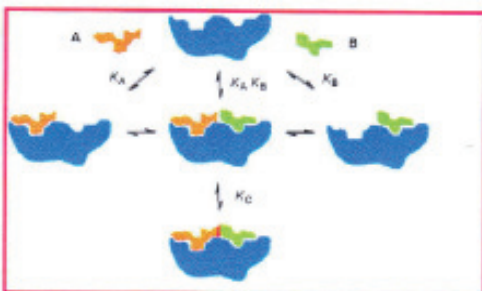


KEYWORDS

- » Chemical biology
- » drug discovery
- » high-throughput screening
- » protein ligands
- » proteases
- » phosphatases
- » protein-protein interactions



CONTACT

Prof. Dr. Jörg Rademann
Pharmazeutische/Medizinische
Chemie

Institut für Pharmazie
Brüderstraße 34
04103 Leipzig
Fon +49-(0)341-97 36801
Fax +49-(0)341-97 36889
rademann@uni-leipzig.de
www.uni-leipzig.de/~pharm/phache/

MEDICINAL CHEMISTRY – DISCOVERY OF PROTEIN BINDERS FOR MODULATING LIVING SYSTEMS

Protein-binding small molecules are valuable tools for studying structure and function of their target macromolecules. The group develops novel chemical and biochemical methods for the identification and optimization of protein ligands using ligations of small molecular fragments and fragment-ligation assays. Aim of this work is to gain a more profound understanding of contributions of molecular substructures to the overall activity of protein ligands. Results of this research are translated into protein-specific, chemical probes which are employed for the structural and functional characterization of proteins as well as for imaging purposes. Optimized chemical probes can be the starting point for hit-to-lead development and in special cases are investigated with respect to their pharmacological potential. Disease-related protein targets of the group include various proteases, protein tyrosine phosphatases and protein-protein interactions.

Special attention is given to the cooperative enhancement of fragment-interactions. For the purpose, we employ multivalent, polymer-attached protein ligands, e.g. "peptide polymers". These are nano-sized functional tools and imaging probes for chemical biology. Peptide polymers allow for the multivalent enhancement of the activity towards intracellular protein-protein interactions.

All research projects of the group are based on a strong background in synthetic organic chemistry with a focus on the polymer-supported synthesis of bioactive molecules, peptidomimetics and carbohydrate derivatives. The integration of C-acylation into standard N-acylation (peptide) chemistry was instrumental for the development of novel ligation chemistry and biochemistry.

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