

Subject name	Application of Isotopes and Antibodies in Biology and Medicine	
Subject code	H.KFZa.APL9.SM.HZOBY	
Department	Animal Physiology and Endocrinology	
Faculty	Animal Sciences	
Subject supervisor/Lecturer	Professor Andrzej Sechman, Professor Anna Hrabia, Dr. Małgorzata Grzesiak	
General information	semester	winter
	ECTS credits	4
	Lectures total	15 hrs
	Laboratories	20 hrs
Objective and general description	<p>The main objective of the course is understanding basic methods and laboratory techniques connected with isotopes and antibodies application. During the course basic aspects of nuclear physics and isotopes production will be presented. Following the course students should be familiar with principles of analytical methods in which isotopes and antibodies are applied, i.e. radioimmunoassay (RIA), radioreceptorassay (RRA), blood flow, hormone kinetics, immunocytochemistry, ELISA etc. The possibilities of these method application in biology, animal science and medicine will be presented.</p> <p><u>Lectures:</u></p> <p>Introduction – discussion concerning the basic problems of nuclear physics (radioactivity, dose of radioactivity, isotopes etc.). Application of labeled substances in vivo and in vitro (hormone kinetics, blood flow through the tissue, hormone uptake by the tissue, cell proliferation). Overview basic concepts of immunology: antigen, antibody, characteristic antigen-antibody reaction; review of methods using isotopes and/or antibodies in laboratory diagnosis. Mono- and polyclonal antibodies - the characteristics and method of their production. Immunochemical methods (immunoassay techniques, the method ABC, fluorescent and chemiluminescent methods). The use of antibodies in selected techniques, Part I: immunocytochemistry. The use of antibodies in selected techniques, Part II: ELISA, Western blot, immunoprecipitation, immuno-PCR, EMSA. Radioimmunoassay (RIA) - the principle of the method, cross-reactivity of antibodies, the test parallelism and recovery. Principles of radioreceptorassay (RRA) – kinetics of radioligand assays, the Scatchard's plot. Application of the RRA method in biology, medicine and pharmacology</p> <p><u>Labs:</u></p> <p>Immunocytochemistry (the location of apoptotic or proliferating cells on paraffin sections of tissue). Determination of hormones and proteins by ELISA, using the ELISA method in laboratory diagnosis; determination of TSH levels in the human blood plasma Radioimmunoassay (RIA) - determination of titer and cross-</p>	

	<p>reactivity of antibodies, the assessment of antigen-antibody affinity; determination iodothyronine concentrations in animal and human blood plasma.</p> <p>Determination of kinetic parameters using radioactive hormone thyroxine (biological half-life, area of distribution, metabolic clearance).</p>
Assessment method	<p>Lectures: Time limited written exam.</p> <p>Labs: Demonstration of practical skills.</p>
References	<p>Rothfeld B.: Nuclear medicine in vitro, J.B. Lippincott Company, London, Mexico City, New York, St. Louis, Sao Paulo, Sydney, 1983.</p> <p>R.V. Lloyd, Morphology methods, Cell and Molecular Biology Techniques, Humana Press, Totowa, New Jersey, 2001.</p> <p>Ed Harlow, David P Lane: Antibodies: A Laboratory Manual, Cold Spring Harbor Laboratory Press, New York, 1988.</p>