

Colombo Raffaella (17/07/1979)

Assistant Professor. Dep. of Drug Sciences, Medicinal Chemistry and Technology Section, Univ. of Pavia.

Pharmaceutical Analysis Laboratory-PAL

Nutraceutical & Food Chem Toxicol Analysis Laboratory

Teaching 2017/2018

1. Quantitative Drug Analysis (Galeno, 6ECTS), (Teaching: Pharmaceutical Analysis 2, VI sem.), School of Pharmacy, Univ. of Pavia.
2. Practical training in Pharmaceutical Analysis (Galeno, Quantitative part-2ECTS), (Teaching: Pharmaceutical Analysis 2, VI sem.), School of Pharmacy, Univ. of Pavia.

Curriculum vitae

Education

- **2004:** Master degree in Pharmaceutical Chemistry and Technology, Univ. of Pavia; project title: "Study of A β 1-40 and A β 1-42 aggregation process using Capillary Electrophoresis" (Pharmaceutical Analysis Lab., Dep. of Drug Sciences. Graduation: 110/110 cum laude).
- **2005:** State certification exam (pharmacist).
- At Pharmaceutical Analysis Lab., Dep. of Drug Sciences:
 - Feb-Sep2005:** Scholarship. Project title: "Amyloidogenic proteins and potential pharmaceutical ligands";
 - Nov2005-Oct2008:** PhD in Pharmaceutical Chemistry and Technology. Project: "Amyloidogenic proteins and Capillary Electrophoresis: from folding to small molecule binding";
 - Nov2008-Oct2009:** Post-doctoral fellow. Project title: "Small molecules and amyloidogenic proteins: interaction studies by using separative analytical techniques";
 - Dec2009-Sep2010:** Post-doctoral fellow. Project title: "Affinity Screening drug-receptor by microcantilevers", in collaboration with Institute of Chemistry of Molecular Recognition-ICRM, CNR, Milan).
- **December2010-present** Assistant professor (CHIM/08).

Fellowship/Awards

- **2005-present:** teaching and laboratory assistant and supervisor of students during experimental projects of Schools of: Pharmaceutical Chemistry and Technology, Pharmacy and Biotechnology, Univ. of Pavia.
- **2009-present:** Expert (CHIM/08) in exams of Schools of: Pharmaceutical Chemistry and Technology, Pharmacy and Biotechnology, Univ. of Pavia.
- **2011/2012-2013/2014:** Assistant Professor of Practical training in Pharmaceutical Analysis, School of Medical and Pharmaceutical Biotechnologies (Pharmaceutical course, 3ECTS), Univ. of Pavia.
- **Sep2011:** member of the Organizing Committees of the 16th Summer School on Pharmaceutical Analysis (SSPA 2011) and of the 14th International Meeting on Recent Developments in Pharmaceutical Analysis (*RDPA 2011*), Univ. of Pavia.
- **2011/2012-present:** Assistant Professor of Practical training in Pharmaceutical Analysis 2 (Quantitative part) (Teaching: Pharmaceutical Analysis 2), School of Pharmacy, Univ. of Pavia.

- **2013/2014:** Assistant Professor of Advanced Technologies in Drug Analysis, School of Medical and Pharmaceutical Biotechnologies (Pharmaceutical course, 3ECTS), Univ. of Pavia.
- **2014/2015-present:** Assistant Professor of Quantitative Drug Analysis (Galeno, 6ECTS) (Teaching: Pharmaceutical Analysis 2), School of Pharmacy, Univ. of Pavia.
- **2013-present:** member of Commission for the student's counseling (COR), Univ. of Pavia.
- **Jan2017-present:** member of Commission for the student's tutoring service, Univ. of Pavia.
- **Jan2018-present:** member of Teaching board of Master Course "Esperto in Chimica Analitica per l'Industria Farmaceutica-ECAIF", Univ. of Pavia.

Research fields

- Use of analytical techniques (LC, CE, MS) to study amyloidogenic proteins (protein conformers and oligomeric species) in different diseases (as for example Dialysis Related Amyloidosis and Alzheimer's Disease)
- Use of analytical techniques in affinity studies (ACE, UF-CE, MS, SPR, MCs) to identify small molecules able to interfere in protein/peptide misfolding and aggregation processes.
- Use of CE-UV for the urinary determination of pathological peptides, involved in prolidase deficiency, a rare disease, associated with imidodipeptiduria and lack of or reduced prolidase activity.
- Use of CE-UV and HPLC-UV-MS in the quality control of biotechnological products.
- HPLC-UV-MS characterization and studies of bioactivity of compounds obtained from natural products, food and by-products of food industry.

Funded projects (last 10 years)

- **-2007 PRIN** area 03 project 20079SLZMC_001 "Advanced analytical methodologies in drug discovery. **-2009 Progetto Reg. Lombardia:** "Dalla scienza dei materiali alla biomedicina molecolare". **-2009 European Grant NASPE** (Research for SMEs, Grant 222023). **-2009 PRIN** area 03 project 2009Z8YTYC_001 "Advanced analytical methodologies in drug and health care product discovery". **-2011 Progetto Reg. Lombardia:** "Dalla scienza dei materiali allo sviluppo di nuovi dispositivi per la diagnosi e la cura di patologie associate all'invecchiamento".

Scientific publications: 19 (average IF ~3.5), **Hindex:** 8, **total citations:** 162 (<http://orcid.org/0000-0001-9675-6598> Scopus Feb2018). **N. book chapters:** 1; **N. patents:** 1.

Scientific publications

1. Maietta, M., Colombo, R., Corana, F., Papetti, A.
Cretan tea (*Origanum dictamnus* L.) as a functional beverage: an investigation on antiglycative and carbonyl trapping activities
(2018) *Food and Function*. DOI: 10.1039/c7fo01930k.
2. Brusotti, G., Calleri, E., Colombo, R., Massolini, G., Rinaldi, F., Temporini, C.
Advances on Size Exclusion Chromatography and Applications on the Analysis of Protein Biopharmaceuticals and Protein Aggregates: A Mini Review
(2018) *Chromatographia*, 81, pp. 3-23. DOI: 10.1007/s10337-017-3380-5.
3. Maietta, M., Colombo, R., Lavecchia, R., Sorrenti, M., Zuorro, A., Papetti, A.
Artichoke (*Cynara cardunculus* L. var. *scolymus*) waste as a natural source of carbonyl trapping and antiglycative agents
(2017) *Food Research International*, 100, pp. 780-790. DOI: 10.1016/j.foodres.2017.08.007.

4. De Lorenzi, E., Chiari, M., Colombo, R., Cretich, M., Sola, L., Vanna, R., Gagni, P., Bisceglia, F., Morasso, C., Lin, J.S., Lee, M., Mcgeer, P.L., Barron, A.E.
Evidence that the human innate immune peptide LL-37 may be a binding partner of amyloid- β and inhibitor of fibril assembly
(2017) *Journal of Alzheimer's Disease*, 59 (4), pp. 1213-1226. DOI: 10.3233/JAD-170223.
5. Bertolletti, L., Schappler, J., Colombo, R., Rudaz, S., Haselberg, R., Domínguez-Vega, E., Raimondi, S., Somsen, G.W., De Lorenzi, E.
Evaluation of capillary electrophoresis-mass spectrometry for the analysis of the conformational heterogeneity of intact proteins using beta²-microglobulin as model compound
(2016) *Analytica Chimica Acta*, 945, pp. 102-109. Cited 2 times. DOI: 10.1016/j.aca.2016.10.010.
6. Bertolletti, L., Bisceglia, F., Colombo, R., Giorgetti, S., Raimondi, S., Mangione, P.P., De Lorenzi, E.
Capillary electrophoresis analysis of different variants of the amyloidogenic protein β_2 -microglobulin as a simple tool for misfolding and stability studies
(2015) *Electrophoresis*, 36 (19), pp. 2465-2472. Cited 2 times. DOI: 10.1002/elps.201500148
7. Besio, R., Maruelli, S., Gioia, R., Villa, I., Grabowski, P., Gallagher, O., Bishop, N.J., Foster, S., De Lorenzi, E., Colombo, R., Diaz, J.L.D., Moore-Barton, H., Deshpande, C., Aydin, H.I., Tokatli, A., Kwiek, B., Kasapkara, C.S., Adisen, E.O., Gurer, M.A., Di Rocco, M., Phang, J.M., Gunn, T.M., Tenni, R., Rossi, A., Forlino, A.
Lack of prolidase causes a bone phenotype both in human and in mouse
(2015) *Bone*, 72, pp. 53-64. Cited 2 times. DOI: 10.1016/j.bone.2014.11.009.
8. Bertolletti, L., Regazzoni, L., Altomare, A., Colombo, R., Colzani, M., Vistoli, G., Marchese, L., Carini, M., De Lorenzi, E., Aldini, G.
Advanced glycation end products of beta²-microglobulin in uremic patients as determined by high resolution mass spectrometry
(2014) *Journal of Pharmaceutical and Biomedical Analysis*, 91, pp. 193-201. Cited 3 times. DOI: 10.1016/j.jpba.2013.12.021.
9. Brogi, S., Butini, S., Maramai, S., Colombo, R., Verga, L., Lanni, C., De Lorenzi, E., Lamponi, S., Andreassi, M., Bartolini, M., Andrisano, V., Novellino, E., Campiani, G., Brindisi, M., Gemma, S.
Disease-modifying anti-Alzheimer's drugs: Inhibitors of human cholinesterases interfering with β -amyloid aggregation
(2014) *CNS Neuroscience and Therapeutics*, 20 (7), pp. 624-632. Cited 22 times. DOI: 10.1111/cns.12290.
10. Butini, S., Brindisi, M., Brogi, S., Maramai, S., Guarino, E., Panico, A., Saxena, A., Chauhan, V., Colombo, R., Verga, L., De Lorenzi, E., Bartolini, M., Andrisano, V., Novellino, E., Campiani, G., Gemma, S.
Multifunctional cholinesterase and amyloid beta fibrillization modulators. Synthesis and biological investigation
(2013) *ACS Medicinal Chemistry Letters*, 4 (12), pp. 1178-1182. Cited 16 times. DOI: 10.1021/ml4002908.
11. Bertolletti, L., Regazzoni, L., Aldini, G., Colombo, R., Abballe, F., Caccialanza, G., De Lorenzi, E.
Separation and characterisation of beta₂-microglobulin folding conformers by ion-exchange liquid chromatography and ion-exchange liquid chromatography-mass spectrometry
(2013) *Analytica Chimica Acta*, 771, pp. 108-114. Cited 7 times. DOI: 10.1016/j.aca.2013.01.058.
12. Oliviero, G., Chiari, M., De Lorenzi, E., Colombo, R., Cretich, M., Damin, F., Federici, S., Depero, L.E., Bergese, P.
Leveraging on nanomechanical sensors to single out active small ligands for β_2 -microglobulin
(2013) *Sensors and Actuators, B: Chemical*, 176, pp. 1026-1031. Cited 4 times. DOI: 10.1016/j.snb.2012.09.032.

13. Regazzoni, L., Colombo, R., Bertoletti, L., Vistoli, G., Aldini, G., Serra, M., Carini, M., Facino, R.M., Giorgetti, S., Stoppini, M., Caccialanza, G., De Lorenzi, E.
Screening of fibrillogenesis inhibitors of β_2 -microglobulin: Integrated strategies by mass spectrometry capillary electrophoresis and in silico simulations
(2011) *Analytica Chimica Acta*, 685 (2), pp. 153-161. Cited 9 times. DOI: 10.1016/j.aca.2010.11.025.
14. Regazzoni, L., Bertoletti, L., Vistoli, G., Colombo, R., Aldini, G., Serra, M., Carini, M., Caccialanza, G., De Lorenzi, E.
A combined high-resolution mass spectrometric and in silico approach for the characterisation of small ligands of β_2 -microglobulin
(2010) *ChemMedChem*, 5 (7), pp. 1015-1025. Cited 8 times. DOI: 10.1002/cmdc.201000082.
15. Rambaldi, D.C., Zattoni, A., Reschiglian, P., Colombo, R., De Lorenzi, E.
In vitro amyloid A β 1-42 peptide aggregation monitoring by asymmetrical flow field-flow fractionation with multi-angle light scattering detection
(2009) *Analytical and Bioanalytical Chemistry*, 394 (8), pp. 2145-2149. Cited 18 times. DOI: 10.1007/s00216-009-2899-1.
16. Colombo, R., Carotti, A., Catto, M., Racchi, M., Lanni, C., Verga, L., Caccialanza, G., De Lorenzi, E.
CE can identify small molecules that selectively target soluble oligomers of amyloid β protein and display antifibrillogenic activity
(2009) *Electrophoresis*, 30 (8), pp. 1418-1429. Cited 29 times. DOI: 10.1002/elps.200800377.
17. De Lorenzi, E., Colombo, R., Sabella, S., Corlin, D.B., Heegaard, N.H.H.
The influence of Cu²⁺ on the unfolding and refolding of intact and proteolytically processed β_2 -microglobulin
(2008) *Electrophoresis*, 29 (8), pp. 1734-1740. Cited 6 times. DOI: 10.1002/elps.200700506.
18. Carazzone, C., Colombo, R., Quaglia, M., Mangione, P., Raimondi, S., Giorgetti, S., Caccialanza, G., Bellotti, V., De Lorenzi, E.
Sulfonated molecules that bind a partially structured species of β_2 -microglobulin also influence refolding and fibrillogenesis
(2008) *Electrophoresis*, 29 (7), pp. 1502-1510. Cited 14 times. DOI: 10.1002/elps.200700677.
19. Quaglia, M., Carazzone, C., Sabella, S., Colombo, R., Giorgetti, S., Bellotti, V., De Lorenzi, E.
Search of ligands for the amyloidogenic protein β_2 -microglobulin by capillary electrophoresis and other techniques
(2005) *Electrophoresis*, 26 (21), pp. 4055-4063. Cited 13 times. DOI: 10.1002/elps.200500313.

Book chapters

1. Caselli D., Cimaz R., Besio R., Rossi A., De Lorenzi E., Colombo R., Cantarini L., Riva S., Spada M., Forlino A., Aricò M. Partial rescue of biochemical parameters after hematopoietic stem cell transplantation in a patient with prolydase deficiency due to two novel PEPD mutations. (2011) *JIMD Reports*. vol. 3, p. 71-77. SSIEM and Springer-Verlag, ISBN: 9783642249358, doi: 10.1007/8904_2011_62.

Patents

1. Colombo R., De Lorenzi E., Carotti A., Catto M., Racchi M., Lanni C., Verga L., Caccialanza G. Derivati antracenedionici e aza-antracenedionici come agenti capaci di inibire l'aggregazione di peptidi beta amiloidi. Domanda numero MI2008A366. 25/03/2011 Brevetto n. 0001387037.