

Body development and the molecular background of diseases – topics of the course

1. The general mechanisms of animal development. Siamese twins, embryo deformities - The formation of body pattern (polarity, segment polarity, homeotic genes), organ formation and appendages - Molecular base of appendage abnormalities
2. Cell movements and body formation of vertebrates. The formation of the body axis (situs inversus totalis) - The neural development -The axonal growth cone, formation of the visual and auditory map, formation and processing of the synapse
3. The formation of the epidermis and its renewal from stem cells- The definition of stem cells, types of stem cells, usefulness for therapies
4. The sensory epithelial development - The molecular evidence of renewal of connections between olfactory neurons and the bulbous - The characteristics of the renewal of auditory neurons and retinal neurons
5. The airways and the gut development - The connection of mucociliary escalator and situs inversus. The renewal of the intestine epithelial layer - The connection between liver size and whole body size
6. Blood vessels and endothelial cells, the molecular drive of angiogenesis, VHL syndrome and hemangioblastoma.
7. Renewal by multipotent stem cells: blood cell formation -The pathological migration of crista neuralis cells.
8. Genesis, modulation and regeneration of skeletal muscle - Muscle size and quality, myopathies with functional defects, secondary muscle defects
9. Fibroblasts and their transformations: the connective-tissue cell family - Leptins and obesity, bone abnormalities, achondroplasia
10. Stem-cell origin and engineering, the main questions of stem cell therapy, the special renewal of the heart and brain
11. Cancer as a micro evolutionary process, features making cancer diagnosis problematic
12. The molecular base of cancer formation, the character of tumour cell formation, the definition of tumour, the contradictive nature of tumour stem cell
13. Nutrition and life span, the rules of proper nutrition, the likely genetic background of metabolic syndrome, genes influencing life span

Lecturer: Ernő Zádor PhD. **Credit:** 2 (2 hours/week)

Handout: Molecular developmental biology (partially), lecture slides

Place: Biochemistry dep. seminar room

Time: Friday, 12-14 hrs