



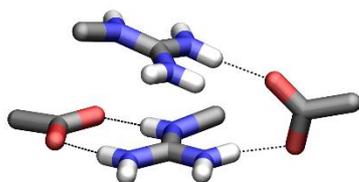
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Ústav organické chemie a biochemie
Akademie věd České republiky, v. v. i.
Institute of Organic Chemistry and Biochemistry
of the Czech Academy of Sciences

PRESS RELEASE

A new way to get a drug molecule into the cell?

Prague, November 1, 2017 – The research team of Pavel Jungwirth from the Institute of Organic Chemistry and Biochemistry of the CAS (IOCB Prague) in cooperation with scientists at the Lund University (Sweden) discovered a new way how peptides or proteins can bind to each other. The results of their research were published in the prestigious scientific journal *Proceedings of the National Academy of Sciences of the USA (PNAS)*.



A detailed view of the chemical structure of the newly discovered binding motif.

We know from school that ions or charged groups carrying a charge of the same sign repel each other. In aqueous media, however, this electrostatic repulsion is significantly reduced and can be compensated by other molecular forces.

Scientists from Prague and Lund used this fact to unravel a new binding motif, wherein the positively charged side chains of arginine amino acids bind to each other in the presence of negatively charged terminal groups or side chains of peptides or proteins. Subsequently, they have identified an analogous motif in more than two hundred biologically significant structures in a protein database.

"This newly discovered binding motif will help us to rationalize why the peptides with a high content of arginine easily pass through cell membranes and how to use this knowledge for designing efficient transport of drug molecules into the cell," says Pavel Jungwirth.

Pavel Jungwirth's Group built upon their long-term research aimed at understanding the unusual properties of the arginine amino acid, which is sometimes referred to in biochemical circles as the "arginine magic".

Article: Giulio Tesei, Mario Vazdar, Malene Ringkjøbing Jensen, Carolina Cragnell, Phil E. Mason, Jan Heyda, Marie Skepö, Pavel Jungwirth, and Mikael Lund. Self-association of a highly charged arginine-rich cell-penetrating peptide. *PNAS* **2017**, 114 (43), 11428-11433.

The Institute of Organic Chemistry and Biochemistry of the Czech Academy of Sciences / IOCB Prague (www.iocb.cz) is a leading scientific institution in the Czech Republic, recognized internationally. Its primary mission is basic research in the fields of chemical biology and medicinal chemistry, organic and material oriented chemistry, chemistry of natural compounds, biochemistry and molecular biology, physical chemistry, theoretical chemistry, and analytical chemistry. The Institute has a long tradition and expertise in medicinal chemistry and drug development together with the pharma industry. Antivirals discovered by Antonín Holý and developed further by Gilead Sciences revolutionized the treatment of AIDS and hepatitis B and have significantly improved lives of millions of people around the globe.

Prof. Pavel Jungwirth (born 1966, Prague) is a Czech physical chemist, university lecturer and science popularizer. He studied physics at the Faculty of Mathematics and Physics of Charles University (MMF UK), Prague with a major in chemical physics. He pursued a Ph.D. in computational chemistry at the J. Heyrovský Institute of Physical Chemistry of the CAS, where his advisor was Prof. R. Zahradník. He held postdoc and visiting scientist positions at University of California, Irvine, at South California University, Los Angeles, and at Hebrew University, Jerusalem. Currently he is a Distinguished Chair at IOCB Prague and also a Full Professor (external faculty) in the Department of Chemical Physics and Optics, MFF UK and is a Finland Distinguished Professor at Technical University in Tampere.

Pavel Jungwirth has published over 300 original papers in prestigious journals including Science, Nature Chemistry, and PNAS with more than 11,000 citations. He is a senior editor of the Journal of Physical Chemistry published by the American Chemical Society. He is a member of the Learned Society of the Czech Republic and recipient of numerous awards, including the Spiers Prize by the Royal Society of Chemistry (UK) and the Jaroslav Heyrovský Honorary Medal for Merit in Chemical Sciences by the Czech Academy of Sciences. Popular science articles by Pavel Jungwirth have appeared in the weekly Respekt and in popular science shows broadcast by the Czech Radio and Czech TV.

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PRESS CONTACT:

Pavel Jungwirth: pavel.jungwirth@uochb.cas.cz, mob: +420 739 002 228

Dušan Brinzanik – Communications: dusan.brinzanik@uochb.cas.cz, mob: +420 731 609 271