

Molecules and peptides as natural products for well-being: EUNIWELL projects from Cologne to Florence

EUniWell Workshop

Firenze, March 15th at 2.15 pm

Novoli Campus, D6, room 004 (ground Floor)

<https://unifirenze.webex.com/unifirenze/j.php?MTID=m7de4231eb08afc6e8396e2f7b5c2fd95>

Programme

14.15 Welcome

Prof. G. Giovannetti | Vice President for International relation at the University of Florence

14.20 Seminar

Prof. I. Neundorf | Professor of Biochemistry at the University of Cologne

Abstract

Peptides are the little siblings of proteins. They are equally composed of a chain of amino acids, only they are somewhat smaller. Peptides have numerous important functions in the human body, act as signal molecules and hormones, show analgesic and anti-inflammatory effects, or even antimicrobial activity. These properties make them interesting molecular probes and diagnostic tools for medical applications. Within the EUniWell landscape the connection between the Universities of Florence and Cologne is of special importance as two designated focal points in the area of peptides complement to discover sustainable synthesis methodologies and to design novel peptide pharmaceuticals.

In fact, peptides often outperform small molecule drugs due to their favorable pharmacodynamic characteristics. They are highly selective and specific for their targets reducing the risks of side- and off-target effects.

Today peptide therapeutics have been used in wide range of indications as oncology, endocrinology and metabolic, cardiovascular and antimicrobial applications and their further development as drugs has become one of the hottest topics in pharmaceutical research. Chemical synthesis can be used to optimize and modulate the bioactivity of peptides and the field of peptide drug development has greatly advanced thanks to technical and analytical improvements in their production. This work will highlight recent efforts in finding novel key approaches to transform peptide leads for therapeutic use with a particular emphasis on peptides with antimicrobial activity.

The Universities of Florence and Cologne are both experts in the field of peptide synthesis, modification and application. Our partnership within EUniWell will generate new knowledge and

provide new perspectives for the use and development of bioactive peptides, and this synergy will bring improvements in health, well-being and quality of life.

Short bio of Prof. Dr. Ines Neundorf

Vice-Dean for Gender, Diversity and Young Academics. Professor of Biochemistry

Important functions and memberships outside UoC:

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| Since 2019 | Member of the Editorial Board of <i>Scientific Reports</i> |
| Since 2014 | Member of the Max-Bergmann-Kreis zur Förderung der Peptidchemie |

Prizes, Awards and Honours:

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| 2016-2019 | Funding within the Professorinnenprogramm of the Federal Ministry of Education and Research |
| 2012-2013 | Grants within the 2 nd and 3 rd Professorinnenprogramm of UoC |

Five most important publications:

- Klimpel, A., Stillger, K., Wiederstein, J.L., Krüger, M., Neundorf, I. (2021): Cell-permeable CaaX-peptides affect K-Ras downstream signaling and promote cell death in cancer cells. *FEBS J.* 288(9): 2911-2929.
- Negrete-Hurtado, A., Overhoff, M., Bera, S., De Bruyckere, E., Schätzmüller, K., Kye, M.J., Qin, C., Lammers, M., Kondylis, V., Neundorf, I., Kononenko, N.L. (2020): Autophagy lipidation machinery regulates axonal microtubule dynamics but is dispensable for survival of mammalian neurons. *Nat Commun.* 11(1): 1535.
- Feni, L., Parente, S., Robert, C., Gazzola, S., Arosio, D., Piarulli, U., Neundorf, I. (2019): Kiss and Run: Promoting Effective and Targeted Cellular Uptake of a Drug Delivery Vehicle Composed of an Integrin-Targeting Diketopiperazine Peptidomimetic and a Cell-Penetrating Peptide. *Bioconjug Chem.* 30(7): 2011-2022.
- Horn M, Reichart F, Natividad-Tietz S, Diaz D, Neundorf I. (2016): Tuning the properties of a novel short cell-penetrating peptide by intramolecular cyclization with a triazole bridge. *Chem Commun (Camb).* 52: 2261-2264.
- Splith, K., Hu, W., Schatzschneider, U., Gust, R., Ott, I., Onambele, L.A., Prokop, A., Neundorf, I. (2010): Protease-activatable organometal-peptide bioconjugates with enhanced cytotoxicity on cancer cells. *Bioconjug Chem.* 21(7): 1288-1296.