Prof. Caterina Temporini
Associate Professor
Laboratory of Pharmaceutical Analysis
Liquid Chromatography – Mass Spectrometry Unit
Department of Drug Sciences,
University of Pavia
Italy
e-mail: caterina.temporini@unipv.it
tel. +39 0382 987782

Caterina Temporini graduated in Pharmacy at the University of Pavia in 2000: She obtained her PhD from the same institution in 2005. Since 2015 she is Associate Professor in Pharmaceutical Analysis at the University of Pavia.

Her main research deal with the development and application of liquid phase separations and mass spectrometry (LC-MS) based methods for the functional and structural analysis of proteins.

The earliest activities focused on the development of enzyme-based chromatographic stationary phases for in-flow reactions in different pharmaceutical applications, ranging from enantioselective discrimination/catalysis (penicillin G acylase, lipase), peptide/glycopeptide mapping (trypsin, chymotrypsin, pronase), recombinant protein production (enterokinase), inhibition studies (purine nucleoside phosphorylase as target for antitubercular drugs). Biochromatographic systems based on immobilized receptors, such as membrane (GPR17 and A2A) and soluble (PPAR-α and PPAR-γ) receptors, were also developed to characterize ligand-protein interactions with a great impact in the discovery of new potential ligands.

In the recent years, the research carried out and directed by Prof. Temporini is strongly dedicated to the development and the application of integrated analytical platforms for structural analysis and process optimization of biopharmaceuticals, including polypeptides, glycopeptides, monoclonal antibodies from different sources (CHO cells, plants) and extracellular vescicles (EVs). The characterization of recombinant protein critical quality attributes is obtained by the most recent chromatographic stationary phases (HILIC, SEC, RP, IEX, Affinity) and instrumentations (HRMS). Within a multidisciplinary network, she is also working on the design, the preparation and analytical characterization of neo-glycocojugate proteins as potential vaccines active against tuberculosis.

She is the scientific responsible for two research projects financed by pharmaceutical companies, focussed on the development of advanced analytical methods for the characterization of monoclonal antibodies produced by plants (Special Product's Line SpA) and biotechnology-based active ingredients such as recombinant human collagen for nutritional and pharmaceutical applications (Gnosis by Lesaffre). Prof. Temporini is also scientific responsible for a collaboration with CNR institute of Traslational Pharmacology, Rome, and Corion Biotech srl within a project dealing with the analytical characterization of the protein and EVs profile of a new biopharmaceutical for the treatment of pre-enclampsy.

Since February 2023, she is involved in the ImmunoHUB Project (4-Years, Funded by Italian Ministry of Health) with the scientific responsibility for Pavia University Unit. The project is focussed on the construction of a network for the rational design, development, preclinical and clinical evaluation of glycoconjugate antitubercular vaccines; sub-unit and glycoconjugate vaccines against SARS-CoV2; pronectines and monoclonal antibodies for immunotherapy of SARS-CoV2, hepatocellular carcinoma; renal cell carcinoma.

The main editorial activities include co-editing of three special issues for Molecules (2014; Oligosaccharides and Glyco-Conjugates), for Frontiers in Molecular Biosciences (2020-2021; Analytical Devices Based on Immobilized Macromolecules for Structural and Activity/Affinity Studies in Drug Discovery), and for Journal of Pharmaceutical and Biomedical Analysis (2022-203; Biopharmaceutical analysis: trends and perspectives on biosimilar products).

Latest Publications

Glycovaccine Design: Optimization of Model and Antitubercular Carrier Glycosylation via Disuccinimidyl Homobifunctional Linker. Tengattini, S., Rubes, D., Serra, M., Piubelli L, Pollegioni L, Calleri E, Bavaro T, Massolini G, Terreni, M., Temporini, C. Pharmaceutics, 15 (2023) 1321.

Chromatographic separation by RPLC-ESI-MS of all hydroxyproline isomers for the characterization of collagens from different sources. Lioi, M., Tengattini, S., Gotti, R., Bagatin F., Galliani S., Massolini G., Daly, S., Temporini, C. Journal of Chromatography A 1720 (2024) 464771.

Development of a rapid, efficient, and reusable magnetic bead-based immunocapture system for recombinant human procollagen type II isolation from yeast fermentation broth. Lioi M, Tengattini S, Bagatin F, Galliani S, Daly S, Massolini G, Temporini C. Anal Bioanal. Chem. 415 (2023):3155-3166.

Hydrophilic interaction liquid chromatography (HILIC) for the analysis of intact proteins and glycoproteins. Tengattini, S., Massolini, G.,Rinaldi, F., Calleri, E., Temporini, C. TrAC - Trends in Analytical Chemistry 174 (2024) 117702.

Effect of glycosylation on the affinity of the MTB protein Ag85B for specific antibodies: towards the design of a dual-acting vaccine against tuberculosis. Bernardini, R., Tengattini, S., Li, Z., .Temporini, C., Terreni, M. Biology Direct 19 (2024) 11.

Selected Publications

Hydrophilic interaction liquid chromatography-mass spectrometry as a new tool for the characterization of intact semi-synthetic glycoproteins. S. Tengattini, E. Dominguez-Vega, C. Temporini, T. Bavaro, F. Rinaldi, L. Piubelli, L. Pollegioni, G. Massolini, G.W. Somsen. Analytica Chimica Acta 981 (2017) 94-105.

Advances on Size Exclusion Chromatography and Applications on the Analysis of Protein Biopharmaceuticals and Protein Aggregates: A Mini Review. Brusotti G., Calleri E., Colombo R., Massolini G., Rinaldi F., Temporini C. Chromatographia 81 (2018) 3-23.

Enterokinase monolithic bioreactor as an efficient tool for biopharmaceuticals preparation: on-line cleavage of fusion proteins and analytical characterization of released products, Tengattini S., Rinaldi F., Piubelli L., Kupfer T., Peters B., Bavaro T., Calleri E., Massolini G., Temporini C. Journal of Pharmaceutical and Biomedical Analysis 157 (2018) 10–19.

Epitope and affinity determination of recombinant Mycobacterium tuberculosis Ag85B antigen towards anti-Ag85 antibodies using proteolytic affinity-mass spectrometry and biosensor analysis. F. Rinaldi, L. Lupu, H. Rusche, Z. Kukačka, S. Tengattini, R. Bernardini, L. Piubelli, T. Bavaro, S. Maeser, L. Pollegioni, E. Calleri, M. Przybylski, C. Temporini. Analytical and Bioanalytical Chemistry 411 (2019) 439-448.

Chromatographic profiling of silk sericin for biomedical and cosmetic use by complementary hydrophylic, reversed phase and size exclusion chromatographic methods Tengattini S., Orlandi G., Perteghella S., Bari E., Amadio M., Calleri E., Massolini G., Torre M.L., Temporini C. Journal of Pharmaceutical and Biomedical Analysis 186 (2020) 113291.

Multi-approach LC-MS methods for the characterization of species-specific attributes of monoclonal antibodies from plants. S. Tengattini, F. Rinaldi, V. Perez-Fernandez, A. Fabbri, M. Donini, C. Marusic, G. Sferrazza, P. Pierimarchi, M. Zonfrillo, E. Calleri, G. Massolini, C. Pisano, C. Temporini. Journal of Pharmaceutical and Biomedical Analysis 216 (2022) 114796.