

Annotations of Doctoral Thesis Topics for Degree Course in „Biomaterials and Biocomposites“ for the Academic Year 2017/2018

Topic: Application of polymers in tissue engineering
Tutor: doc. Ing. Petr Humpolíček, Ph.D.
Consultant: Ing. Zdenka Capáková, Ph.D.
E-mail: humpolicek@ft.utb.cz

Annotation:

Conducting polymers play a key role in the preparation of biomaterials for regeneration of excitable tissues. The low cytotoxicity, electrical conductivity under physiological conditions and ability to be combined with other materials to produce desirable 3D structure are critical properties for their application. The study will focus on the preparation of conducting polymers in its native form or as composites or copolymers with mentioned properties. The key part will be the modification of its surface properties to achieve desirable interaction with the cells in terms of the cell adhesion, growth, proliferation, differentiation and death. The electrical field will be also applied to change the cell behavior. The interaction of materials with cell will be studied in the cell laboratory using an *in vitro* techniques.

Requirements:

Creative abilities, skills for working in laboratory.

Literature:

1. Polymers for regenerative medicine. Publisher: Berlin ; New York : Springer, (2006) ISBN 3540333533.
2. Biomedical technology and devices handbook. Publisher: Boca Raton : CRC Press, (2004) ISBN 0-8493-1140-3
3. Cell Biology: A Laboratory Handbook, Four Volume Set. Publisher: Academic Press, 3 edition (July 18, 2005). ISBN-10: 0121647307.
4. Culture of Animal Cells: A manual of Basic Technique. Publisher: Wiley-Liss; 5 edition (July 29, 2005) ISBN-10: 0471453293.
5. Culture of Cells for Tissue Engineering. Publisher: Wiley-Liss; 1 edition (February 3, 2006) ISBN-10: 0471629359.
6. Molecular Biology of the Cell. Publisher: Garland Science; 5 edition (2007) ISBN-10: 0815341059.