PERSONAL INFORMATION Nicolò MAURO

Università degli Studi di Palermo
Department of "Scienze e Tecnologie Biologiche Chimiche e Farmaceutiche" (STEBICEF)
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Enterprise	University	EPR
☐ Management Level	☐ Full professor	☐ Research Director and 1st level Technologist / First Researcher and 2nd level Technologist / Principal Investigator
☐ Mid-Management Level	☒ Associate Professor	☐ Level III Researcher and Technologist
☐ Employee / worker level	☐ Researcher and Technologist of IV, V, VI and VII level / Technical collaborator	☐ Researcher and Technologist of IV, V, VI and VII level / Technical collaborator

WORK EXPERIENCE

04/01/2024 – to date

Associate Professor

Università Degli Studi di Palermo – Department STEBICEF

- Principal investigator in the breast cancer theranostic unit: development of innovative carbon-based nanoparticles (graphene oxide, carbon nanodots) for precision cancer therapy, cancer diagnosis, drug delivery and photothermal therapy; development of innovative hybrid nanomaterials as MRI and fluorescence imaging contrast agents for tumor microenvironment monitoring. Development of biomaterials for medical and pharmaceutical applications.
- Teaching Advanced Pharmaceutical Technology in the M.Sc. course of "Chimica e Tecnologia Farmaceutiche" at Università Degli Studi di Palermo.
- Teaching Pharmaceutical Technology in the M.Sc. course of "Medicina e Chirurgia" at Università Degli Studi di Palermo.

Cancer Nanotheranostics and Nanomedicine, Biomaterials

04/01/2021 – 03/01/2024

Assistant Professor (RTD-B)

Università Degli Studi di Palermo – Department STEBICEF

- Principal investigator in the breast cancer theranostic unit: development of innovative carbon-based nanoparticles for cancer diagnosis and photothermal therapy; development of innovative hybrid nanomaterials as MRI and fluorescence imaging contrast agents for tumor microenvironment monitoring
- Teaching Advanced Pharmaceutical Technology in the M.Sc. course of "Chimica e Tecnologia Farmaceutiche"

Cancer Nanotheranostics and Nanomedicine

01/04/2018 – 31/12/2020

Fondazione Umberto Veronesi Postdoctoral Felloship

Fondazione Umberto Veronesi - Università Degli Studi di Palermo, Department STEBICEF

- Principal investigator in the breast cancer theranostic unit: development of innovative nanoparticles for cancer diagnosis and photothermal therapy; development of innovative hybrid nanomaterials as MRI and fluorescence imaging contrast agents for tumor microenvironment monitoring; development of innovative polymer-carbon-metal nanogels for cancer theranomics.

Cancer Nanotheranostics and Nanomedicine

15/12/2017 – 31/03/2018 **Postdoctoral Research Fellow**

Università Degli Studi di Palermo – Laboratory of Biocompatible Polymers – Department STEBICEF

- Research entitled "Sintesi e caratterizzazione di materiali polimerici biocompatibili adatti alla produzione di sistemi per la veicolazione di molecole bioattive". The main topic was the synthesis and characterization of biocompatible polymeric nanoparticles for the delivery of drugs to the eyes.

Nanomedicine for the treatment of retinopathies

04/10/2016 – 03/10/2017 **Postdoctoral Research Fellow**

Università Degli Studi di Palermo – Laboratory of Biocompatible Polymers – Department STEBICEF

- Research entitled "Preparazione e caratterizzazione si sistemi colloidali a base di biopolimeri per il rilascio di farmaci idonei al trattamento di patologie riguardanti il segmento posteriore dell'occhio". The main topic was the synthesis and characterization of biocompatible polymeric micelles for the delivery of drugs to the posterior segments of the eyeball.

Nanomedicine for the treatment of retinopathies

16/02/2015 – 15/08/2016 **Postdoctoral Research Fellow**

Università Degli Studi di Palermo – Laboratory of Biocompatible Polymers – Department STEBICEF

- Research entitled "Sviluppo di sistemi colloidali a base di biopolimeri per il rilascio di farmaci al segmento posteriore dell'occhio". The main topic was the synthesis and characterization of biocompatible polymeric nanoparticles for the delivery of drugs to the posterior segments of the eyeball.

Nanomedicine for the treatment of retinopathies

03/2014 – 02/2015 **Research Scholar**

Università Degli Studi di Palermo – Laboratory of Biocompatible Polymers - Department STEBICEF

Research entitled "Sviluppo e caratterizzazione di nano e microsistemi polimerici per il rilascio modificato di farmaci nel trattamento delle retinopatie e di patologie oncologiche". The main topic was the synthesis and characterization of biocompatible polymeric nanoparticles and micelles for the delivery of anticancer drugs to the posterior segments of the eyeball.

Nanomedicine for the treatment of retinoblastoma

01/02/2013 – 31/01/2014 **Scientific Advisor**

Consorzio Interuniversitario per Scienza e la Tecnologia dei Materiali Nanostrutturati (INSTM) – Department of Chemistry – Univesrity of Milan (IT)

- The main topic was the synthesis of heterobifuctional monomers with monoacriloyl-monoamine structure for the production of semitelechelic polyamidoamines for biomedical applciations

Peptidomimetics with established molecular architecture and molecular weight

25/03/2013 – 15/04/2013 **Postdoctoral Research Fellow**

Università Degli Studi di Milano – Laboratory of Macromolecular Chemistry – Department of Chemistry (IT)

- The main topic were: i) the synthesis and characterization of biocompatible poly(amidoamine)s for the production of hydrogel scaffolds and nanocomposites for tissue engineering applications; ii) the synthesis of linear chiral poly(amidoaminoamino acid)s with interpenetrating properties as broad spectrum antivirals against sexually transmitted diseases.

Peptidomimetics for the production of chiral biomaterials

01/01/2013 – 28/02/2013 **Visiting Scientist**

Monash University – Alfred Hospital – Plebanski's Laboratory of Immunology – Melbourne (AU)

▪ The main topic was to prepare biodegradable polymeric nanoparticles as vaccine adjuvants

Polyesters-based Nanoparticles

10/01/2011 – 30/06/2011

Visiting Scholar

Cardiff School of Chemistry – P. Griffiths' Laboratory of physical chemistry - Cardiff (UK)

▪ The main topic was to prepare biodegradable self-assembled nanoparticles for gene and protein delivery, and the study of macromolecule dynamics in different layers

Multilayer nanoparticles for protein and gene delivery

01/11/2008 – 30/10/2009

Junior Research Scholar

Università Degli Studi di Milano– Dipartimento di Farmacologia (IT)

▪ The main topic was to assess the blood fatty acid profiles of children in the scholar age by GC-FID analysis, and find correlations with social and behavioral diseases.

Drug products production

05/05/2008 – 15/10/2008

Stage in Quality Assurance

Bayer Healthcare Spa– Garbagnate Milanese (IT)

The main topic was to assure quality of each product and raw materials adopted during production steps of pharmaceutical formulations for the USA, Japanese and Italian market.

Drug products production

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EDUCATION AND TRAINING

31/10/2018

National Scientific Abilitation as Associate Professor (03/D2 – SSD CHIM/09) - Tecnologia, Socioeconomia e Normativa dei Medicinali

Ministero dell'Istruzione dell'Università e della Ricerca - MIUR

01/01/2010 – 15/03/2013

Ph.D. in "Scienze Biologiche e Molecolari" – Corso di Biomateriali"

University of Pisa (Italy)

▪ Synthesis and design of poly(amidoamine)s with tailored properties for biomedical applications
▪ Characterization of polymers and nanocomposites

July/2008

Qualification to practice as Pharmacist

University of Palermo (Italy)

01/01/2010 – 15/03/2013

M.Sc. in "Chimica e Tecnologia Farmaceutiche" (14S) *Summa cum laude*

University of Palermo (Italy)

▪ Synthesis and design of polycations for gene delivery applications
▪ Characterization of interpolyelectrolytic complexes

WORK ACTIVITIES

Awards

1) "Antonella Siena" award for outstanding oral communication at Meeting "Biotecnologie: Ricerca di Base, Interdisciplinare e Traslazionale in Ambito Biomedico" Consiglio Nazionale delle Ricerche (Ibim-CNR) Palermo (Italy) 15-16 Dec 2016.

2) Best MedMind award for the best research project in medicalfields: Faivolarelatuamente-MakingScienceMakeSense® -PolitecnicodiMilano Bayer Healthcare s.p.a., Milan May 2008.

Editorial & Reviewer activities

1) Guest Editor for Materials ("Functional Nanomaterials and Biopolymers for Precision Medicine");

2) Guest Editor for Pharmaceutics ("Advanced Colloidal Systems for Multimodal Drug Delivery");

3) Scientific Committee Member of the Milan Polymer Days International Congress - MIPOL2021-2024;

5) External reviewer VQR 2015-2019 SSD CHIM/09, CHIM/07, CHIM/04.

6) External examinator Ph.D. thesis for the Doctoral Programme in Industrial Chemistry and Chemical Engineering of Politecnico di Milano – Deparment of Chemistry, Materials and Chemical Engineering "Giulio Natta".

7) Reviewer for top international journals in the field of materials science, biomaterials and pharmaceutics such as Pharmaceutics, Materials, ACS Applied Materials & Interfaces, Small, Cancers, International Journal of Pharmaceutics, Carbohydrate Polymers, and Biomacromolecules.

Patents

1) E. Ranucci, P. Ferruti, F. Fenili, A. Manfredi, N. Mauro, X. Fernandez-Buesquets, P. Urban, "Amphoteric polyamidoamines in the treatment of malaria", EP2732821 A1, WO2014076150A1;

2) P. Ferruti, A. Mandredi, N. Mauro, E. Ranucci, "Dimeri e polimeri a caratteri di poliammidoammine eterobifunzionali ai terminali di catena", - domanda MI2012A000953;

3) G. Giammona, N. Mauro, G. Cavallaro, F. Messina, A. Sciortino, G. Buscarino, M. Marrale, C. Gagliardo, "Nanosystem for diagnosis and photothermal treatment of tumors" – domanda PCT/IB2021/060873

ADDITIONAL INFORMATION

Ten selected publications

1) Urbán P, Valle-Delgado J.J., Mauro N, Marques J, Manfredi A, Rottmann M, Ranucci E, Ferruti P, Fernàndez-Busquets X, Use of poly(amidoamine) drug conjugates for the delivery of antimalarials to Plasmodium, J CONTROL. RELEASE 2014; 177, 84-95.

2) Mauro N., et al., Biotin-Containing Reduced Graphene Oxide-Based Nanosystem as a Multieffect Anticancer Agent: Combining Hyperthermia with Targeted Chemotherapy, BIOMACROMOLECULES 2015; 16: 2766-75.

3) Mauro N., et al., Linear biocompatible glyco-polyamidoamines as dual action mode virus infection inhibitors with potential as broad-spectrum microbicides for sexually transmitted diseases. SCI REP. 2016; 6, 33393.

4) Mauro N. et al., Branched High Molecular Weight Glycopolypeptide with Broad-Spectrum Antimicrobial Activity for the Treatment of Biofilm Related Infections. ACS APPL. MATER. INTERFACES 2018; 10, 318-331.

5) Mauro N. et al., Folic acid-functionalized graphene oxide nanosheets via plasma etching as a platform to combine NIR anticancer phototherapy and targeted drug delivery. MATER. SCI. ENG. C 2020; 107, 110201.

6) Mauro N., et al., SPIONs embedded in polyamino acid nanogels to synergistically treat tumor microenvironment and breast cancer cells. International Journal of Pharmaceutics, 2019, 555, 207–219.

7) Scialabba C., et al., Highly Homogeneous Biotinylated Carbon Nanodots: Red-Emitting Nanoheaters as Theranostic Agents toward Precision Cancer Medicine. ACS APPL. MATER. INTERFACES 2019, 11, 19854–19866.

8) Nicosia A. et al., Carbon nanodots for on demand chemophotothermal therapy combination to elicit necroptosis: Overcoming apoptosis resistance in breast cancer cell lines. Cancers, 2020, 12, 1–23, 3114.

9) Mauro N., et al. Hyaluronic acid dressing of hydrophobic carbon nanodots: A self-assembling strategy of hybrid nanocomposites with theranostic potential, Carbohydrate Polymers, 2021, 267, 118213.

10) Mauro N., et al., Decagram-Scale Synthesis of Multicolor Carbon Nanodots: Self-Tracking Nanoheaters with Inherent and Selective Anticancer Properties. ACS APPL. MATER. INTERFACES 2022, 14, 2551–2563.