Study program: Reproductive Biology

Study level: Master's studies

Course title: INTRODUCTION TO THE TECHNIQUES OF GAMETES MICROMANIPULATION

Course code: RB04

Teacher: dr Sonja Kaisarevic

Course status: obligatory

ECTS: 6

Requirements: -

Course objectives: Acquiring practical knowledge on work on micromanipulator and gaining skills in micromanipulation using different experimental models.

Learning outcomes: Upon completion of the pre-examination activities and final exam, the students will adopt micromanipulation technique on different experimental models, as well as the basic procedures for isolation and analysis of gametes of experimental animals.

Syllabus

Theoretical instruction

Micromanipulation and microinjection. Zebrafish (*Danio rerio*) as experimental model in embryology, embryonic development. Basic principles of ICSI procedure. Characteristics of spermatozoa, semen analyses. Capacitation and acrosomal reaction. Superovulation. Ethical aspects of using experimental animal models.

Practical laboratory

Basic principles of micromanipulation. Micromanipulation and microinjection on *Danio rerio* embryo as a model: microinjection of dye, dechorionisation. Micromanipulation on artificial models. Computer simulation of ICSI procedure – adaptation of techniques of micromanipulation and ICSI procedure in a virtual system. Microscopic analysis of rat spermatozoa (determination of concentration, viability, morphology and motility of spermatozoa, staining of spermatozoa). Induction of acrosomal reaction and evaluation of the acrosome status in rat spermatozoa. Induction of superovulation in female rat, collection and observation of oocytes. Keeping a laboratory notebook.

Literature

1. Lecture presentations and tekstbook provided by the teacher.
2. WHO laboratory manual for the examination and processing of human semen, Fifth edition, World Health Organization 2010.
3. Reviews and original scientific papers on topics related to the subject matter of the course.
4. Group of authors: Practicum in Reproduction (material provided within the course „Frontiers in Reproduction", Marine Biological Laboratory (MBL), Woods Hole, Massachusetts, USA, 2008 и 2010).

Weekly teaching load

Lectures: 1	Teaching laboratory: -	Other forms of teaching: 4	Research activities: -	Other: -

Teaching methods

Lectures, laboratory work, consultations

Evaluation of knowledge (maximum score 100)

Pre-exam obligation	Points	**Final exam**	Points
Student engagement in lectures		Written exam	
Seminar		Oral exam	up to 40
Tests			
Practical laboratory	up to 40		
Laboratory notebook	up to 20		