

Please note updates of events on [www.unicat.tu-berlin.de](http://www.unicat.tu-berlin.de)

Lecturer: **Prof. Annette Beck-Sickinger**, Institute of Biochemistry, Leipzig University, Germany

Title: ***Immobilisation and Controlled Activation of Peptides and Proteins***

Abstract: Multifunctionality is gaining more and more importance in the field of improved biomaterials. Accordingly, specific and selective modification of surfaces is required. Peptides feature a broad chemical variability and are versatile mediators between inorganic surfaces or polymers and living cells. The fully biodegradable polymer poly(lactic-co-glycolic acid) (PLGA) is frequently used for biomedical implants and can be applied as nanoparticles for drug delivery<sup>1</sup>. On the other side inorganic surfaces, e. g. titanium oxide or silicium oxide are frequently used inorganic materials that require specific attachment of cells. We developed several strategies for immobilization of peptides and proteins on hydrophobic, hydrophilic and inorganic surfaces using selectively binding peptides<sup>2</sup> or bioorthogonal ligation<sup>3</sup> and click- or click-like reactions. In the next step, we developed linkers for controlled release of therapeutics, e. g. chemokines like interleukin 8<sup>4</sup> or stromal derived factor 1 alpha (SDF-1 alpha)<sup>5</sup>, which has been shown to promote and initiate migration of progenitor cells. Chemokines were produced recombinantly and chemically modified by native chemical ligation strategy<sup>6</sup>. Peptide linkers were obtained by solid phase peptide synthesis. By the combination of different strategies we could induce cell spreading and cell viability of osteoblasts on inorganic surfaces<sup>7</sup>, migration of eEPCs towards hydrogel slices<sup>8</sup> and activation of chemokines by light<sup>9</sup>. Accordingly, novel types of biomaterials with significantly improved surfaces have been developed.

Find more about Prof. Beck-Sickinger [http://www.biochemie.uni-leipzig.de/agbs/default\\_en.asp](http://www.biochemie.uni-leipzig.de/agbs/default_en.asp)

Date: **Wednesday, October 16<sup>th</sup>, 2013 at 5:15 pm**

Location: **TU Berlin, Department of Chemistry  
Straße des 17. Juni 115, 10623 Berlin  
Building C, Lecture Hall C 264**

<sup>1</sup> Hassert R, Hoffmeister PG, Pagel M, Hacker M, Schulz-Siegmund M, Beck-Sickinger AG. On-resin synthesis of an acylated and fluorescence-labeled cyclic integrin ligand for modification of poly(lactic-co-glycolic acid). *Chem Biodivers.* **2012**;9(11):2648-58.

<sup>2</sup> Bachmann M, Goede K, Beck-Sickinger AG, Grundmann M, Irbäck A, Janke W. Microscopic mechanism of specific peptide adhesion to semiconductor substrates. *Angew Chem Int Ed Engl.* **2010**;49(49):9530-3.

<sup>3</sup> Steinhagen M, Holland-Nell K, Meldal M, Beck-Sickinger AG. Simultaneous "One pot" expressed protein ligation and CuI-catalyzed azide/alkyne cycloaddition for protein immobilization. *ChemBioChem.* **2011**; 12(16):2426-30.

<sup>4</sup> Nordsieck K, Pichert A, Samsonov SA, Thomas L, Berger C, Pisabarro MT, Huster D, Beck-Sickinger AG. Residue 75 of interleukin-8 is crucial for its interactions with glycosaminoglycans. *ChemBioChem.* **2012**;13(17):2558-66.

<sup>5</sup> Bellmann-Sickert K, Baumann L, Beck-Sickinger AG. Selective labelling of stromal cell-derived factor 1 $\alpha$  with carboxyfluorescein to study receptor internalisation. *J Pept Sci.* **2010**;16(10):568-74.

<sup>6</sup> David R, Günther R, Baumann L, Lühmann T, Seebach D, Hofmann HJ, Beck-Sickinger AG. Artificial chemokines: combining chemistry and molecular biology for the elucidation of interleukin-8 functionality. *J Am Chem Soc.* **2008**;130(46):15311-7.

<sup>7</sup> Hassert R, Pagel M, Ming Z, Häupl T, Abel B, Braun K, Wiessler M, Beck-Sickinger AG. *Bioconjug Chem.* **2012**;23(10):2129-37.

<sup>8</sup> Baumann L, Prokoph S, Gabriel C, Freudenberg U, Werner C, Beck-Sickinger AG. *J Control Release.* **2012**;162(1):68-75.

<sup>9</sup> Baumann L and Beck-Sickinger AG *Angewandte Chem. Int. Ed.* 2013, in press.

Coffee and tea will be served thirty minutes prior to the lecture start.  
**Guests are cordially invited to attend!**

Prof. Dr. Matthias Driess, Chair of the Cluster of Excellence Unicat