Laura Russo

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Summary – Scientific and research activities

Laura Russo's research experience dates to **2009**, as PhD student in the BioOrganic research group of University of Milano-Bicocca, working on a multidisciplinary project exploiting glycoscience in the field of nano- and bio-materials for tissue engineering. In **2010** Dr. Laura Russo joined the research group of Prof. Julian R. Jones, at **Imperial College of London**, as Visiting Researcher, working on the design and synthesis of hybrid biomaterials for tissue regeneration. From **2013** to **2015** she worked, as Post Doc Fellow, at University of Milano – Bicocca, Dept of Biotechnology and Biosciences, where she was **unit coordinator of a research project founded by CARIPLO Foundation** on the design and synthesis of smart biomaterials through the chemical derivatization with carbohydrates as signal biomolecules. In **2016** Dr. Russo awarded a **SFI Starting Investigator Research Grant (SIRG)** to conduct her research on Glyco-functionalized hydrogels and biomaterials for tissue engineering applications. From **2017** Dr Russo is Assistant Professor at University of Milano-Bicocca, working in the new established Nanomedicine Building, U28 belonging to the Centre of Nanomedicine of the Milano-Bicocca University and Visiting Researcher at Cùram – NUIG, Ireland.

Education and Training

- **2012**, PhD in Industrial Biotechnologies at the University of Milano-Bicocca, Department of Biotechnology and Biosciences ("Design, functionalization and activation of smart biomaterials").
- **2007**, School of R&D Management at SDA Bocconi University (Supply Chain Management; - R&D Project Selection; - Operation Performance Measurement).
- **2007**, ProTon Europe Training School – at University of Genova (ILONET Project) – Technology Transfer School, European network of Knowledge Transfer Offices (KTOs) and

companies affiliated to universities and other Public Research Organisations (PROs).

- **2006**, MSc in Industrial Biotechnologies – Processes and Products - at the University of Milano-Bicocca, Department of Biotechnology and Biosciences ("Enzymes for the production of Vitamin C: studying isolation through affinity chromatography", Prof. Francesco Nicotra).

Research Experience

Dr. Laura Russo gained expertise on regenerative medicine and nanomedicine. In particular she worked on nano- and biomaterials functionalization using a wide range of materials (organic, inorganic, polymeric, natural and synthetic), and smart functionalized hydrogel for 3D cell cultures. Dr Russo has also expertise in manipulating complex biomolecules such as carbohydrates. Her research activity to date has allow to the design and set up of different chemoselective ligation strategies for the covalent immobilization of several carbohydrates and peptides of biological interest on nanomaterials for tissue engineering applications (bone and cartilage regeneration, cardiac regeneration, neuronal regeneration). Today, research interests of Dr. Russo are focused on 3D smart biomaterials for cell studies and on 3D printed biomaterials for biomedical applications.

Professional Experience

- **2017 Assistant Professor** at University of Milano-Bicocca, Department of Biotechnology and Biosciences – U28 Nanomedicine Institute and Visiting Researcher at *Cùram - Centre for Research in Medical Devices, National University of Galway, Ireland.*
- **2016 Principal Investigator** - SFI Foundation SIRG scheme established "to support excellent researchers and innovative research ideas with potential economic and societal impact". Coordination of a research project focused on Glyco-functionalized hydrogels for tissue engineering applications. *Cùram - Centre for Research in Medical Devices, National University of Galway, Ireland*
- **2013** to **2015**, **Unit Coordinator** at University of Milan-Bicocca, Dept. Of Biotechnology and Biosciences, on project founded by CARIPLO Foundation on the design and synthesis of smart biomaterials for 3D cultures and Tissue Engineering.
- **2010**, **Visiting Researcher** at Imperial College of London, Department of Materials, on Design, Synthesis and Functionalization of new hybrid biomaterials for bone tissue engineering - Dr Julian R. Jones.
- **2009 - 2012**, **PhD Student** in Industrial Biotechnology at the University of Milano-Bicocca,

Department of Biotechnology and Biosciences, on "Design, Functionalization and Activation of Smart Biomaterials" - Prof. L. Cipolla.

- **2007 - 2008**, fellowship at Technology Transfer Office of University of Milan Bicocca, (ILONET Project) worked on Technology Transfer Activities (Patents, Spin-Offs and Research Valorisation in Business Community).
- **2007** stage at Notarbatolo e Gervasi S.p.A. (Patent Trademarks Designs, European Trademark Attorneys) on Assessment of patentability. Analysis, drafting and filing of applications for Italian, European or PCT international patents.

Awards and Honours:

- **2017** Award for innovation in research of the Italian Chemical Society - "Organic Chemistry in Life Science" Award.

The research of Laura Russo gained a strong national and international recognition being reported by the media, including the *Tg1 National Edition*, in which she was personally interviewed, and numerous foreign newspapers.

Invited Lectures

1. Nuovo materiale ibrido 3D per ingegneria tissutale cartilaginea. Expò Sanità, 20° mostra al servizio della sanità, 18-21 Maggio 2016 – Bologna
2. Scaffolds for neuronal differentiation. (Nanomib - University Milano-Bicocca). NanoInnovation 2016, Rome 20-23 September 2016.
3. Neoglycosylated collagen for neuronal regeneration. 1° International Conference on the Glycobiology of Nervous System. September 2-5, Seoul, Korea.
4. When glycochemistry meets biomaterials: from design to application of synthetic glyco-tools. XXVI National Conference of Italian Chemical Society. Paestum 10-14 September.

Press Review:

Recognition of Minister of State for Training, Skills and Innovation, John Halligan TD - as "next leaders of research in Ireland, shaping the research community both in Ireland and internationally". Several Press releases - newspaper notifications.

Self-repair 3D printed material for osteochondral tissue regeneration:

More than 30.000 visualization on Social Media, Several press releases (**more than 80**) - radio, TV and newspaper notifications and interview.

Selected Press Reviews

- **Tg1 National Edition**, “Bionic Bone”- 26 May 2016
http://Www.Rai.Tv/Dl/Raitv/Programmi/Media/Contentitem-3c481b04-5dee-43f7-B0a2-6a481879ecd6-
Tg1.Html
- **Il Sole 24 Ore**, Creato in laboratorio l'osso bionico che si stampa in 3D. 26/05/2016
- **Tgr Leonardo**: "Osso Bionico" auto-riparante, la ricerca e il finanziamento del Miur. 24/05/2016.
- **Rai News**. L'osso bionico sviluppato dall'Universita' di Milano-Bicocca e dall'imperial College di Londra.
13/05/2016
- **Repubblica Tv Milano**, L'osso bionico che si stampa in 3D e si ripara da solo quando si rompe. 12/5/16
- **Corriere**, Osso Bionico stampato in 3D. 12/05/2016
- **Materials Today (Elsevier Journal)** “New bio-glass can mimic mechanical properties of cartilage” 20/05/2016
- **Dailymail UK** “Silicon implant 'helps worn knees to regrow': thousands of patients could be spared
Surgery” 13/05/2016
- **New Zeland Herald**, “Silicon implant may help worn knees to regrow” 13/05/2016
- **Sciencedaily.com** New bio-glass could make it possible to re-grow or replace cartilage 13/05/2016
- **Ansa.It** Italian and British scientists invent bionic bone 13/05/2016

Glucosylated collagen for Neuronal Regeneration:

Several Press releases and newspaper notifications.
- ***Panorama.it*** Ricerca: Ai Neuroni Piace 'La Dolce Vita', Studio Apre A Rigenerazione14/05/2014
- ***Adnkronos.com***/IGN Ricerca: Ai Neuroni Piace 'La Dolce Vita', Studio Apre A Rigenerazione 14/05/2014
- **Ansa.it** Neuroni 'Viziati', Crescono Meglio Sullo Zucchero 14/05/2014
- ***Agi.it*** Salute: Studio Italiano, A Neuroni Piace 'Dolce Vita' Del Glucosio14/05/2014
- ***Scienzainrete.it*** Ai Neuroni Piace "La Dolce Vita"14/05/2014
- ***Federchimica.it*** Ai Neuroni Piace "La Dolce Vita" 23 mag 2014

Project involvement and coordination

1. **NMBP-15-2017 Nanotechnologies for imaging cellular transplants and regenerative processes in vivo:** Project: Integration of Nano- and Biotechnology for beta-cell and islet Transplantation. (PI Biotalentum; UNIMIB coordinator: Prof. Francesco Nicotra, Laura Russo Partecipant)
2. **Starting Investigator Research Grant (SIRG)**: Principal Investigator Award on the Project: Glyco-functionalised Hydrogel for Intervertebral Disc Tissue Repair. c/o National University of Ireland (NUI) Galway – Ireland (2016) (**Coordinator: Laura Russo**)
3. **CARIPLO FOUNDATION**: project 2012-0891 (3/2013-2/2015): Smart nanostructured hydrogelsystems for generation of contractile cardiac organoids (PI Marco Rasponi, Politecnico di Milano; **UNIMIB Coordinator Laura Russo**).
4. **PRIN 2011** n. 2010L9SH3K Metodologie chimiche innovative per biomateriali intelligenti, Coordinator Prof. Francesco Nicotra, Laura Russo partecipant.
5. **CARIPLO FOUNDATION**: project 2011-0270 (1/3/2012-28/2/2015): Sintesi di una macromolecola brush-like con architettura e proprietà meccaniche biomimetiche ottimizzate (PI: Dr. Simone Vesentini, UNIMIB coordinator: Prof. Francesco Nicotra, Laura Russo Partecipant)
6. **CARIPLO FOUNDATION**: project 2010-0378 (1/6/2011-31/5/2013): "Nanostructured biomaterial functionalization for treatment of articular cartilage defects (PI and UNIMIB coordinator: Prof. Laura Cipolla, Laura Russo Partecipant)
7. **CARIPLO FOUNDATION**: project 2008-3175 "(01.06.2009-31.05.2010) Development of NMR techniques for tissue Engineering studies" (UNIMIB coordinator: Prof. F. Nicotra, Laura Russo partecipant)

Awarded Fellowship:

2015 winner of a research Fellowship at University of Milano-Bicocca, Department of Biotechnology and Biosciences, on the project "Nanotecnologie Biomediche per l'Oncologia. Drug Delivery Sistems e Targeting"

2012 winner of a research Post Doctoral Fellowship at University of Milano-Bicocca, Department of Biotechnology and Biosciences, on the Cariplo Funded project "Synthesis of a mechano responsive molecular brush with tuned biomimetic architectures"

2010 winner of a research travel fellowship at Imperial College of London – Department of Materials founded by "Consorzio Interuniversitario per le Biotecnologie – CIB".

2009 winner of a research fellowship at University of Milano-Bicocca, Department of Biotechnology and Biosciences on the Cariplo Funded project "development of NMR techniques for tissue engineering studies".
2007 winner of ILONET (Industrial Liason Office NETwork) fellowship on Technology Transfer

Journal Cover:

Russo et al. 2014 ***ACS Chem Neurosci.*** 5,261-265.

Commission of Trust:

- Acting as referee for peer reviewed scientific journals: European Journal of Pharmaceutics and Biopharmaceutics, Journal of Colloid and Interface Sciences, Journal of the Royal Society Interface, Gels - MDPI journals
- Grant referee for: IRC - Irish Research Council, Technology Croatian Science Foundation (HRZZ) and National Science Centre, Poland (NCN)

Membership of Scientific Societies and European Agencies Participation:

Dr. Russo is Member of several Research Network:
"Società Chimica Italiana" (SCI)
"American Chemical Society" (ACS)
"International Union of Pure and Applied Chemistry (IUPAC)"
"*European Center for Nanomedicine (CEN)*"
"*Milan center for Neuroscience (Neuromi)*"
"*Nanomedicine Interdepartmental Center* (*Nanomib)*"
"European Innovation Partnership on Active and Healthy Ageing (EIP on AHA)" - European Commission.

Didactic activities

- **2015 – 2017 Contract Professor** - I Semester - Organic Chemistry Laboratory Course, University of Milan-Bicocca; practical based course for undergraduate students of Biological Sciences (I year).
- **2015 – 2017 Contract Professor** -II Semester - Organic Chemistry Laboratory Course, University of Milan-Bicocca; practical based course for undergraduate students of Biotechnology (I year).

- **2016 Professor** Grant Writing Course, PhD School, University of Milano - Bicocca
- **2015 – 2016 Contract Professor** - I Semester - Organic Chemistry Laboratory Course, University of Milan-Bicocca; practical based course for undergraduate students of Biological Sciences (I year).
- **2015 – 2016 Contract Professor** - I Semester - Organic Chemistry Laboratory Course, University of Milan-Bicocca; practical based course for undergraduate students of Biological Sciences (I year).
- **2013 Support Teacher** for Dyslessic Undergraduated students of Biological sciences. Organic Chemistry Course, University of Milano – Bicocca.
- **2005 – 2014 Tutor**, Organic Chemistry Laboratory Course. University of Milan-Bicocca Practical based course for undergraduate students of Biological Sciences.

Supervision of Graduate Students and Undergraduate fellows

Tutor of 3 PhD students in Industrial Biotechnology and 2 PhD Students in Chemistry, 5 Master Degree students in Chemistry, 5 Master Degree students in Industrial Biotechnolgy, 2 Erasmus students in Chemistry.

Major Achievements

- Development of new 3D printed self-repair hybrid materials for osteochondral tissue regeneration – (Patent Application) - in collaboration with Imperial College of London - Department of Materials

- First researcher to validate the efficacy of glucose functionalized collagen scaffolds to transform neuronal F11 cells into active functional neurons. Her work open up a new paradigm for cell biologists to study neuronal cell differentiation mechanisms in a cell environment closer to physiological conditions.

- First researcher to validate the efficacy of glucose and galactose functionalized collagen scaffolds in vivo to restore osteoarthritic damage in rats evaluated by Walking Track Analysis. Her work open a new paradigm to study ostheochondral tissue repair processes

- Development of liquid NMR method to characterize the functionalization of silica based hybrid materials during their preparation to resolve the problematic set up of hybrid silica systems. (Visiting Researcher - Imperial College London).

- Development of formulation and chemoselective ligation strategies to design biomimetic biomaterials and matrices functionalized with glycan epitopes to improve cell behaviour at the cell-material interface for tissue regeneration and cells fate control.

- Design of short OGP and CNP peptide motifs and investigation on their ability in differentiation of MSC cells for bone and cartilage tissue engineering approaches. This strategy has been useful for the selection of new short signal peptides.

Communications:

From **2009** Dr. Russo is co-author of **44** publications on peer-reviewed international scientific journals with impact factor, (**3** submitted, **15** as first author, **1** as corresponding author, **5.8** publications/year) **2** Patents, **8** book chapter on biomaterial functionalisation and carbohydrate chemistry, more than **60** poster communications, **2** oral communications and **4** invited lectures, at national and international meetings and several press reviews.

Pursuant to Article 13, Act 675/96 (Privacy Law), I hereby agree to the handling of my personal data.
"Le dichiarazioni rese nel presente curriculum sono da ritenersi rilasciate ai sensi degli artt. 46 e 47 del D.P.R. 445/2000".