Recent Advances of Regenerative Medicine

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The selection of a proper material to be used as a scaffold or as a hydrogel to support, hold or encapsulate cells is both a critical and difficult choice that will determine the success of failure of any tissue engineering and regenerative medicine (TERM) strategy.

We believe that the use of natural origin polymers is the best option for many different approaches that allow for the regeneration of different tissues. In addition to the selection of appropriate material systems it is of outmost importance the development of processing methodologies that allow for the production of adequate scaffolds/matrices.

Furthermore an adequate cell source should be selected. In many cases efficient cell isolation, expansion and differentiation methodologies should be developed and optimized. We have been using different human cell sources namely: mesenchymal stem cells from bone marrow, mesenchymal stem cells from human adipose tissue, human cells from amniotic fluids and membranes and cells obtained from human umbilical cords.

The potential of each type of cells, to be used to develop novel useful regeneration therapies will be discussed. Their uses and their interactions with different natural origin degradable scaffolds and smart hydrogels will be described.

Several examples of TERM strategies to regenerate different types of tissues will be presented.

RUI L. REIS VERY SHORT BIOGRAPHICAL SKETCH

Professor Rui L. Reis, PhD, DSc, Hon. Causa MD, 48 years old, is the Vice-Rector for R&D of University of Minho (UMinho) in Portugal, Director of the 3B's Research Group on Biomaterials, Biodegradables and Biomimetics (www.3bs.uminho.pt) and of the ICVS/3B´s Associate Laboratory (around 430 researchers), of UMinho. He is the CEO of the European Institute of Excellence on Tissue Engineering and Regenerative Medicine (TERM), the President and CSO of the company Stemmatters, the President-elect of Global TERMIS and the editor-in-chief of the Journal of Tissue Engineering and Regenerative Medicine.

He is co-author of 870 ISI listed publications (710 full papers in scientific journals), around 210 book chapters, 30 patents and 6 books. He has around 1650 communications in international conferences. He is PI of projects totalizing around 30 MEuros, including the very prestigious ERC Advanced Grant and an ERA Chairs. He runs a research group of around 175 researchers with more than 70 PhD holders.

He was been awarded several major national and international scientific and innovation awards in Europe and the USA, including the Jean Leray and George Winter awards from ESB and the Clemson Award for Contributions to the Literature from SFB.

CELL PRINTING FOR TISSUE ENGINEERING AND BIOLOGICAL MODELS

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Cell Printing technology could provide an enabling platform for the fabrication of hierarchically structured and functional cell assemblies mimicking composition, structure and physiological behavior of animal tissues and namely human tissues. These assemblies could be used as part of tissues for tissue engineered replacements that could be implanted in humans starting for the patient's differentiated or stem cells. Moreover, they could constitute 3D model cell assemblies for the evaluation of drugs, contaminants, additives to food, pesticides, cosmetics etc., and also used as biological models to study the mechanism of in vitro induced diseases.
The platform should comprise: 1. the selection, design, control and optimization of cells encapsulation materials and methods; 2. the design and implementation of a computer controlled cell printing machine; 3. the identification of specific dynamic culture conditions in specific bioreactors to drive cell differentiation, ECM production, tissue assemblies.
The ideal path should proceed through the following steps: Encapsulation of cells under proper conditions and in proper gel materials; Deposition of the capsules of gel polymers containing different types of cells following specific 3D geometric patterns; Transfer of the printed assemblies to specifically designed dynamic bioreactors for culture under tailored dynamic conditions till the development of vascularized extracellular matrix.
The present talk will explore different cell printing technologies and will outline some of the results that we have achieved in the field by using a Electrodynamic Spraying method and sodium alginate as an encapsulating matrix material.
Considerations about the characteristics of the encapsulating materials and results about the effect of the method and of the materials on encapsulated cells viability and metabolic activity will be presented.

Claudio Migliaresi- CV

Department of Industrial Engineering, University of Trento, via Sommarive 13, 38123 Trento, Italy

Present Academic Role
-Full Professor of Materials Science and Technology and of Biomaterials and Biomedical Technologies(since 1990)
-Head of the Interdepartment Research Center BIOtech- Biomedical Technologies

Past Academic Career
-Delegate of the Rector for Technology Transfer and Intellectual Property Policies
-Director of the Department Industrial Engineering and Dean of the corresponding schools
-Director of the Department of Materials Engineering, 1997-2003 and 2009-12
-Dean of the School of Engineering, 1990-1995
-Associate professor of Composite Materials Science and Technology, University of Trento, 1987-1990
-Research Associate, University of Napoli, 1980-1987

Teaching
-Composite Materials Science and Technology, Engineering School, University of Trento, since 1987
-Biomaterials and Biomedical Technologies, Engineering School, University of Trento, since 1998
-Biomaterials Science, Science School, University of Trento, 2004-2008
-Dental Materials, Medical School, University of Verona, 1997-2006
-Materials Technologies and Applied Chemistry, Engineering School, University of Trento, 1987-88
-Materials Engineering Principles, Engineering School, University of Trento, 1987-89

Prof. Migliaresi has supervised a large number of master and PhD students. Presently he leads a group of about 25 master and PhD students, and Post-docs. He is co-editor of the Journal of Bioactive Polymer and member of the Editorial Board of several other Journals.

Research
Current researches deal with processing and characterization of composite materials, nanocomposites, biomaterials, and materials and technologies for nanomedicine and tissue engineering applications. These activities are partly performed in the laboratories of the Department and partly at the BIOtech, Biomedical Technologies Research Center.

Editor of six books
16 Patents/Application Patents
Over 250 papers in International Scientific Journals in addition to a large number of book chapters, conference proceedings and conference participations also as Invited speaker.

Silk: from textiles to tissue regeneration

Antonella Motta

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Silks, and in particular silks from silkworms cocoons, have been used for many years as suture filaments, more recently acquiring attention for applications in medicine and namely in tissue engineering. The "silks success" should be attributed to the material versatile properties that can be tuned according to the requirements via tailored processing and post-treatment methods that, in turn, affect molecular structure, supramolecular conformation and final properties.

By adjusting biopolymer architecture and chemical composition, the formation of the extra cellular matrix (ECM) can be triggered such as to guide cells to the generation of functional tissues.
Crystallinity and morphologies at different scale level can modulate the interaction with the inflammatory system, trigger angiogenesis, and control the stem cell fate.
Materials source, advanced processing strategies and selective chemical modifications can control chemistry and thus silk's function.

Silk fibroin can be used as polymer model to debate the relationship between material structure, physical and biological properties.
The lecture will explore the history, uses and potential future of silk fibroin as elective materials for tissue engineering applications, starting from basic "primitive" bidimensional substrates till the design and fabrication of microniches populated 3D structures able to guide the cell behavior and the regenerative process.

Professor Antonella Motta's Biographical Summary

(March 1st, 2016)

After ten years research activity at the Experimental Silk Center in Milan (Italy), Antonella Motta got an appointment as Assistant Professor with the Department of Materials Engineering and Industrial Technologies at University of Trento, Italy, and then as Associate professor at Department of Industrial Engineering, University of Trento, Italy.

Graduated in Natural Sciences at the University of Padova (Italy), then receiving the Master in Biomaterials and the PhD in Biomaterials by University of Trento.

The research topics include polymer-based materials for regenerative medicine applications, chemical-physical and biological characterization of materials for biomedical use, interactions between implants materials, proteins and cells, protein based materials, immobilization and adhesion mechanisms of proteins and cells, blood-contacting materials, nanostructured materials for biomedical applications; in particular, a 20 years experience on silk-based matrices design for application in tissue engineering such as bone, cartilage, brain, myocardium regeneration.

Editor of Journal of Biomaterials, Polymer Edition; Associate Editor of Journal of Bioactive and Compatible Polymers; Member of the Scientific Editorial Board of International Journals, and referee for international Journals in the Biomaterials and Biomedical Technologies field.

Visiting professor in several Universities, i.e. Tufts University (Boston, MA, USA), Chulalongkorn University (Bangkok, Thailand), University of Texas at Arlington (Arlington, TX, USA), University of Colorado at Boulder (Boulder, CO, USA).

Member of TERMIS-EU Council since 2015 and member of TERMIS Endorsement Committee since 2011.

About 130 papers published in International Journals, Co-editor of a book on Tissue engineering, 6 book chapters, 5 International Patents. Invited Speaker at several International and National Conferences and Schools. Plenary speaker at TERMIS-EU Conference 2014.

The Contribution of Tissue Engineering in the Advance of Skin Substitutes

Alexandra P. Marques

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Despite the longest history of application and the highest record of marketing, skin tissue engineered substitutes still lead skin repair rather than promote tissue regeneration. Tissue engineering, by integrating stem cells and biomaterials knowledge, has nevertheless a major potential in defining innovative strategies to improve the functionality of skin tissue engineered constructs dictating the triggering of the regenerative pathway.

Under this context we have been studying the role extracellular matrix (ECM) in the different stages of the wound healing cascade by exploring cell-sheet engineering technology, creating native ECM representatives, and innovative hydrogel-like matrices, as artificial ECM mimickers. Additionally we have been focusing on tackling some of the limitations of skin tissue substitutes such as the lack of vascularization that is shared by many tissue engineered analogues. Hypothesizing that transplanted cells have the ability to interact/respond to the wound microenvironment, issues such low cell survival rates, and poor engraftment upon transplantation are likely to play a significant role in the wound healing progressing. Therefore we have been addressing these aspects by creating different microenvironments that have been allowing understanding cellular crosstalk at different levels including among the transplanted progenitor cells, and with the host resident cells. By creating constructs comprising adipose tissue stem and skin tissue cells, and artificial and natural ECM we were able to demonstrate that skin healing is dependent on tissue engineered constructs self-cell-cell and -cell-ECM interactions, as well as on constructs cell-cell interactions and paracrine signaling with resident cells.

Ultimately, we envision taking advantage of the generated knowledge to propose tissue engineered substitutes with improved functionality, as well as to advance the creation of tissue engineered 3D in vitro skin models with features that are not provided by current systems.

Alexandra P. Marques's Biographical Summary

(March 1st, 2016)

Alexandra P. Marques concluded her four years **graduation in Biochemistry** in 1997 in the Faculty of Sciences of the University of Porto, Portugal. During 1998 and 1999 she attended a one year specialisation course as part of the **Biomedical Engineering Master/Doctoral Programme** at the Faculty of Engineering of the University of Porto, Portugal. In 2004 Alexandra P. Marques obtained her **PhD on Materials Science and Technology - Biomaterials** in the University of Minho, Portugal under the supervision of Professor Rui Reis and in cooperation with the University of Liverpool, UK under the supervision of Professor John Hunt. In 2005 she was awarded a Post-doctoral fellowship from FCT (Portuguese Science Foundation), and between 2007 and 2009 worked as Assistant Researcher at the 3B's Research Group (3B's - Biomaterials, Biodegradables and Biomimetics) under the scope of the Network of Excellence EXPERTISSUES. In June 2009 she awarded a **Career Starting Grant** under the framework of the National "Compromisso com a Ciência" Programme. From July 2014 is **Principal Investigator** in the 3B's Research Group of the University of Minho, position that is, since March 2105, supported by an FCT **Career Development Grant**.

Alexandra P. Marques is a **founder member and Vice-Director of 3B's Research Group**. Her commitment as one of the co-leaders of the group is demonstrated by her positioning in the of **Board of Directors of the Portuguese Associate Laboratory** that gathers the Institute for Life and Health Sciences of the University of Minho and the 3B´s Research Group and as **board member of the doctoral Program in Advanced Therapies for Health**. As from October 2009 Alexandra P. Marques is **Assistant Editor of the Journal of Tissue Engineering and Regenerative Medicine**, John Wiley & Sons - Blackwell. She is also member of the **Editorial Board** of Current Tissue Engineering journal and has been acting as **referee of 16 international peer review journals**, including some of the most relevant in the field.

Alexandra P. Marques is member of several International Scientific Organizations. She has been actively participating in the activities of the Tissue Engineering and Regenerative Medicine International Society (TERMIS) and the Portuguese Society for Stem Cells and Cellular Therapy (SPCE-TC, **founder member and coordinator of the Section Cell Therapies and Tissue Engineering** -2011/2012). She was part of the **organizing committee of the 2008 TERMIS-EU** meeting held in Porto, and was member of **the scientific committee and of the International Advisory Board of different TERMIS-EU and TERMIS World meetings**, as well as of the **European Society for Biomaterials**. In 2010 she was **Chair of the 5th International Meeting of the SPCE-TC**. She was also **(Co)-Chair of different symposia** at the 3rd TERMIS World Congress, XXXVIII Congress of the ESAO and IV Biennial Congress of the IFAO, and at the 2014 TERMIS-Asia Pacific Meeting. She was **invited as lecturer** of several National and International Conferences, Courses and Workshops (21 in total) and of different National Integrated Master and Doctoral Programmes.

The experience that Alexandra P. Marques has been acquiring along the years in the preparation of research project proposals at European (FP6, FP7, ERC, ESF) and National (FCT, QREN) levels, and in the active participation of its activities, including the management and research activities of the only FP6 European Network of Excellence on Tissue Engineering EXPERTISSUES, has been also recognized as **scientific evaluator**. She has been evaluating PhD grants proposals for Portuguese Foundation for Science and Technology, and has been acting as External Evaluator of Project proposals for EU (H2020), Diabetes UK, Agencia Nacional de Promoción Científica y Técnica (ANPCyT), Argentina, for Czech Science Foundation, and for Netherlands Organisation for Scientific Research.

As PI and Co-PI she obtained **funding** from FCT and EC in a total amount of 1.8M€ while she has participated in the proposal preparation and research team of National granted Projects corresponding to a total budget of about 1.3M€, and EC projects corresponding to a total budget of over 12.5M€. As a supervisor or as co-supervisor Alexandra P. Marques has been awarded 10 PhD and 5 Post-doctoral scholarships, an amount of more than 0.75M€.

Alexandra P. Marques has been integrating stem cells and biomaterials knowledge into tissue engineering as a way to define **innovative strategies to improve the functionality of bone and skin tissue engineered constructs**. The establishment of **in vitro 3D culture platforms** to understand cellular crosstalk as well to be able to modulate the engineered constructs outcome has been the focus of her work. Mimicking tissue's native extracellular matrix (ECM) by exploring **cell-sheet engineering** technology and innovative **hydrogel-like matrices** has been contributing to address her goal on tackling the limitations of skin tissue substitutes such as the lack of vascularization and the limited source of "regenerative" epidermal cells. She has been supervising **9 final year projects of under-graduated students**, **6 Master projects** (2 ongoing), **14 PhDs** (7 ongoing, 2 in the final stage of writing thesis) and **9 Post-Doctoral fellows** (4 ongoing). She has also supervised **visiting PhD students** resulting from different International Collaborations.

Alexandra P. Marques is **co-editor** of the Handbook Natural-based Polymers for Biomedical Applications, Woodhead Pub., Cambridge, (2008) and author of **165 publications**: 75 peer-reviewed, 13 book chapters, 77 ISI indexed conference abstracts and proceedings and more than 200 communications in major conferences of the field. In addition she is **co-inventor of 2 patents** and has also filled **in 2 more applicatio**ns. She has an **h-factor of 21**, was cited more than 1700 times, 1683 without self-citations (23.85 citations/article) (March 2016, ISI Web of Knowledge).

New Advances in Tissue Engineering and MIcrofluidics: Say Good Bye to Flat Biology

J. Miguel Oliveira[1,2,*] and Rui L. Reis[1,2]

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Microfluidics has emerged with the potential to fulfill many technological gaps as it can allow producing three-dimensional (3D) architectures with controlled spatial relationships between cells, the presence of flow-induced signaling and transduction, and the introduction of chemical gradients necessary to mimic the architecture of the *in vivo* microenvironment. In the last few years, our group has greatly impact the field of tissue engineering and regenerative medicine by means of providing advanced biomaterials and scaffoolds that best emulate the extracelular matrix (ECM) of different tissues (e.g. bone, cartilage, intervertebral disc, and meniscus). The convergence of tissue engineering (TE) and microfluidics has now ignited a breakthrough into the design of *in vitro* microfluidic culture models that better adapt to morphological changes in tissue structure and function over time, providing a level of precision control that could not be achieved before.

Recently, our group has proposed innovative 3D TE in vitro models as alternative to 2D in vitro culturing,[1] that can potentially comprise multiple tissues and micro-organs obtained by scaffolding strategies, allowing a deeper understanding of biology processes at multiscales. The developed 3D tissue engineered in vitro models have also possibly investigating nanoparticles internalization by different cell types. In brief, microfluidics systems show great value in the development of 3D tissue engineered *in vitro* models mimicking the in vivo conditions, thus contributing to decrease animal experimentation while accelerating the research achievements in a wide range of fields including cancer research.

References:

1. Carvalho M. R., Daniela L., Correlo V. M., Reis R. L., and Oliveira J. M., "Evaluating Biomaterial- and Microfluidic-Based 3D Tumor Models", *Trends In Biotechnology*, vol. 33, pp. 667–678, 2015.

Miguel Oliveira, BSc, PhD is an **Assistant Researcher at the PT Government Associate Laboratory ICVS/3B´s** (http://www.3bs.uminho.pt/users/migueloliveira), University of Minho (UM), Portugal (PT). He is hired by the Portuguese Foundation for Science and Technology (FCT), under the most prestigious program available "Investigador FCT 2012" (IF/00423/2012, Starting grant-STG), which supports the top young scientists (PhD<5 years). He has funded his independent group at ICVS/3B's in Jan. 2013 under the IF2012 (StG) establishing a strategic research line on 3D *in vitro* models (www.3bs.uminho.pt). Miguel Oliveira is **Director of Pre-Clinical Research and Basic Science** at both the **FIFA MEDICAL CENTER**, Estádio do Dragão, Porto, PT since Feb. 2013 and the **recently established D. Henrique Research Centre (Porto - PT).** Currently, Miguel Oliveira is also a Lecturer in Doctoral Program in Tissue Engineering, Regenerative Medicine and Stem Cells (TERM&SC; http://termsc.3bs.uminho.pt/content/about) at UM, PT (since Dec. 2013). He is also Invited Lecturer in three different PT Universities in the topic of: (i) Orthotraumatology, Faculty of Medicine, University of Porto, PT (since Sep. 2013); Tissue Engineering and Regenerative Medicine, University of Algarve, PT (since Mar. 2010); and Biomaterials at Dep. of Polymer Engineering, University of Minho, PT (since 2009). In the last 15 years, he has focused his work on the field of biomaterials for tissue engineering, nanomedicine, stem cells and cell/drug delivery. He has been involved in the development of biomaterials from natural origin polymers (chitin, chitosan, carboxymethylchitosan, algae-based materials such as ulvan, silk-fibroin, and gellan gum and its derivatives) and ceramics (tricalcium phosphate, hydroxyapatite) for bone, cartilage, osteochondral tissue, peripheral nerve, spinal cord injury, meniscus and intervertebral disc (IVD) regeneration. His research activities have been increasingly focused on **tissue engineering, nanomedicine, stem cells and drug delivery applications**. He made great contributions in the osteochondral TE field, namely by proposing bilayered scaffolds, which has been highly cited by its peers. He has also a unique type of research in the areas of isolation, selection of sub-populations and differentiation of distinct sources of stem cells, and combining them with new biomaterials, leading to innovative regenerative approaches. In particular, his extensive and innovative work with biomaterials allowed the development of an exciting class of enzymatically cross-linked (e.g. **enzymatically cross-linked silk fibroin hydrogels**) and photo-crosslinked (e.g. **methacrylated gellan gum**) biomaterials with tunable properties including its processability, biodegradability and biological performance as compared to the existing materials. He has been the responsible for developing and licensing a patent on **gellan gum-based polysaccharides**. As result of his proficiency (as of **15th Nov. 2015)**, Miguel Oliveira produced **119 publications listed in ISI Web of Knowledge (ResearcherID: H-8636-2012), 123 publications listed in ORCID (0000-0001-7052-8837) and 80 original articles (listed in Scopus) published in scientific journals with referee**, some of which in high impact Journals (e.g. Biomaterials, Adv. Materials, Adv. Funct. Materials, Small, Progress in Polymer Science, Trends in Biotechnol., Biotechnol. Adv., ACS Biomater. Sci. Eng.) – being **9 of those review papers** (3 under invitation). The PI has an **h-index of *23*, i10 of 42** and received **~2110 citations (Google Scholar**) or an **h-index of *18*, ~1516 total citations or *1334 citations (excluding self-citations) by 1251 documents (Scopus*)**. He has an **R^G37.24 (ResearchGate index)**.

He is a member of **6 Editorial Advisory Boards of journals and also scientific adviser of several journals (n=35) and Science Funding Agencies**. He was **Member of several Master/PhD Assessment Committees.** Miguel Oliveira is a very committed member of several Societies, editor and referee of several Journals in the regenerative medicine field. At the present, he is the PI or scientific responsible of grants totalizing ~3.2 M€, but he has been involved in the preparation of other PT and EC funded projects at UMINHO (e.g. Infrastructure, Equipment's, Promotion of Series of Events in TERM field and Human resources) totalizing ~27 M€. **He currently supervises/co-supervises 8 PhD students and 6 Post-docs, being 8 currently funded by FCT and 6 under EC funded projects (PhD and Post-doctoral grants).** Miguel Oliveira was **granted 9 patents**. In addition, he has **published 2 books** (1 in preparation, Springer), **1 special issue** in scientific journals, **33 book chapters** in books with international circulation and encyclopaedias, and **4 book chapters** (science dissemination). He has participated in more than **150 communications in national/international conferences**, almost all of them in international meetings (Portugal but mostly in other countries in Europe, USA, Japan, South Korea, Singapore, China). In addition, he participated as **invited/keynote speaker in more than 40 plenary sessions**. As a result of his academic activities, Miguel Oliveira has been **awarded 20 prizes/honours**, being the most prestigious one, **The Jean Leray Award 2015 (Young Scientists and Group Leaders under 40 years old) attributed by the European Society for Biomaterials for its Outstanding Contributions within the field of Biomaterials**.

One of the technologies developed by Miguel Oliveira "the meniscus implants" is in the permanent collection of the National Museum of Sports, Palácio Foz, Lisbon - Portugal. For his scientific achievements the Municipality of Guimarães (PT), in the person of the City Mayor Dr. Domingos Bragança, attributed a Vote of Honor (ref. 92-SEG-JX dated from Mar. 19th, 2015).

Functional Nanofibrous Scaffolds Combined with Stem Cells for Advanced Biomedical Devices and Therapies

Nuno M. Neves[1,2]

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Among the various possible embodiements of Advanced Therapies and in particular of Tissue Engineering the use of temporary scaffolds to regenerate tissue defects is one of the key issues. The scaffolds should be specifically designed to create environments that promote tissue development and not merely to support the maintenance of communities of cells. To achieve that goal, highly functional scaffolds may combine specific morphologies and surface chemistry with the local release of bioactive agents.

Many biomaterials have been proposed to produce scaffolds aiming the regeneration of a wealth of human tissues. We have a particular interest in developing systems based in biodegradable polymers. Those demanding applications require a combination of mechanical properties, processability, cell-friendly surfaces and tunable biodegradability that need to be tailored for the specific application envisioned. Those biomaterials are usually processed by different routes into devices with wide range of morphologies such as biodegradable fibers and meshes, films or particles and adaptable to different biomedical applications.

In our approach, we combine the temporary scaffolds populated with therapeutically relevant communities of cells to generate a hybrid implant. For that we have explored different sources of adult and also embryonic stem cells. We are exploring the use of adult MSCs, namely obtained from the bone marrow for the development autologous-based therapies. We also develop strategies based in extra-embryonic tissues, such as the perivascular region of the umbilical cord (Wharton´s Jelly).

This talk will review our latest developments of natural-based biomaterials and scaffolds in combination with stem cells for advanced biomedical devices and therapies.

Professor Nuno M. Neves Biographical Summary

(March 18th, 2016)

Nuno M. Neves is an Assistant Professor at the Dept. of Polymer Eng. of Univ. Minho in Portugal, where he is Vice-Director of the *3B's Research Group – Biomaterials, Biodegradables and Biomimetics.* This is a research unit of *Excellence*, directly funded by the Portuguese Foundation for Science and Technology (FCT). The 3B's Research Group also integrates the PT Associate Laboratory ICVS/3B's, as homologated by the Portuguese Ministry for Science and High Education, being Nuno M. Neves one of the members of the Board of Directors.

His background education includes: (i) BSc in Polymer Engineering, Univ. Minho, (ii) a Master degree by research on Polymer Engineering and (iii) a PhD on Polymer Science and Engineering, Univ. Minho, Portugal, degree that was prepared in co-operation with the University of Twente, Netherlands. Nuno M. Neves has been involved in biomaterials research since 2002. He has worked several periods abroad at the University of Twente and recently in a sabbatical leave at the University of Tokyo, Japan (at Prof. Kazunori Kataoka's lab). His main area of research is focused on tissue engineering and regenerative medicine strategies using stem cells and advanced drug delivery scaffolds and medical devices.

He is supervising or co-supervising the work of more than 10 post-graduation researchers (including Post-docs and PhD students). The researchers have a multidisciplinary background including, Mat. Sci. Eng., Polymer Eng., Chem. Eng., Chemistry, Biological Eng., Biochemistry, Biology and Applied Biology, Medicine and Dentistry. He is also involved on the Bioengineering program of the Portugal – MIT (Massachusetts Institute of Technology) initiative, lecturing for the biomaterials module and supervising PhD students.

As of March 2016, he is the author of 146 publications listed in the Web of Science (100+ peer reviewed international papers), with h-factor of 29 and a total number of citations of over 2660 (2950 in Scopus). He was invited and currently serves as Academic Editor of PLoS ONE and the peer-reviewed Elsevier Journal on Regenerative Therapy started in January 2015. Nuno M. Neves acts as referee of more than 70 major scientific journals and major international scientific meetings. Furthermore he is routinely invited to review grants and research proposals for the European Commission and for various funding agencies namely in Portugal, Argentina, Austria, Czech, France, Georgia, Germany, Netherlands, New Zealand, Singapore, Slovakia and Slovenia and USA and advisory panels of research labs in France and Croatia.

He recently finished a term as member elected of the Board of the European Chapter of the Tissue Engineering and Regenerative Medicine International Society, having served as member of the Nominating Committee of the European Chapter. He is member of the European Society for Artificial Organs and is currently the responsible for the Tissue Engineering Working Group of the ESAO. He has been serving as officer of the Orthopaedic Biomaterials Special Interest Group (SIG) of the Society for Biomaterials (SFB, USA). He was since its foundation until 2013 a member of the Board of the Portuguese Society for Stem Cells and Cellular Therapies (SPCE-TC).

Selected recent publications (IF>6)

Faia-Torres A.B.,…, Neves, N.M. Osteogenic differentiation of human mesenchymal stem cells in the absence of osteogenic supplements: A surface-roughness gradient study, Acta Biomaterialia, 28 (2015) 64-75 (IF:6.0)

Faia-Torres A.B., …, Neves, N.M. Regulation of human mesenchymal stem cell osteogenesis by specific surface density of fibronectin: A gradient study, ACS Applied Materials and Interfaces, 7 (2015) 2367-2375 (IF:6.7)

Monteiro, N., …, Neves, N.M. Antibacterial activity of chitosan nanofiber meshes with liposomes immobilized releasing gentamicin, Acta Biomaterialia, 18 (2015) 196-205 (IF:6.0)

Monteiro N., …, Neves, N.M., Instructive nanofibrous scaffold comprising runt-related transcription factor 2 gene delivery for bone tissue engineering, ACS Nano, 8 (2014) 8082-8094 (IF:12.8)

Faia-Torres A.B., …, Neves, N.M., Differential regulation of osteogenic differentiation of stem cells on surface roughness gradients, Biomaterials, 35 (2014) 9023-9032 (IF:8,5)

Martins, A., …, Neves, N.M., Osteogenic induction of hBMSCs by electrospun scaffolds with dexamethasone release functionality, Biomaterials, 31 (2010) 5875-5885 (IF:8.5)