University of Pretoria Yearbook 2019

Biocatalysis and integration of metabolism 357 (BCM 357)

Qualification	Undergraduate
Faculty	Faculty of Natural and Agricultural Sciences
Module credits	18.00
Programmes	BSc Biochemistry
	BSc Biotechnology
	BSc Chemistry
	BSc Genetics
	BSc Human Genetics
	BSc Human Physiology
	BSc Microbiology
	BSc Plant Science
	BSc Zoology
Prerequisites	BCM 251 and BCM 252 and BCM 261 or permission from the HOD
Contact time	2 lectures per week, 1 practical/tutorial per week
Language of tuition	Module is presented in English
Department	Biochemistry, Genetics and Microbiology
Period of presentation	Semester 1

Module content

Enzyme nomenclature and classification. Specificity and mechanisms: the active site, mechanisms of catalysis and examples of specific enzyme mechanisms, e.g. lysozyme and carboxypeptidase A. Advanced enzyme kinetics, Cleland nomenclature and multi-substrate reactions. Allosteric enzymes: models by Koshland, Hill and Monod. Ligands binding to proteins. Inhibitors of angiotensin converting enzyme (ACE). RNA as enzymes. Applications of enzymes in food and cosmetics industries and in clinical pathology assays as biomarkers of diseases and toxic responses. Elucidation of metabolic pathways. Antibiotic resistance mechanisms and development of new drugs. Hormonal regulation and integration of mammalian metabolism. Regulation of fuel metabolism after a meal, period between meals and starvation. Metabolic adaptions during diabetes. Obesity and the regulation of body mass. Obesity, matabolic syndrom and Type 2 diabetes (T2D). Management of T2D with diet, exercise and medication. Practical sessions cover tutorials on calculations, isolation of an enzyme, determination of pH and temperature optimum, determination of Km and Vmax, enzyme activation and enzyme inhibition. Computer simulations of drug design and protein docking to improve efficacy and lower toxicity.

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