

Lorenzo Tei

Curriculum vitae

PERSONAL DATA

Born in Florence (IT) on the 18.5.1972

Resident in Torino

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BIO AND EDUCATION

I graduated in Chemistry at the University of Florence on July 16, 1996 (110 cum laude) with a thesis entitled "Synthesis of two new macrocyclic receptors ambivalent for the coordination of anions and metal cations".

I then received the PhD in Chemistry from the University of Nottingham (England) in June 2001 with a thesis entitled "Synthesis and coordination chemistry of macrocycles bearing various pendant arms" (Supervisor: Professor Martin Schröder). I won the "The J. J. Turner Prize for PhD Thesis Excellence" for the best doctoral thesis presented at the School of Chemistry in 2001.

Before joining the University of Piemonte Orientale I worked as post-doctoral researcher at the universities of Cagliari and Turin where I also worked as consultant for Bracco S.p.A. at the Department of Chemistry IFM, University of Turin.

UNIVERSITY CAREER

2015-	Associate Professor in Organic Chemistry (SSD: CHIM 06) at the Department of Scienze ed Innovazione Tecnologica (DiSIT), Università del Piemonte Orientale
2015-2017	Alexander Von Humboldt Fellow for Experienced Researchers at the Klinikum Rechts der Isar and Radiopharmacy Department, Technische Universität München (Germany)
2006-2015	Assistant Professor in Organic Chemistry (SSD: CHIM 06) at the Department of Scienze ed Innovazione Tecnologica (DiSIT), Università del Piemonte Orientale
2003-2006	Post-doc at Dipartiment of Internal Medicine and Chemistry IFM, University of Turin
2000-2002	Post-doc at the Department of Inorganic and Analytical Chemistry, University of Cagliari

UNIVERSITY POSITIONS

2013-	Member of the Research Commission of DiSIT
2016-	Member of the Management Committee of the Foundation ITS for Biotechnology (Piemonte Region, Italy)
2017-	Member of the Steering Committee of Piedmont-Val d'Aosta Section of Italian Chemical Society
2011-2014	Elected Member of the Senate, Università del Piemonte Orientale

2011	Member of the Commission for the revision of the Statute of the University of Piemonte Orientale
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SCIENTIFIC POSITIONS

2006-	Member of the Italian Chemical Society (SCI)
2010-	Member of the European Society for Molecular Imaging (ESMI)
2008-	Member of Italian Group of Discussion on Magnetic Resonance (GIDRM)
2012-2015	Member of the EU COST Action TD 1004: "Theranostics imaging and therapy: an action to develop novel nanosized systems for imaging-guided drug delivery"
2003-2011	Member of the COST Actions D18 e D38: "Lanthanide Chemistry for Diagnosis and Therapy" and "Metal-Based Systems for Molecular Imaging Applications"

MAIN FIELDS OF INTEREST

1. Synthesis of contrast agents for clinical diagnostics
2. Multimodal probes for molecular imaging applications
3. Functionalized nanosystems for application in diagnosis and therapy
4. NMR characterization of paramagnetic agents
5. Synthesis of hyper-cross-linked porous polymers for gas storage applications

CURRENT ISSUES OF RESEARCH

1. Contrast agents for clinical diagnostics

Synthesis, characterization and biomedical applications of polyaminocarboxylic ligands whose metal complexes are used as contrast agents for Magnetic Resonance Imaging (MRI) or Positron Emission Tomography (PET). Design and synthesis of novel ligands for optimization of contrast agent efficiency. Synthesis of functionalized systems for bioconjugation to biological carriers.

2. Multimodal Molecular Imaging Probes

A molecular imaging probe allows the identification of pathological abnormalities at the genetic, cellular and molecular level. The chemical probe consists of a part responsible for the generation of the signal detected externally (eg. Gd- or Mn-complexes for MRI, ^{68}Ga complexes or compounds containing the ^{18}F for PET, fluorescent compounds for optical imaging) and a part responsible for the molecular recognition of the pathology, able to differentiate diseased from healthy tissues.

3. Functionalized Nanosystems for diagnostic and/ or theranostic applications

Nanosystems of various nature (for example: mesoporous silica nanoparticles, liposomes, micelles, proteins, metal oxides) are used to accumulate a large number of contrast agents and carry them on the site of interest to visualize a given pathology through diagnostic techniques such as MRI or Photoacoustic imaging. When these particles are also loaded with specific drugs they become theranostic systems (combination of diagnosis and therapy).

4. NMR characterization of paramagnetic agents

The efficiency of a contrast agent must be optimized both in terms of thermodynamic and kinetic stability to avoid release of metal ions *in vivo* and in terms of effective response from the diagnostic technique used. Thus, we synthesize new types of chelating agents that can improve efficiency without losing stability. The MRI efficiency is measured by means of NMR relaxometric techniques.

5. Synthesis of porous aromatic hyper-crosslinked polymers for gas storage

Development of new porous hyper-crosslinked aromatic polymers capable of adsorbing, and then store high amounts of gases such as H₂, CH₄, CO₂. These gases are of great interest for the gas storage, energy production and automotive industries. The synthesis and characterization of these materials have the objective to increase the surface area and the total pore volume in order to optimize the adsorption capacity of gas and aromatic molecules.

CURRENT FUNDED PROJECTS

PROGRAMME	FUNDED PROJECT
FAR 2019	"Paramagnetic chelates embedded in nanogels as highly efficient MRI probes" – 2019-2021 – 20000 €
Bracco Imaging S.p.A.	Feasibility studies on the synthesis of bis-amide derivatives of CDTA – 2018-19 - 6.000€ total
CE.RI.TEC. srl (Metlac group) Institutional research funding	"Identification of NIAS (Non Intentionally Added Substances) from food packaging" – (2016-2019) - 69.000€
Nestec SA	"Synthesis of cyclic oligomers based on phthalic acids and diols" – 2018-2019 - 15000 €
Compagnia di San Paolo 2014	"Tailoring the magnetic properties of mesoporous silica nanoparticles for theranostic applications" (THERASIL) – Principal Investigator

TOP FIVE PAPERS

1. L. Lattuada, A. Barge, G. Cravotto, G. B. Giovenzana and L. Tei, **The synthesis and application of polyamino polycarboxylic bifunctional chelating agents**, *Chem. Soc. Rev.* 2011, **40**, 3019-3049 (Impact Factor: 33.383; 69 citations).
2. S. Aime, S. Geninatti Crich, E. Gianolio, G.B. Giovenzana, L. Tei, E. Terreno, **High Sensitivity Lanthanide(III) based Probes for MR-Medical Imaging**, *Coord. Chem Rev.*, 2006, 250, 1562-1579 (Impact Factor: 12.098; 214 citations).
3. M. Botta and L. Tei, **Relaxivity Enhancement in Macromolecular and Nanosized Gd^{III}-Based MRI Contrast Agents**, *Eur. J. Inorg. Chem.*, 2012, 1945-1960 (Impact Factor: 2.942; 67 citations).
4. F. Kielar, L. Tei, E. Terreno, M. Botta, Relaxivity Enhancement of Paramagnetic Lipid Nanoparticles by Restricting the Local Motions of the Gd^{III} Chelates, *J. Am. Chem Soc.*, 2010, **132**, 7836-7837 (Impact Factor: 12.113; 77 citations).

5. S. Geninatti Crich, C. Cabella, A. Barge, S. Belfiore, C. Ghirelli, L. Lattuada, S. Lanzardo, A. Mortillaro, L. Tei, M. Visigalli, G. Forni, S. Aime, **In vitro and in vivo MR-detection of tumors cells by targeting glutamine transporters with Gd-based probes.** *J. Med. Chem.*, 2006, 49, 4926-4936 (Impact Factor: 5.480; 60 citations).

AWARDS

1. 2014: Awarded a Alexander Von Humboldt Fellowship for Experienced Researchers to be carried out at the Klinikum Rechts der Isar, Technische Universität München with Prof. M. Schwaiger on a project with title: "A combined PET-MRI study for an improved, simultaneous characterization of tumor neoangiogenesis" (2015-2017)
2. 2001: Awarded The J. J. Turner Prize for PhD Thesis Excellence for the best thesis submitted at the School of Chemistry in the year 2001.
3. 1997: Awarded a research grant by the University of Florence to attend postgraduate courses in foreign countries.

FURTHER INFORMATION

- o Author of 123 peer-reviewed publications (H-index=29; total citations > 2600), 6 patents and 6 invitations to take seminars in foreign universities, 22 oral presentations and several poster communications at international and national conferences.
- o Co-author of two book chapters on Molecular Imaging and Contrast enhancing agents.
- o He has a 15 years' experience in the field of imaging agents and he has participated in several European initiatives in the field (COST Actions D18, D38 and TD1004); European Master in Molecular Imaging (EMMI): "*Probes and Models for Imaging Diseases and Therapy*" (2012-2013) and "*Design, Synthesis and Validation of Imaging Probes*" (2009-2011); European Networks of Excellence: "*European Molecular Imaging Laboratories - EMIL*" (2004-2009); "*Diagnostic Molecular Imaging DiMI*" (2005-2010); MEDITRANS: *Targeted Delivery of Nanomedicine* (2006-2011).

Collaborations with:

- Prof. Silvio Aime and Enzo Terreno group of the Department of Molecular Biotechnology and Health Sciences, University of Turin;
- Bracco Imaging S.p.A. one of the world leaders of diagnostic agents located at the BioIndustry Park of Canavese (Ivrea, TO);
- Prof. M. Schwaiger and Prof. H.-J. Wester, Technische Universität München
- Dr Zsolt Baranyai and Prof. Imre Toth group, University of Debrecen, Hungary;
- Dr Kristina Djanashvili, Delft University of Technology, Netherlands.
- Dr Stephen J. Butler, Loughborough University, UK

Invited Seminars:

- 1) "Optimizing the relaxivity of Gd-based MRI probes at high magnetic fields", 10th International Conference on f-Elements (ICFE-10), Swiss Federal Institute of Technology Lausanne (EPFL), September 3-6, 2018.
- 2) "Exploring mesoporous silica nanoparticles as multimodal imaging and theranostic probes", LE STUDIUM CONFERENCE: Is Multimodal Imaging an Invention with a Future? The Input of Chemistry, Orleans (Fr), December 11-13 2017.
- 3) "Chemical design for innovative MR-imaging probes" Max Plank Institute for Biological Cybernetic, Tübingen, Germany, July 16, 2015.
- 4) "Optimization of MR-imaging contrast agents: differences & similarities with nuclear medicine probes" Radiopharmacy department, Technische Universität München, Munich, Germany, May 13, 2015
- 5) "Chemical design for innovative MR-imaging probes" Klinikum rechts der Isar, Technische Universität München, Munich, Germany, July 15, 2013.
- 6) "Paramagnetic MR-imaging probes: from simple complexes to nanosized systems" Division of Imaging Sciences and Biomedical Engineering, King's College London, The Rayne Institute, Londra, England, October 30, 2012.
- 7) "Gd^{III}-based MR-imaging probes: from simple complexes to nanosized systems" University of Nottingham, England, September 16, 2011.

PhD supervision:

Luca Gaino (*Synthesis of new paramagnetic probes for Magnetic Resonance Imaging application*, PhD in Chemical Sciences XXVII cycle).

Co-supervisor with Prof. M. Botta: **Giuseppe Gugliotta** (*Synthesis and validation of new probes for Magnetic Resonance-Molecular Imaging protocols*, PhD in Chemical Sciences XXII cycle) e **Giuseppe Gambino** (*Development of high relaxivity systems and Magnetic Resonance-Molecular Imaging probes*, PhD in Chemical Sciences XXVI cycle);

Co-supervisor with Prof. L. Marchese: **Mina Errahali** (*Synthesis and characterization of new microporous polyaromatic materials (PAFs) with high surface area for gas storage and OLED device applications*, PhD in Chemical Sciences XXVII cycle).