GHENT UNIVERSITY

Course Specifications

Valid in the academic year 2018-2019

Medical Biochemistry (J000402)

Course size (nominal values; actual values may depend on programme)

Credits	8.0	Study time	240 h
Contact hrs	45.0 h		

Course offerings and teaching methods in academic year 2018-2019

A (semester 1)	Dutch	guided self-study	2.5 h
		seminar: coached exercises	6.25 h
		lecture	36.25 h

Lecturers in academic year 2018-2019

Van Bocxlaer, Jan	FW03	lecturer-in-charge

Offered in the following programmes in 2018-2019	crdts	offering
Bachelor of Science in Pharmaceutical Sciences	8	A

Teaching languages

Dutch

Keywords

Medical biochemistry, Metabolism, Clinical chemistry, Molecular basis of function and dysfunction of an organism

Position of the course

This course aims to provide an in-depth knowledge of the biochemical processes which constitute the basis of the normal as wall as the pathological metabolism. It transfers knowledge of the molecular basis of health and disease. An important goal is to acquire a better understanding on the integration of the various metabolic cycli, the subtle control mechanisms and equilibria which govern these processes, and, on defective functioning, the association with the particular disease profile. The student will learn how to think in a conceptual biochemical way. The course provides a sound basis for other courses such as pharmacology, medicinal chemistry or immunochemistry through the medical orientation, in terms of the origin of important human diseases as well as their clinical-chemical diagnosis and aspects of (pharmacological) treatment.

Contents

The course is composed around the major themes in biochemistry, including the energy management of the cel (oxydative phosphorylation), the carbohydrate metabolism, the lipid metabolism (with special emphasis on the lipoproteins and cholesterol, related to cardiovascular disease), the amino acid metabolism (with the inborn errors of metabolism), the metabolism of haem and iron, and the nucleotide metabolism. In addition, the "reactive oxygen species" issue and various chemicals with hormonal activity (also in relation to the physiological and biochemical control mechanisms) are addressed. In that respect, the basis of cellular management of external (hormonal) signals (signal transduction and amplification) is equally touched upon. In each instance, the fundamental biochemical processes themselves, as well as their (patho) physiological manifestation and (in brief) some analytical aspects of appropriate clinical-biological markers are all dealt with. The latter is also the main link to the course entitled "Bioanalytical Practical" in which one of the major parts aims to introduce the student into the process of measuring clinically diagnostic markers in a biological matrix. Additionally this highlights the daily use and practice of medical biochemistry in its derived format, clinical chemistry.

Initial competences

At the start of this course, the student disposes of general and specific fundamental knowledge which is used as building blocks in the concepts which are the subject matter of medical biochemistry. The knowledge and views from two vertical lines in the

previous part of the studies constitute the foundation of medical biochemistry.
A first line consists of organic chemistry (knowledge of the structure and characteristics of organic compounds) followed by biochemistry and biophysics I and II (insight in the structure, functions and interactions of biomolecules, knowledge of aspects of bioenergetics and enzyme kinetics).
A second line consists of physiology and pathophysiology of body systems and pathology.
The student has either successfully taken the courses indicated, or alternatively, has acquired the competences which these courses aim for, in a different but equally functional way.
In view of the abovementioned close contextual relationship with the "Bioanalytical Practical" course, those students who plan to include Medical Biochemistry in their deliberation set compulsory have to include the Bioanalytical Practical too, unless they have already obtained the particular credit.

Final competences

1 To have a profound understanding of the biochemical pathways and cycles of the intermediate metabolism.
2 To establish relationships and understand the interaction between the different biochemical pathways with respect to the interplay between tissues, metabolic conditions and disease states.
3 To understand the (patho-) chemical working principles of the organism on a fundamental molecular level and within a medical clinical context.
4 To have a profound understanding of the importance of regulation mechanisms on a (set of) biochemical pathway(s) and the relationship this constitutes with (patho-) physiology.
5 To have an understanding of those mechanisms which come into play in various diseases.
6 To have a basic knowledge on which a discipline as pharmacology (how do drugs affect and potentially correct a pathological metabolism) can continue.
7 To have improved knowledge with respect to modern laboratory research techniques, particularly in a clinical, bio-analytical context.

Conditions for credit contract

Access to this course unit via a credit contract is determined after successful competences assessment

Conditions for exam contract

This course unit cannot be taken via an exam contract

Teaching methods

Guided self-study, lecture, seminar: coached exercises

Learning materials and price

A dedicated syllabus and metabolic schemes are used, approximate cost: 25 euro. To these core study materials, the PowerPoint presentations are additionally available.

References

Course content-related study coaching

The aspects of study coaching are integrated into the practical exercises, as integrated in the sattelite course "Bioanalytical Practical", completed with the training of the students in problem solving skills and integrated knowledge. In this respect, communication with the tutor is provided and exchange of knowledge and discussion among students and tutor is made possible for a selection of medical biochemical subjects and problems. Every week, before or after one of the lectures, the lecturer stays present in a nearby location, to conduct a fixed individual "question time" session.

Evaluation methods

end-of-term evaluation

Examination methods in case of periodic evaluation during the first examination period

Written examination

Examination methods in case of periodic evaluation during the second examination period

Written examination

Examination methods in case of permanent evaluation

Possibilities of retake in case of permanent evaluation

not applicable

Extra information on the examination methods

This course uses periodic evaluation. The students’ knowledge concerning the course is tested through a written examination. A first part aims to evaluate the knowledge of the student on a course-wide level. A second part mainly investigates whether the student thinks and reasons in terms of a biochemical concept. The oral examination part mainly deals with the contents, facts and figures are a second order priority. Part of the exam can take the format of multiple choice questions, a biochemical calculation problem is additionally a possibility.

Calculation of the examination mark