circulation Research

- 6) Blood
- 7) Arteriosclerosis, Thrombosis and Vascular Biology
- 8) Journal of Lipid Research
- 9) Diabetes
- 10) Diabetes Care
- 11) Kidney International
- 12) American Journal of Human Genetics

CLINICAL LABORATORY WEBSITES:

- 1) American Association for Clinical Chemistry, www.aacc.org
- 2) Associació Catalana de Ciències de Laboratori Clínic, www.acclc.cat
- 3) International Federation of Clinical Chemistry and Laboratory Medicine, www.ifcc.org
- 4) Sociedad española de Química Clínica y Patología Molecular, www.seqc.es