

POSMAT I Programa de Pós-graduação em Engenharia de Materiais



Course: Interaction between Material and Host

Code: MEM.010

Credits: 03

Module: Specific formation

Research area: Biomaterials

Contents:

Anatomy fundamentals, histology and physiology of normal and damaged tissues and structures that constitute the locomotor system, the skin and the circulatory system (tissues, organs or systems: bone, muscle, joint, tendon, peripheral nervous, vascular and skin). Concepts about the biomechanics, biocompatibility and biofunctionality of both these tissues and structures, distinction between their interaction with physical and chemical agents, aimed at their rehabilitation. Basic immunological and biochemical principles of material and host interaction. Apoptosis and necrosis. Systemic and local reactions to biomaterials. Molecular transport and separation of molecules. Use of advanced research techniques, such as electrophoresis, ELISA and NO measurement. Characterization with image systems, such as high-resolution microscopy and with spectroscopy in the study of tissue interaction with materials.

References:

1. DEE, Kay C.; PULEO, David A.; BIZIOS, Rena. **An Introduction To Tissue-Biomaterial Interactions**. New Jersey: John Wiley & Sons Inc, 2002. p228.
2. SANTOS, Edorta; ORIVE, Gorka; HERNÁNDEZ, Rosa M.; PEDRAZ, Jose Luis. **Cell-Biomaterial Interaction: Strategies To Mimic The Extracellular Matrix**. In: PRAMATOROVA, Lilyana. On Biomimetics, 1th Edition InTec, Croatia, 2011. cap. 25, p.528-558.
3. SIEDLECKI, Christopher. **Hemocompatibility of Biomaterials for Clinical Applications**. 1th Edition. Woodhead Publishing Limited, 2017, 482p.
4. OBRADOVIĆ, Bojana. **Cell and Tissue Engineering**. 1th Edition. Springer-Verlag Berlin Heidelberg, 2012, 276p.

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5. RATNER, Buddy D.; HOFFMAN, Allan S, LEMONS, Jack. **Biomaterials science: An introduction to materials in medicine.** 3th Edition Ed. Elsevier Academic Press, 2012, 1573p.