



Curriculum Vitae Europass

PERSONAL INFORMATION

Name

LUISA FIANDRA

E-mail

luisa.fiandra@unimib.it

Nationality

Italian

Date of birth

01.08.1973

WORKING EXPERIENCE

- Dates (from-to)
- Position and working address
- Main responsibilities

November 2020

Researcher and Aggregate Professor in Clinical Biochemistry - Department of Biotechnology and Biosciences, University of Milano Bicocca (UNIMIB), Italy.

Research activity in Nanomedicine; study of the efficiency of biologically active molecules and nanodrugs against tumours and neurodegenerative diseases on advanced 3D cell systems.

- Dates (from-to)
- Position and working address
- Main responsibilities

June 2018 -October 2020

Researcher and Aggregate Professor in Cytology and Comparative Anatomy - Department of Earth and Environmental Sciences, University of Milano Bicocca (UNIMIB), Italy

-Teaching activity in Cytology, Comparative Anatomy and Applied Biology for the degree in Biological Sciences and Environmental Science and Technology (UNIMIB); research activity in Nanotoxicology;

Responsible of part of the *in vitro* and *in vivo* research activity for the development of innovative nano-drug of NanoBioLab (UNIMIB).

- Dates (from-to)
- Position and working address
- Main responsibilities

February 2017 –May 2018

Lab Manager - Department of Biotechnology and Biosciences – UNIMIB, Italy

Manager of NanoBioLab (<http://www.nanobiolab.btbs.unimib.it>), center of excellence in the field of the design, pre-clinical efficacy validation and safety of new nanodrugs for oncology, neurological diseases and autoimmune diseases.

Responsible of part of the *in vitro/ex vivo* and *in vivo* research activity of NanoBioLab and of the Nanomedicine Unit of “L. Sacco” University Hospital

- Dates (from-to)
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August 2015 –January 2017

Senior post-doc associate. Nanomedicine Unit, Department of Biomedical and Clinical Sciences “L. Sacco”, University of Milan (UNIMI), Italy.

Research activity in Nanomedicine: biological validation of new nanodrugs for breast cancer theranostics and brain disease targeting; co-responsible of the Nanomedicine Unit platform for *in vitro/ex vivo* (Confocal Microscopy) and *in vivo* (IVIS Optical system) Imaging

- Dates (from-to)
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April 2010 –August 2015

Senior researcher. “L. Sacco” Hospital, Milan, Italy.

Research activity in Nanomedicine and scientific coordination of the project “Development of novel nanostructured materials for the diagnosis of breast cancer, inflammatory bowel disease (IBD) and modulation of antiretroviral therapy (HAART) in HIV” (NanoMeDia) financed by “Assessorato alla Sanità”, Regione Lombardia; co-responsible for *in vitro/ex vivo* (Confocal Microscopy) and *in vivo* (IVIS Optical system) Imaging

- Dates (from-to)
- Working address
- Main responsibilities

EDUCATION

- Dates (from-to)
- Institution/organization
- Degree

- Dates (from-to)
- Institution/organization
- Degree

PERSONAL SKILLS AND COMPETENCES

Mother tongue(s)
Other language(s)
Self-assessment
European level (*)

ENGLISH

November 2003- April 2010

Department of Biology- UNIMI, Milano.

Post-doc fellowship. Research activity in physiology and biotechnology.

2000 - 2003

Department of Biology - University of Milan.

PhD in Animal Biology

1993 - 1998

University of Milan.

Graduated in Natural Sciences

ITALIAN

Understanding		Speaking		Writing
Listening	Reading	Spoken interaction	Spoken production	
C1	C1	C1	C1	C2

(*) Common European Framework of Reference (CEF) level

RESEARCH ACTIVITY

Up to 2010, LF dealt with transport and cell physiology at the Department of Biology of the University of Milan, to detect the interaction of molecules with membrane receptors, their intracellular uptake and their ability to cross intact epithelia by ex vivo assays.

From 2010 to 2017, LF was responsible of the preclinical studies of the Nanomedicine Unit of "L. Sacco" University Hospital, where she coordinated research activity mainly devoted to the use of nanotechnology for cancer therapy and diagnosis, and for biological barriers overcoming. In particular, LF played the role of scientific coordinator of the national project "Development of novel nanostructured materials for the diagnosis of breast cancer, inflammatory bowel disease (IBD) and modulation of antiretroviral therapy (HAART) in HIV". In close collaboration with the Anatomy Pathology Unit of the hospital and with the Pharmacology Unit of the department of Biomedical Sciences "L. Sacco" of University of Milan, LF designed and supervised in vitro and in vivo experiments aimed to assess:

- 1) interaction, internalization and trafficking of biologically active molecules and nanodrugs in cells and animal tissues,
- 2) biological activity on target and non-target cells,
- 3) ability in crossing biological barriers (i.e., BBB) in vitro and in vivo,
- 4) biodistribution, pharmacokinetic properties, therapeutic effect, and acute and sub-acute toxicity in murine models.

As reported in publications reported below, LF main targets of interest were: breast cancer (diagnosis and therapy of primary tumor and metastases); Blood brain barrier overcoming for CNS disease targeting; HIV-eradication from sanctuaries; anti-diabetic oral nanoformulation of insulin with colonic release.

From February 2017, LF played the role of manager of the NanoBiolab, and supervisor for projects dealing with the design and pre-clinical validation of newly formulated nanodrugs for

oncology, neurological diseases and autoimmune diseases. In the meantime, LF continued the activity of Scientific consultant for the in vitro and in vivo pre-clinical assays of the NanoBioLab and of Nanomedicine Unit of "L. Sacco" University Hospital.

More recently, LF as member of Centre POLARIS (Particular Matter and Health Risk) and of the Nanotoxicology Laboratory of UNIMIB, she has been involved in the evaluation of the human safety of pharmaceutical and manufacturing nanoproducts.

From November 2020, as RTDB of the BtBs, on the project CHRONOS - CHRONical multifactorial disorders explored by NOvel integrated Strategies, she has been involved in various projects involving the development of advanced cellular models for the validation of conventional or latest generation drugs directed towards tumor or neurodegenerative pathologies; she is also involved in a project aimed at the implementation of electron microscopy systems, through the subcellular localization of nanoparticles of different types.

Finally, she collaborates with NanoBioLab (BtBs) leading in vitro and in vivo research activities for the development of innovative nano-drugs.

RESEARCH PROJECTS

From 2019 - Responsible of the University project "Evaluation of the biocompatibility of different nanomaterials through standardized in vitro and in vivo toxicological assays"

- From 2020 - Responsible of the University project "Impact of new nanomaterials produced for antibacterial or antitumor purposes on biological systems: toxicological assessments in vitro and on developing vertebrates"
- From 2018 - Participation with responsibility in the H2020 project - PROTECT-Pilot lines production of nanostructured and anti-adhesive textiles and medical devices based on novel coating technologies
- From 2019 - Participation with responsibility in the AIRC project - Development of a universal Fcy nano-antenna for triggering Natural Killer cell-mediated immunotherapy of cancer
- From April 2020 - Participation in the H2020 project - ASINA - Anticipating Safety Issues at the Design Stage of Nano Product Development
- From April 2020 - Participation in the project -Study of the role of the SP-D protein in the SARS-CoV-2 coronavirus infection for the development of a therapeutic treatment model (SPeD), funded by Cariplo.
- From 2021 - participation with responsibility in the H2020 European project "ULTRAFast ALL-OPTICAL SPATIO-TEMPORAL ELECTRON MODULATORS: OPENING NEW FRONTIERS IN ELECTRON MICROSCOPY" (H2020-FETOPEN-2018-2019-2020-01).

TECHNICAL SKILLS

- **Optical microscopy - Widefield (WF) and Confocal laser scanning microscopy (CLSM) imaging**

High knowledge of optical microscopy techniques to determine the interaction, the internalization, the trafficking, the degradation mechanisms, and the eventual cell toxicity of biologically active molecules on cultured cells and animal tissue sections:

- ✓ Preparation of fixed cell samples and Immunofluorescence on cells,
- ✓ Ex vivo sample preparation (animal tissue isolation, fixation and cryosectioning) for Immunofluorescence on sections,
- ✓ CLSM and WF observation of fixed cells and tissue sections.
- ✓ Post-acquisition image elaboration by ImageJ and Photoshop software

Significant technical trainings:

- Theoretical and practical course of Confocal Microscopy (Unimi, October 2009).
- Applicative seminar on IMARIS – Analisi quantitativa delle immagini (UNIMI, November 2012).

- **In Vivo Imaging**

High confidence with *in vivo* imaging techniques to assess the biodistribution of bioactive molecules and nanoformulations, in murine models:

- ✓ animal models handling in the total respect of EU guidelines for the animal welfare
- ✓ Tissues and organs post-mortem dissection

- ✓ *in vivo* and *ex vivo* Imaging by IVIS optical systems

Significant technical trainings:

- Seminar by Miltenyi Biotec on "Approaching tumor biology by pre-clinical imaging" (Bologna, October 2012).
- Seminar by Perkin Elmer on "In vivo Preclinical Imaging" (UNIMI, Polo LITA, June 2016)
- Specialization University Course on "Animal welfare and care of laboratory animals" (UNIMI, June-May 2015).

- **Other *in vitro* and *in vivo* techniques:**

- ✓ animal models handling (mouse, rat), in the total respect of EU guidelines for the animal welfare: production of mouse tumor models, injections, bleeding, organs dissection, surgery, *in vivo* imaging by IVIS
- ✓ Cell cultures and *in vitro* techniques finalized to determine the interaction, the internalization, the trafficking, the degradation mechanisms, and the toxicity of drugs on target and non-target cells (murine and human cell lines).
- ✓ production of *in vitro* barrier models on transwell for permeability assays (Fiandra L, et al. Journal of Visualized Experiments. 2016. 114, e54279).
- ✓ physiological techniques: transport physiology through intact epithelia and cellular membranes, and electrophysiology of tissues and cell layers
- ✓ cell separation techniques from tumors and other tissues
- ✓ preparation of samples for Transmission Electron Microscopy (theoretical and practical course on Ultramicrotomy - Fondazione Filarete, Milano, June 2014)

TEACHING ACTIVITIES

- **2010-2018:** teaching assistant for the course of General Physiology - degree in Life Sciences (University of Milan, Italy)
- **2010-2019:**
 - specialization seminars on "Nanotechnology applied to Medicine" for the student of Medicine and Surgery of the University of Milan, Department of Biomedical and Clinical Science L. Sacco (from 2013)
 - specialization seminars for the students involved in a "Double Diploma" program between the Department of Biotechnology and Bioscience of the University of Milan Bicocca and the University of Paris 5 (from 2011)
 - specialization seminars for the PhD students of Clinical and Experimental Pharmacology of Unimi.
 - specialization seminar for the European Master in Translational Cosmetic and Dermatological Sciences –University of Eastern Piedmont, Italy.
- **From 2018:** Aggregate Professor in Cytology and Comparative Anatomy for the degree in Biological Sciences and in Environmental Science and Technology (University of Milan Bicocca)
- **From 2021,** she will hold the Laboratory of Biochemical and Molecular Techniques (Degree Course in Industrial Biotechnology, Unimib).

HONORS AND MEMBERSHIPS

- Reviewer for: Journal of Controlled Release, ACS Nano, Nanomedicine: Nanotechnology, Biology, and Medicine, Nanomaterials, *In vitro* cellular and developmental Biology, International Journal of Molecular Sciences.
- 2015, conference chairing: 5th International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery Systems. Dubai, 16-18 Marzo.
- 2016, member of the organizing committee for "8th International Conference and Exhibition on Pharmaceutics & Novel Drug Delivery Systems". Madrid, Spain, March 07-09.
- 2015-2016: member of "Controlled Release Society, Italian chapter".
- 2019, member of Organizing Committee and Chair of the symposium "Biosafety of Nanomaterials" for Nanoinnovation 2019 (Roma 11-14 Giugno).
- 2020-2021, Guest Editor for the Special Issue "Recent Research on Nanostructured Biomedicine: Clinical Potential and Safety", for the journal NANOMATERIALS.
- From 2021, Co-Editor of Current Pharmaceutical Biotechnology (Bentham Science)
- Member of the Research Center POLARIS (Particular Matter and Health Risk) of Unimib.

- Member of the Italian Society of Clinical Biochemistry (SiBioC)
- Member of BioNanoMedicine Center "NANOMIB" of Unimib.
- Member of Centro 3R (Inter-University Center for the Promotion of the 3Rs Principles in Teaching & Research).

Author of 37 publications in peer-reviewed international journals (Scopus H-index 16)

Selection of most relevant publications:

- 1) Bellini M, Riva B, Tinelli V, Rizzuto MA, Salvioni L, Colombo M, Mingozi F, Visioli A, Marongiu L, Frascotti G, Christodoulou MS, Passarella D, Prospero D, **Fiandra L**. Engineered Ferritin Nanoparticles for the Bioluminescence Tracking of Nanodrug Delivery in Cancer. *Small* 2020, 28: e2001450.
- 2) Das P, Fatehbasharad P, Colombo M, **Fiandra L**, Prospero D. Multifunctional Magnetic Gold Nanomaterials for Cancer. *Trends Biotechnol.* 2019, 37(9), pp. 995-1010.
- 3) Colombo M, Rizzuto M, Pandolfi L, Pacini C, Bonizzi A, Truffi M, Monieri M, Catrambone, Francesco, **Fiandra L**, Corsi F, Prospero D, Mazzucchelli S. Half-Chain Cetuximab Nanoconjugates Allow Multitarget Therapy of Triple Negative Breast Cancer. *Bioconjugate Chemistry.* 2018, 29(11):3817-3832.
- 4) **Fiandra L**, Capetti A, Sorrentino L, Corsi F. Nanoformulated antiretrovirals for penetration of the central nervous system: state of the art. *J Neuroimmune Pharmacol.* 2017; 12(1): 17-30.
- 5) Mazzucchelli S, Bellini M, **Fiandra L**, Truffi M, Rizzuto MA, Sorrentino L, Longhi E, Nebuloni M, Prospero D, Corsi F. Nanometronomic treatment of 4T1 breast cancer with nanocaged doxorubicin prevents drug resistance and circumvents cardiotoxicity. *Oncotarget.* 2017; 8(5): 8383-8396.
- 6) Colombo M*, **Fiandra L***, Alessio G, Mazzucchelli S, Nebuloni M, De Palma C, Kantner K, Pelaz B, Corsi F, Parak WJ, Prospero D. Less Is More - How in Vivo Tumor Homing and Localization of Colloidal Nanoparticles Depends on the Number of Attached Antibodies. *Nature Communications, Nature Communications*, 2016; 7: 13818.
- 7) Salvioni L, **Fiandra L**, Del Curto M, Mazzucchelli S, Allevi R, Truffi M, Sorrentino I, Santini B, Cerea M, Plaugan L, Corsi F, Colombo M. Oral delivery of insulin via polyethylene imine-based nanoparticles for colonic release allows glycemic control in diabetic rats. *Pharmacological Research* 2016, 110: 122-130.
- 8) **Fiandra L**, Colombo M, Mazzucchelli S, Truffi, M, Santini B, Allevi R, Nebuloni M, Capetti A, Rizzardini G, Prospero D, Corsi F. Nanoformulation of antiretroviral drugs enhances their penetration across the blood brain barrier in mice. *Nanomedicine*, 2015; 11(6): 1387-1397.
- 9) Bellini M, Mazzucchelli S, Galbiati E, Sommaruga S, **Fiandra L**, Truffi M, Rizzuto MA, Colombo M, Tortora P, Corsi F, Prospero D. Protein nanocages for self-triggered nuclear delivery of DNA-targeted chemotherapeutics in Cancer Cells. *J Control Release*, 2014; 196: 184-96.
- 10) **Fiandra L**, Mazzucchelli S., De Palma C., Colombo M., Allevi R., Sommaruga S., Clementi E., Bellini M., Prospero D., Corsi F. Assessing the in vivo targeting efficiency of multifunctional nanoconstructs bearing antibody-derived ligands. *ACS Nano* 2013; 7: 6092-6102.
- 11) Corsi F.*, **Fiandra L.***, De Palma C., Colombo M., Mazzucchelli S., Verderio P., Allevi R., Tosoni A., Nebuloni M., Clementi E., Prospero D. HER2 Expression in Breast Cancer Cells Is Downregulated Upon Active Targeting by Antibody-Engineered Multifunctional Nanoparticles in Mice. *ACS Nano* 2011; 5: 6383-6393

(* equally contributed to the work)