CV Roberta Cavalli

Roberta Cavalli, Full Professor of Pharmaceutical Technology, Dipartimento di Scienza e Tecnologia del Farmaco - Università degli Studi di Torino.

a) Curriculum Vitae
-1985: MD degree in Pharmaceutical Chemistry, (University of Turin, Italy)
-1986: MD degree in Pharmacy, (University of Turin, Italy)
-1993: PhD degree (University of Turin, Italy)
-1993-96: Post-doc position, University of Turin (Italy)
-1997-99: Research assistant, University of Turin (Italy)
-1999-2002: Assistant professor of Pharmaceutical Technology, University of Turin (Italy)
-2002-2015: Associate professor of Pharmaceutical Technology, University of Turin (Italy)
-**2015-today**: Full professor of Pharmaceutical Technology, University of Turin (Italy)

b) Teaching

- Pharmaceutical Technology I (12 ECTS, comprising 9 ECTS lectures and 3 ECTS laboratory activities)
- Design and Formulation of Biotech Medicinal Products (4 ECTS)
- Design and Development of Topical and Dermatological Products (2 ECTS)
- Innovative Drug Delivery Systems (2 ECTS PhD Students)
- Pharmaceutical Technology II (2 ECTS, Hospital Pharmacy degree)

RC directs Pharmaceutical Chemistry and Technology degree since 2017..

c) Research activity
Roberta Cavalli have a multi-year experience in the design and development of either conventional pharmaceutical formulations or innovative nanotechnology-based drug delivery systems, as well as their *in vitro* and *in vivo* characterization.
Much research focused the attention on developing novel nanoparticulate formulations to improve the efficacy of the loaded therapeutic molecules. The incorporation of a therapeutic agent within a nanoformulation aims at changing the physico-chemical characteristics of the loaded molecule, modifying the pharmacokinetics and the biodistribution, magnifying the effectiveness and decreasing the side effects. RC developed various types of novel nanocarriers consisting of safe components, generally either polymers or lipids, admitted by the regulatory authorities to assure biocompatibility, biodegradability and low cytotoxicity.
A number of studies concerned the fine tuning of nanostructured systems for low soluble drugs to increase their solubility, improve their bioavailability, modify their pharmacokinetics parameters as well as their biodistribution.
The research of RC payed a great attention on cyclodextrin derivatives and cyclodextrin-based nanocarriers. Among them, nanosponges, polymer nanoparticles obtained by the cross-linking of cyclodextrins with different cross-linking agents, have been deeply studied. The cross-linking of cyclodextrin units produce a nanoporous solid nanostructure consisting on cyclodextrin cavities and nanochannels due to the cross-linking network. Consequently, it is possible to include various compounds. A number of nanosponge formulations have been obtained for the delivery of different

types of lipophilic and hydrophilic molecules, gases and macromolecules. Cyclodextrin-based nanosponges showed a marked capability to improve the oral bioavailability of the incorporated molecules in animal models after *per os* administration.
Another field of RC research involved the studies of new biocompatible nanosystems for the delivery of nucleic acids, such as DNA, oligonucleotides and siRNAs. Particularly novel biocompatible self-assembled nanocarriers were tuned to protect them from degradation and to improve the intracellular release of nucleic acids improving their effectiveness.
Additionally, much experimental research focussed on the design and characterization of new nanostructures as potential nanocarriers for antiviral, antifungal and antibacterial drugs. Among them, various studies concerned either novel nanodelivery systems or novel polymers for the treatment of viral infectious diseases.
More recently, her interest moved to the design of novel polymer/lipid hybrid nanobubbles and nanodroplets, core-shell nanostructure filled with a gas or a liquid perfluorocarbon respectively. Nanobubbles can be loaded with gases, small molecules and macromolecules due to the unique architecture. The surface conjugation with specific ligands (i.e. antibodies) have been exploited for active targeting to specific cells or tissues.
These types of nanocarriers can be used as such or combined with an external physical stimulus, such as ultrasound for targeted drug release.
Different technological approaches have been studied to associate macromolecules (i.e. proteins or nucleic acids) within the bubble structure.The association with nanobubbles improved the stability and the transfection efficiency of DNA and RNAs.
Interestingly, theranostic nanobubbles have been developed for improving the cure and imaging of cancer or other important diseases. Moreover, targeted nanobubbles to dendritic cells have been successfully designed for cancer vaccination either to treat existing cancer or prevent development of a cancer. Based on the results, this unique nanobubble platform can be considered a versatile tool for t controlled and targeted delivery of. drugs.

RC played the role of Principal Investigator of a number of private and public multidisciplinary projects. She is used to work with colleagues with complementary expertise and knowledge to go beyond existing approaches. Many international papers, congress communications and patents evidenced the RC pharmaceutical technology, nanoformulation expertise and multidisciplinary approach.
Since 2019 RC directs TEFARCO INNOVA consortium

Co-author of more than 190 full papers in peer-reviewed international journals with impact factor and more than 25 patents. Overall citations >6200, *H index* 45 (www.scopus.com).

d)Editorial Board Member

Drug Delivery Letter
J. Drug Delivery

e) Memberships

RC is member of:

- Italian Association of Pharmaceutical Technology Researchers (ADRITELF)
- Italian Chemical Society (SCI),
- Consorzio interuniversitario Nazionale per la Scienza e la Tecnologia dei Materiali (INSTM)
- Nanostructured Interfaces and Surfaces (NIS)

- Italian Association of Industrial Pharmacists (AFI),
- Controlled Release Society (CRS)
- Italy chapter CRS
- American Association of Pharmaceutical Scientists (AAPS)
- European Society for Molecular Imaging (ESMI)
- Italian Association of Cyclodextrins.