

Biography of H.P. Jennissen

Career

Herbert P. Jennissen is University-Professor of Physiological Chemistry (em.) (1989) at the Institute of Physiological Chemistry in the Medical Faculty of the University of Duisburg Essen in D-45147 Essen, Germany. He holds a Dr. med. degree (1970) from the Albert-Ludwigs-University of Freiburg (Germany) and a Habilitation in Physiological Chemistry (1977) from the Ruhr-University of Bochum (Germany). Before coming to Essen he was University-Professor at the Institute of Physiological Chemistry and Nutritional Physiology (1981-1989) in the Faculty of Veterinary Sciences at the Ludwig-Maximilians-University of Munich (Germany). Co-opted faculty memberships were held in the Faculties of Chemistry at the Universities of Bochum, Munich and Duisburg-Essen.

Extracurricular teaching:

A. Post-Graduate PhD Research Programs (Graduiertenkollegs):

1. **GRK1993-95 of RWTH Aachen and the University-GHS Essen** (Term: 1993-1995)

Founding Chairman Aachen: Prof. Dr. G. Ondracek; Local Chairman Essen: Prof. Dr. H. P. Jennissen

GRK-Title: "Biomaterials – Composite Materials in the Application Field of Medicine"

Project Jennissen: "Adsorption Mechanisms of Model Proteins on Modified Agarose and Silica Surfaces"

2. **GRK689 of the University of Duisburg-Essen** (Term: 2001-2004)

Chairmen: Prof. Dr. G. Schmid, Prof. Dr. H. Rehage, Prof. Dr. H.P. Jennissen

GRK-Title: "Reactivity in the Vicinity of Surfaces"

Project Jennissen: "Functionalization of Metal Surfaces and Immobilization of Mediator Molecules for the Preparation of Bioactive Implants with Drug Delivery Properties"

B. Academic Teaching in Foreign Countries:

1997 Biochemistry lectures were held at the State Medical Academy of Nizhny Novgorod, Russia;

2008 Biochemistry Lecture Cycle was held in Bait Albatterjee Medical School, Jeddah, Saudi Arabia.

Research Activities

Research activities of Prof. Jennissen and coworkers addressed the following themes:

(1) Enzymology (1970-1995): Ca^{++} -dependent protein kinases and ubiquitin-proteasome system with discovery of novel enzyme "Ubiquitin-Calmodulin Ligase" (EC 6.3.2.21); **(2) Hydrophobic Interaction Chromatography (HIC) (1976–2006):** Introduction of "Critical Hydrophobicity HIC"; **(3) Protein Adsorption on Biomaterials (1976–present):** Introduction of positive and negative surface cooperativity and adsorption-desorption hysteresis of proteins on surfaces, development of "Hystallosteric Protein Adsorption" model; **(4) Recombinant human protein production (1999-2016):** Production of bone morphogenetic protein-2 (BMP-2) and vascular endothelial growth factor (VEGF); **(5) Proteomics (2018-2020):** First *in situ* proteomic scale protein layer analysis on hip and dental implants, introduction of new field of "Implantomics"; **(6) Surface Structuring of Metals (1999–2015):** Acidic micro- and nano-structuring of implants for wettability enhancement. **(7) Surface Wettability (1999–2015):** Introduction of "imaginary and complex" contact angles on biomaterial surfaces leading to "hyperhydrophilic properties"; **(8) Polymer Based Scaffolds (2014–present):** Electrospinning of 2D and 3D PDLLA implant carriers. **(9) Affinity Constant Defined Biohybrids (Stats) (2021–present):** Paracrine BMP-2 and VEGF releasing biohybrids as "Pico-Stats" leading to sustained steady state concentrations *in situ*. **(10) Receptors (2023–present):** First description of angiogenic receptor for rhBMP-2 with picomolar affinity and evidence for inverse agonism mechanism.

Award: His achievements on protein-surface interactions in the field of Affinity- and Hydrophobic Interaction Chromatography were recognized with the "Pierce Award in Affinity Chromatography" in 2007 in New York, USA.

Start-Up Venture:

1997/98 *Entwicklungs- und Forschungszentrum für Mikrotherapie gGMBH* (EFMT), Bochum (DE)

EFMT acquires his patent application "Method for Immobilizing Mediator Molecules on Inorganic and Metal Implant Materials" (EP 1 035 879 B1).

2002 *Cofounding of MorphoPlant GmbH* together with Dr. Axel Kirsch and Dr. Markus Laub.

Acquirement of patent (EP 1 035 879 B1) from EFMT by MorphoPlant GmbH.

Objective: Development of bioactive and biofunctional implant devices for clinical translation.

2002-2016 **Chief Scientific Officer** (CSO) of MorphoPlant GmbH Development of 11 granted patent families with ca. 65 issued country-specific patents.

2016 Retirement from MorphoPlant GmbH.

International Symposia Organization:

" 7th International Symposium on Affinity Chromatography and Interfacial Macromolecular Interactions"

Aug. 17-21, 1987, Oberammergau, Germany

Symposium Chairman: H.P. Jennissen; Co-Chairman W. Müller

Abstracts: 120 abstracts published in Biol. Chem. Hoppe-Seyler 368, 733-785 (1987)

Proceedings: 35 Papers published in Makromol. Chem. Macromol. Symp. 17, 1-497 (1988)

"International Essen Symposia on Biomaterials: Fundamentals and Clinical Applications"

1998-2010 Major Co-organizers: D. Bingmann, A. Fischer, H.P. Jennissen, et al. of 12 Symposia from 1998 at the University-GHS Essen to 2010 at the renamed University of Duisburg-Essen (UDE-Symposia), with support from the Wissenschaftsministerium NRW, Lord Majors of the City of Essen and the "Fördervereinigung" of the City of Essen".

Abstracts: Full page abstracts of the Symposia were published in the journal *BIOMaterialien Vol. 7-11 (2006-2010)*

Proceedings: The proceedings of 11 Symposia were published in the journal *Materialwiss. Werkstofftech. (Mat.Sci.Engineer.Technol) Vol. 30-41 (1999-2010).*