

Subject: <b>Molecular Pathophysiology</b>	Subject type:	<b>Elective</b>
Study year: 3, 4	Content:	<b>1/0 summer time</b>
Study program: <b>General Medicine</b>		

## Aim of the course

Molecular pathophysiology is integral part of pre-clinical medical education. Molecular Pathophysiology provides a systematic review of the molecular and cellular processes and changes during different pathophysiological processes and diseases.

The course is included in the summer semester of the 3<sup>rd</sup> and 4<sup>th</sup> years of study. The prerequisite subject is Pathological Physiology 1.

**Education:** lectures

**Assessment:** exam

## Syllabus

Week 1 - 2

**Molecular endocrinology I:** principles of humoral intercellular signalling; endocrine/ neuroendocrine, paracrine/ neurocrine, synaptic, distant and contact forms; forms of receptors

**Molecular endocrinology II:** common intracellular signalling cascades, G-proteins, kinases, phosphatases, transcription factors

Week 3 - 4

**Molecular endocrinology III:** disorders of humoral signalling; secretory disorders, receptor defects, post-receptor disorders

**Molecular endocrinology IV:** gain/-loss in function feedback defects; common neurotransmitter defects; syndromes of hormonal resistance

Week 5 - 6

**Disorders of ion channels and selective transport defects I:** common potassium, sodium, calcium and chlorine channelopathies

**Disorders of ion channels and selective transport defects II:** defects of glucose transporters, amino acid transport, neurotransmitters, gut and liver transport systems

Week 7 - 8

**Oxidative stress and oxidative tissue damage I:** reactive forms of oxygen (ROS); mechanisms of antioxidant protection

**Oxidative stress and oxidative tissue damage II:** ROS in cellular signalling; parameters of oxidative stress

Week 9 - 10

**Pathophysiology of gene expression I:** pre-translational and post-translational disorders; epigenetic mechanism; miRNA

**Pathophysiology of gene expression II:** chaperon/ chaperonins; protein folding disorders; insoluble aggregates; defects in intracellular protein transportation

Week 11 - 12

**Molecular basis of inflammation and healing I:** humoral mediators- blood –derived, cell-derived; cytokines - chemotaxins, lymphotactins, interleukins, transmigration- adhesive molecules

**Molecular basis of inflammation and healing II:** Healing process: formation of granulation tissue, neovascularisation, epithelisation

Week 13 - 14

**Molecular carcinogenesis I:** oncogenes; tumor supressor genes; metastasis suppressor genes; telomeres; home keepers

**Molecular carcinogenesis II:** angiogenesis, metastatic tumorigenesis