

BMED904

Cell Biology and Physiology of the Extracellular Matrix

Contents:

The course will cover various aspects of extracellular matrix (ECM) biology. First, the structure and function of the main classes of ECM molecules and the composition of the ECM in different tissues, will be reviewed. Then the theme will be cellular receptors for ECM molecules and their signaling. Finally, the course focuses on interstitial matrix in normal and pathological conditions, i.e. aspects of the mechanisms involved in fluid distribution between different tissues and vessels with special regard to transport of pharmaceuticals. A recurring theme will be the roles of the various ECM molecules and their functions in health and disease.

Literature:

The curriculum will be a collection of recent articles covering the different aspects of the course contents.

Implementation:

The course will be conducted over five consecutive days. The course will be split into three parts. The first part consists of lectures given by local and invited speakers. The second part consists of laboratory experiments/demonstrations and the third part literature studies in small groups.

Lectures:

1. General introduction to the ECM. The various molecules and composition of the ECM in different tissues.
2. Matrix metalloproteinases; expression and activation; functions, role in various diseases conditions.
- 3) Integrins, expressions, functions, role in various diseases conditions.
4. Proteoglycans; expressions, functions, role in various diseases conditions.
5. The interstitial matrix in normal and pathological conditions; expressions, functions, role in various diseases conditions/therapy

Laboratory experiments:

1. Fibroblast interactions with the ECM
 - a. Collagen remodelling
 - b. Microscopy of cells expressing a fluorescently labeled protein
2. Visit to the animal facility for physiological studies of the extracellular fluid.

Discussion groups:

Small groups will be formed. Each group will discuss a scientific publication related to one of the themes of the lectures. Everyone in each discussion group:

- is expected to contribute equally to the group discussions
- must contribute to the group oral presentation and critical review on the selected article at the end of the course.