TOPICS FOR EXAM FROM MOLECULAR PATHOPHYSIOLOGY FOR STUDY YEAR

1.INTERCELLULAR SIGNALLING

- 1. Basics of cellular signaling endocrine, paracrine, autocrine etc., concept of receptors; humoral & neural principles
- 2. Type of receptors, messengers, regulatory cascade kinases, phosphatases principles and examples
- 3. Signaling through GPCR and G proteins (c-AMP, inositol-phosphate cascades and similar)
- 4. Intracellular signaling via mitotic cascades (ras dependent, independent); cytokine signaling (JAK, STAT, SMAD)
- 5. Signaling through intracellular receptors; Contact systems of signaling (Notch, a pod.)
- 6. Role of calcium in intracellular signaling; Signaling via NO- cGMP pathways

2. DAMAGE TO THE CELLS, REPARATOIN, ADAPTATION

A. Inflammatory changes

- 7. Inflammation general description, etiopathogenesis; clinical forms, stages, classif.; systemic manifestations
- 8. Acute inflammation manifest., types, humoral fact.(classes, functions; edffects in tissues); vascular reactions
- 9. Acute inflammation cellular elements (granulocytes, agranulocytes, APC, killing mechanism; disorders)

10. Healing – types, mechanisms, timing; tissue and cellular processes

B. Cellular damage, cell stress

- 11. Cell cycle basics of regulation; cyclins, cyclin/ dependent kinases
- 12. Apoptosis and necrosis morphological and functional alterations; causes and applications
- 13. Cell damage, adaptation & maladaptation morph. & functional changes (aplasia, hyperplasia, meta-/dysplasia
- 14. Cellular stress; HSP (heat shock proteins); stress signaling; ionizing radiation damage
- 15. Cellular pathomechanisms of ischemia and hypoxia; Ischemic-reperfusion injury
- 16. Oxidative damage reactive forms of oxygen (ROS); mechanisms of damage
- 17. System of anti-oxidative defense endogenous antioxidants (in. enzymes), exogenous antioxidants
- 18. Oxidative stress in pathogenesis of diseases (aging, atherosclerosis, chronic complication of diabetes, etc.)
- 19. Atherosclerosis definition, pathogenesis; stages, risk factors

3. PATHOPHYSIOLOGY OF GENE EXPRESSION

- 20. Types & mechanisms of mutations; Alterations (genetic, hereditary, congenital, familiar etc.)
- 21. Monogenic diseases Mendelian autosomal and gonosomal dominant, recessive; principles and examples
- 22. Monogenic disorders with non/ Mendelian heredity (imprinting, triple repeat mutat., mitochondrial heredity)
- 23. Chromosomal aberrations structural and numerical alterations in autosomes and gonosomes
- 24. Pathophysiology of gene expression genetic and epigenetic mechanisms

25. Pre-/ post-translational alterations - alternative RNA splicing; endoplasmic reticulum stress; microRNA

4 MOLECULAR BASICS OF CARCINOGENESIS

- 26. Tumor types, classif., epidem.; Systemic manif.: paraneoplasia; tumor markers; tumor immunology
- 27. Benign & malignt tumors cellular & metabolic characteristics; precanceroses; invasive growth; metastasing 28. Tumor etiopathogenesis physical, chemical, biological factors; hereditary forms of tumors
- 29. Molecular carcinogenesis (in. oncogenes, tumor suppressor genes; muti-hit theory, clonal development)
- 30. Molecular carcinogenesis (in. metastasing forms, mechanisms; metastasis suppressor genes; angiogenesis)

Note. Many topics by their titles and content purposely overlap, extend and follow logically up the topics from Pathological Physiology for 3. year General medicine

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