


Teacher(s)	Bertrand Luc ;Cani Patrice (coordinator) ;Gilon Patrick ;Lanthier Nicolas ;Veiga da Cunha Maria ;
Language :	French
Place of the course	Bruxelles Woluwe
Main themes	This course aims to study the mechanisms involved in the regulation of cellular activity and metabolism. Different membrane and nuclear receptors as well as transcription factors directly regulated by nutrients and/or their metabolites will be investigated (e.g. : PPAR's, FXR, chREBP, GRP40/120/119/41/43, Toll like receptors (TLR's)). We will also study the mechanisms regulating specific signaling pathways involved in energy homeostasis, lipid and glucose metabolism (e.g., insulin, AMPK, mTOR, ROS).
Learning outcomes	<p>At the end of this learning unit, the student is able to :</p> <p>At the end of this course, the students will be able :</p> <p>(1) to understand and to explain the cellular and molecular mechanisms influenced by nutrients (e.g.: different type of lipids, proteins and amino acids, specific carbohydrates) and their cellular metabolites (e.g.: ceramides, DAG, endocannabinoids, ...),</p> <p>1 (2) to describe the mechanisms regulating gene expression directly connected with energy, glucose and lipid metabolism,</p> <p>(3) to understand the key features regulating physiology and metabolism and that may be involved in the onset of specific pathological disorders such as obesity, type 2 diabetes, metabolic inflammation, cardiovascular diseases, pancreatic and hepatic diseases.</p>
Evaluation methods	Written exam on all parts of the course. The student should provide criticism and integrate the different themes addressed during the course
Teaching methods	<p>The course will be fully given in the auditorium.</p> <p>The team of teachers is composed of professors that have a specific knowledge and complementary expertise in molecular and cellular aspects. Each member of the team will teach themes that are in his field of expertise and for some of them directly developed in their research practice. It is worth noting that this will be coordinated between the different members of the teaching team in order to integrate as much as possible all the different aspects of the course. Finally, this approach will help to maintain the content of the course relatively up to date in this fast moving field.</p>
Content	<p>This course aims to provide to students from all orientations the necessary knowledge to:</p> <p>(1) understand and describe the molecular and cellular mechanisms influenced by various nutrients, by the intestinal microbiota and certain cellular metabolites</p> <p>(2) describe and illustrate the mechanisms of regulation of the expression of different genes directly involved in energy, carbohydrate and lipid metabolism,</p> <p>(3) integrate his/her knowledge of the key physiological regulations of metabolism and also clarify the mechanisms involved in the triggering of certain pathologies such as obesity, type 2 diabetes, metabolic inflammation and cardio-metabolic damage, pancreatic and hepatic.</p> <p>The course focuses on the molecular mechanisms involved in the regulation of cellular/molecular activities and metabolism. The molecular and cellular mechanisms influenced by various kinds of energetic or non-energetic nutrients (for example: different types of lipids, proteins and amino acids, specific carbohydrates, vitamins and trace elements) or the impact of the intestinal microbiota and related metabolites are being studied.</p> <p>More precisely, the different professors address both molecular aspects and the regulation of different membrane and nuclear receptors, but also various transcription factors directly regulated by nutrients (for example: PPAR's, LXR, chREBP, TLR's, GPR40 / 120 / 119/ 41/ 43) as well as the regulatory mechanisms of certain signaling pathways involved in energy, lipid and carbohydrate homeostasis (eg: insulin, AMPK, mTOR, etc.).</p>
Inline resources	Several articles from the scientific literature, journals and other materials used for the preparation of the course are made available to students (Moodle).

Other infos	Total hours: Cani P (12h), Bertrand L (8h), Gilon P (4h), Lanthier (4h), Veiga Da Cunha (2h)
Faculty or entity in charge	FASB

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Biomedicine	SBIM2M	4		
Master [60] in Biomedicine	SBIM2M1	4		