Francesca Boccafoschi

Curriculum vitae

PERSONAL DATA

Born at Trieste
Resident in Novara
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BIO AND EDUCATION

She possesses a degree in Biological Sciences (2001), and received a doctoral degree in Molecular Medicine (2007) at University of Piemonte Orientale.

She is Member of National and International Scientific Societies: Società Italiana di Biomateriali (SIB – Board Member), Società Italiana di Medicine e Chirurgia Rigenerativa Polispecialistica (SIMCRI – Scientific Board Member), Indo-Italian Biomaterials and Tissue Engineering Forum (IIF – Board Member), Sociétè Canadienne de Biomateriaux-Canadian Biomaterial Society (SCB-CBS), Società Italiana di Anatomia e Istologia (SIAI); Cocietà Italiana di Chirurgia Vascolare ed Endovascolare (SICVE).

She is member of Advisory Board of: The ScientificWorldJournal (section: Tissue Engineering) since 08/2011; Archivio Italiano di Andrologia e Urologia (section: Anatomical Sciences) since 09/2012; Biomedical Engineering since 11/2012; Journal of Applied Biomaterials & Functional Materials JABFM (section: cardiovascular) since 03/2015; Chemistry (section: biocompatible materials and coatings) since 03/2015.

Reviewer for several scientific international journals: *Biomaterials* (ISSN: 0142-9612), *Journal of Tissue Engineering and Regenerative Medicine* (ISSN: 1738-2696), *Journal of Cellular Physiology* (ISSN: 1097-4652), *Cell Adhesion and Migration* (ISSN: 1933-6918), *Biotechnology and Bioengineering* (ISSN: 1097-0290), *International Journal of Molecular Sciences* (ISSN 1422-0067), *Acta Biomaterialia* (ISSN: 1742-7061), *Journal of Applied Biomaterials - Functional Materials* (e-ISSN 2280-8000).

UNIVERSITY CAREER

2015 - oggi	Associate Professor, Università del Piemonte Orientale
2014 -oggi	Adjunct Professor at Laval University (Quebec City, QC, Canada
2008 - 2015	Assistant Professor, Università del Piemonte Orientale

MAIN FIELDS OF INTEREST

1. Decellularized biological materials for surgical applications
2. Vascular Tissue Engineering
3. Pathogenesis of aneurysm
4. Meccanotransduction and cellular responses to mechanical stimuli (shear stress and deformation)
5. Biocompatibility and hemocompatibility of materials for vascular use

CURRENT ISSUES OF RESEARCH

The main fields of interest concern tissue engineering with special attention to the cardiovascular applications, the effects of mechanical stress applied to cell cultures (mechanotransduction) and materials' bio- and haemo-compatibility.

1. Study of biocompatible polymeric materials for prosthetic cardiovascular use

The materials studied are mainly of polymeric nature (i.e. polyurethanes, polyesters, collagen) used individually or as copolymers. We evaluate the biocompatibility in terms of cytotoxicity, induction of the inflammatory response and tissue regeneration. It is also studied the hemocompatibility in terms of induction of the coagulation cascade, platelet and monocytes adhesion and activation.

2. Decellularized matrices for soft tissue regeneration

The research in this area deals with developing decellularized biological matrices in order to create totally biological supports useful in tissue engineering field, with particular reference to the soft tissue regeneration and replacement of blood vessels. Currently, the field has allowed the establishment of an Academic Spin-off (Tissuegraft Ltd.) sponsored by the Department of Health Sciences of the University of Piemonte Orientale in the development, testing and commercialization of innovative biological substitutes for surgical applications.

3. Pathogenesis aneurysm

The aneurysm consists of an abnormal dilation of a section of an artery, followed by a thinning of the vascular wall for damage to the elastic fibers and muscle cells. These structural changes in the vascular wall are the basis of the pathological process that leads to the development and rupture of the aneurysm. The progressive degradation of the matrix is also accompanied to an apoptotic process that affects smooth muscle cells, resulting in the loss of determining compliance of the vessel. The research is focused on the molecular pathogenetic processes and maintaining of the imbalance in aneurysmal tissue.

4. Mechanical stress and cell behavior: adhesion, survival or apoptosis

The physical forces are important regulators for the development and function of many tissues, influencing cell behavior in terms of differentiation and tissue organization. The focal adhesions and molecular processes related to them have a key role in this context. The scientific activity involves the use of specific instruments useful in the creation and control of mechanical stress in

order to mimic the physiological deformations which different tissues are subjected, with particular interest in the cardiovascular environment.

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
Progetto di Ricerca Sanitaria Finalizzata Biennale della Regione Piemonte, (2009)	Matrici collageniche tridimensionali per uso vascolare: il comportamento cellulare in ambiente dinamico, in termini di adesione e meccanotrasduzione.
Prin (2008)	Biocompatibilità del tessuto cardiovascolare a scaffold polimerici: adesione cellulare al substrato e rimodellamento della matrice cellulare.
Polo "biotecnologie e biomedicale" (2010)	Progetto Nanostent.
Polo "Innovazione e Transizione produttiva" (2013)	Progetto DESTiNi.

TOP FIVE PAPERS

1. Decellularized biological matrices: an interesting approach for cardiovascular tissue repair and regeneration. Boccafoschi F, Botta M, Fusaro L, Copes F, Ramella M, Cannas M. J Tissue Eng Regen Med. 2015 Oct 29. doi: 10.1002/term.2103. [Epub ahead of print] Review. PMID: 26511323
2. Human elastin polypeptides improve the biomechanical properties of three-dimensional matrices through the regulation of elastogenesis. Boccafoschi F, Ramella M, Sibillano T, De Caro L, Giannini C, Comparelli R, Bandiera A, Cannas M. J Biomed Mater Res A. 2015 Mar;103(3):1218-30. doi: 10.1002/jbm.a.35257. Epub 2014 Aug 28. PMID: 24913186
3. Short-term effects of microstructured surfaces: role in cell differentiation toward a contractile phenotype. Boccafoschi F, Rasponi M, Ramella M, Ferreira AM, Vesentini S, Cannas M. J Appl Biomater Funct Mater. 2015 Jul 4;13(2):e92-9. doi: 10.5301/JABFM.5000186. PMID: 24756781
4. Biological evaluation of materials for cardiovascular application: the role of the short-term inflammatory response in endothelial regeneration. Boccafoschi F, Mosca C, Ramella M, Carmagnola I, Chiono V, Ciardelli G, Cannas M. J Biomed Mater Res A. 2013 Nov;101(11):3131-40. doi: 10.1002/jbm.a.34630. Epub 2013 Mar 25. PMID: 23529998
5. The effect of mechanical strain on soft (cardiovascular) and hard (bone) tissues: common pathways for different biological outcomes. Boccafoschi F, Mosca C, Ramella M, Valente G, Cannas M. Cell Adh Migr. 2013 Mar-Apr;7(2):165-73. doi: 10.4161/cam.23020. Epub 2013 Jan 3. Review. PMID: 23287581

FURTHER INFORMATION

Office hours must be agreed (by email) with the professor

COLLABORATIONS

Prof. Diego Mantovani, PhD, Laboratory for Biomaterials and Bioengineering, **Laval University, Quebec City, Canada**; Prof. Gianluca Ciardelli, PhD, Department of Mechanical and Aerospace Engineering, **Politecnico di Torino, Torino, Italy**; Dr. Dario Coletti, PhD, AHFOS Dept. – Section Histology – **Sapienza University of Rome and UPMC Pierre and Marie Curie University, Paris**; Prof. Laura Teodori, Director of Research at **ENEA**, the National Italian Agency for New Technology, Energy and Sustainable Economy, Dignostics and Metrology Laboratory – UTAPRAD-DIM; **Prof. Stephen Badylak**, Professor at Department of Surgery, Director of the McGowan Institute for Regenerative Medicine (MIRM), director of the Center for Pre-Clinical Tissue Engineering, University of Pittsburgh, USA; **Prof. Eileen Ingham**, University of Leeds, UK.