

Name of the subject: Networks of signaling pathway in reproduction		
Teacher(s): Silvana Andric, PhD, professor; Tatjana Kostic, PhD, professor		
Status of the subject: Elective		
Number of ECTS points: 15		
Condition: -		
Goal of the subject: Objective of this course is to acquire knowledge about networks of signaling pathways and their interactions in the regulation and synchronization of reproductive function. Students should gain the ability in scientifically based interpretation of experimental data in the field of signal transduction networks in reproduction.		
Outcome of the subject: At the end of this course students will be able to understand and describe the general features of the intracellular signaling pathways and methods of network detection, transduction, transmission, propagation and amplification of information in order to achieve adequate reproductive biological response, as well as to acquire the capacity for analysis and discussion of scientific papers in the field cell signaling in reproduction.		
Content of the subject <i>Theoretical lectures</i> Overview of types of cellular communication and signal transduction pathways in reproduction. Network of signaling pathways activated by reproductive messengers. Signaling pathways and sexuality. Signaling pathways involved in sex determination. Network of signaling pathways that regulate the development of the ovaries and testes. Network of signaling pathways in the regulation of biosynthesis of female sex hormones and oogenesis. Network of signaling pathways in the regulation of biosynthesis of the male sex hormones and spermatogenesis. Signaling pathways activated during puberty and maturation of the hypothalamic-pituitary-gonadal axis. Network of signaling pathways that include estrogens, androgens and progesterone. Signaling in coitus and fertilization. Signaling pathways in implantation and placental formation. Signaling networks during pregnancy, preparing the fetus for birth, childbirth and lactation. Signaling pathways during reproductive aging and the menopause and andropause. <i>Practical lectures</i> Each student will have an individual project assignment in the research related to the signaling network in the theca/granulosa cells of females and Leydig cells of males. The different <i>in vivo</i> experimental models will be used: pubertal male and female laboratory rats; hypogonadal-hypogonadism; androgenization; superovulation; castration; "knock-out" mice (<i>Insr/Igf1r</i> , <i>Cyp11Cre</i> SKO/DKO) which are important for maintaining reproductive function. <i>Seminars.</i> Short presentation of the specified topics connected with the subject of student's PhD thesis. <i>Journal Club.</i> Presentation of the original peer-review scientific paper from the field.		
Recommended literature Bradshaw RA & Dennis EA (2004) <i>Handbook of Cell Signaling, three volume set 1-3</i> . Academic Press. Chedrese PJ (2009) <i>Reproductive Endocrinology: A Molecular approach</i> . (www.mediafire.com/?93661bl86xuga2c) Hörner M & Weber W (2012) <i>Molecular switches in animal cells</i> . FEBS Letter 586: 2084-2096. Pinilla L, Aguilar E, Dieguez C, Millar RP & Tena-Sempere M (2012) <i>Kisspeptins and reproduction: physiological roles and regulatory mechanisms</i> . <i>Physiol Rev</i> 92(3):1235-1316. Payne A & Hardy M (2007) <i>The Leydig Cell in Health & Disease</i> . www.springerlink.com/content/p47h130171162546/ Jonson MH (2007) <i>Essential Reproduction</i> . Blackwell. Review peer-review scientific paper from the field of networks of signaling pathways in reproduction.		
Number of active classes	Theory: 5	Practice: 5 SRW
Methods of delivering lectures <i>Theoretical lectures</i> – integrative lectures, consultations, group discussions. <i>Students research work</i> – participation in planning and conducting the experiment as well as data analysis, interpretation and discussion. <i>Seminar</i> - Short presentation (10 - 15 min) of the specified topics connected with the subject of student's PhD thesis. <i>Journal Club</i> - Presentation of the original peer-review scientific paper with the subject of student's PhD thesis.		
Evaluation of knowledge (maximum number of points 100) Students research work – up to 30 points; Seminar – up to 10 points; "Journal Club" – up to 10 points; Oral exam – up to 50 points.		