Германо-белорусский научно-исследовательский проект
с финансовой поддержкой через Международное бюро BMBF

Разработка биоаффинных поверхностей как средства детекции биомаркеров для предсказания, диагностики и мониторинга заболеваний»

Entwicklung von Bio-affinittätsoberflächen zum Nachweis von Proteom-Biomarkern zur Vorhersage, Diagnose und Verlaufsbestimmung von Erkrankungen

2009-2010

Vadim Shmanai, *Ph.D.,*

Institute of Physical organic chemistry,
National Academy of Sciences of Belarus

Participants of the project

- **University of Potsdam**, Institute of nutrition.

  Institut für Ernährungswissenschaft.
  Lehrstuhl für Physiologie und Pathophysiologie der Ernährung.
  Prof. Dr. F. J. Schweigert;

- **BioAnalyt GmbH**, spin-off company, University of Potsdam University of Potsdam;

- **Institute of Physical organic chemistry,** Group for chemistry of bionojugates and molecular biotechnology.

German partners

Prof. Florian J. Schweigert

Background of the project

1. **2001.** A paper in an international publication.

2. **2002-2003.** Correspondence by e-mail.
   Visit to Germany.

3. **2004.** Search for a grant.

4. **2005-2007.** project «Biomarkers»
   Foundation: Arbeitsgemeinschaft industrieller Forschungsvereinigungen 'Otto-von-Guericke' e.V. (AiF); contract/grant: ProINNO II.

5. **2007-2008.** «EisenEx» 'Otto-von-Guericke' e.V. (AiF).

6. **2008.** Information from Belarusian office of 7th FP.

Scientific background of the project

molecular biology – life sciences

Genomics: ***genome*** (genes: codes of protein structure);

Proteomics: ***proteome*** (proteins: structure, function in organisms).

The main instrument: mass-spectrometry of proteins;

Metabolomics: metabolome (products of metabolism: influence of metaboloms on function of proteins).

Organization of the project

Potsdam:

experience in proteomics; modern instruments (mass-spectrometers)

+

Minsk:

experience in creating of bio-affinity surfaces

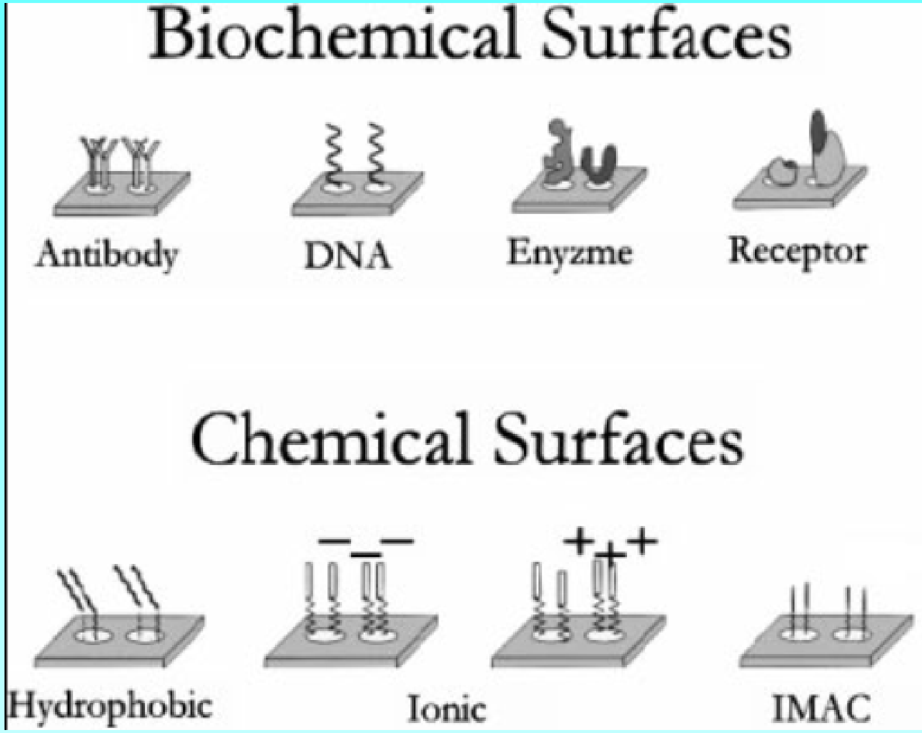
=

New level in proteomic research,

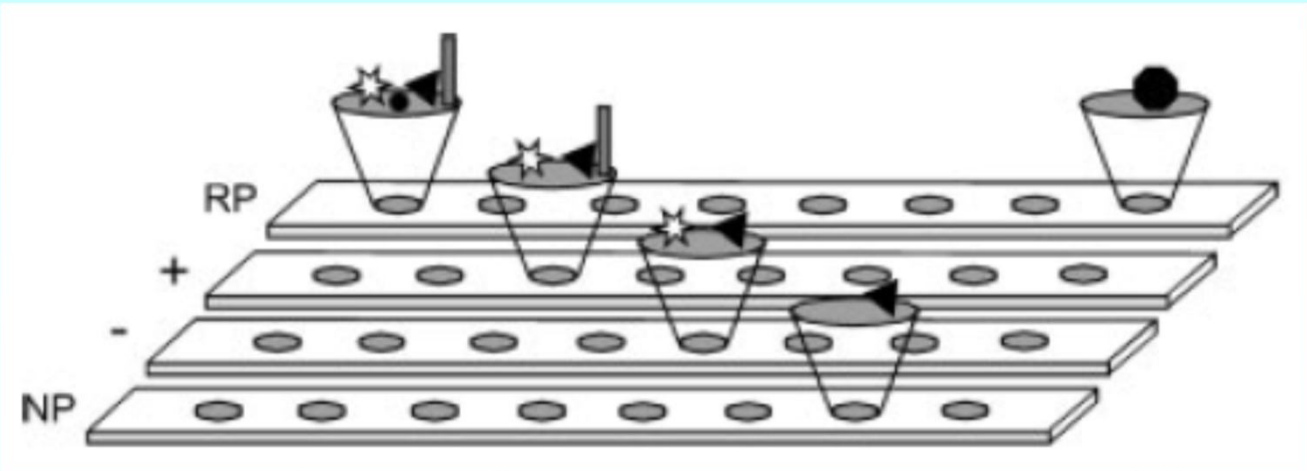
innovation techniques.

Proteomics:

Mass-spectrometry of proteins (MALDI-TOF).



Chips (targets)



Prior results

1. Chemical modification of alluminium surface for mass-spectrometry targets.

2. Development of surfaces for specific binding of glyco-proteins.

3. Highly efficient express-method for model proteins modified with sugars (main proteome elements responsible for diabet complications).

Publications

RAPID COMMUNICATIONS IN MASS SPECTROMETRY
Rapid Commun. Mass Spectrom. 2007; **21**: 1–6
Published online in Wiley InterScience (www.interscience.wiley.com) DOI: 10.1002/rcm.2793

RCM

Application of phenylboronic acid modified hydrogel affinity chips for high-throughput mass spectrometric analysis of glycated proteins

Sergey Gontarev[1,3], Vadim Shmanai[1,3], Simone K. Frey[2], Maksim Kvach[1,3] and Florian J. Schweigert[1,2*]

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[2]Deptartment of Physiology and Pathophysiology, Department of Nutritional Science, University of Potsdam, Arthur-Scheunert-Allee 114–116, 14558 Nuthetal, Germany
[3]Institute of Physical Organic Chemistry, National Academy of Sciences of Belarus, Surganova str. 13, Minsk 220072, Rep. of Belarus

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JOURNAL OF MASS SPECTROMETRY
J. Mass Spectrom. 2007; **42**: 1504–1513
Published online 27 July 2007 in Wiley InterScience
(www.interscience.wiley.com) DOI: 10.1002/jms.1259

JMS

Modification of aluminum chips for LDI mass spectrometry of proteins

Vadim Shmanai,[1,3*] Sergey Gontarev,[1,3] Simone K. Frey[2] and Florian J. Schweigert[2]

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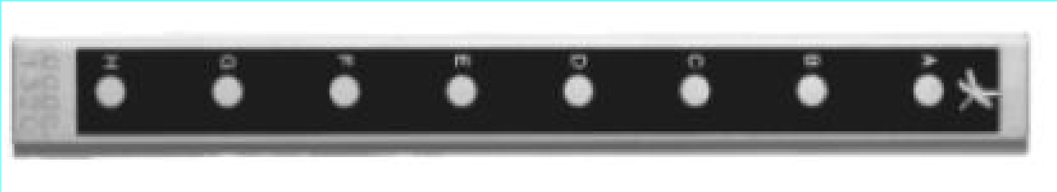
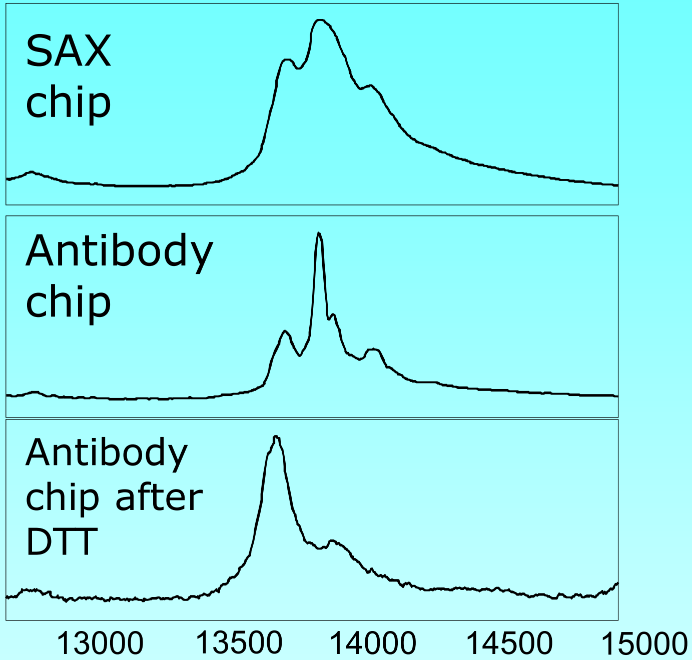
[2] Department of Physiology and Pathophysiology, Department of Nutritional Science, University of Potsdam, Arthur-Scheunert-Allee 114-116, 14558 Nuthetal, Germany
[3] Institute of Physical Organic Chemistry, National Academy of Sciences of Belarus, Surganov str. 13, Minsk 220072, Rep. of Belarus

Content of the project



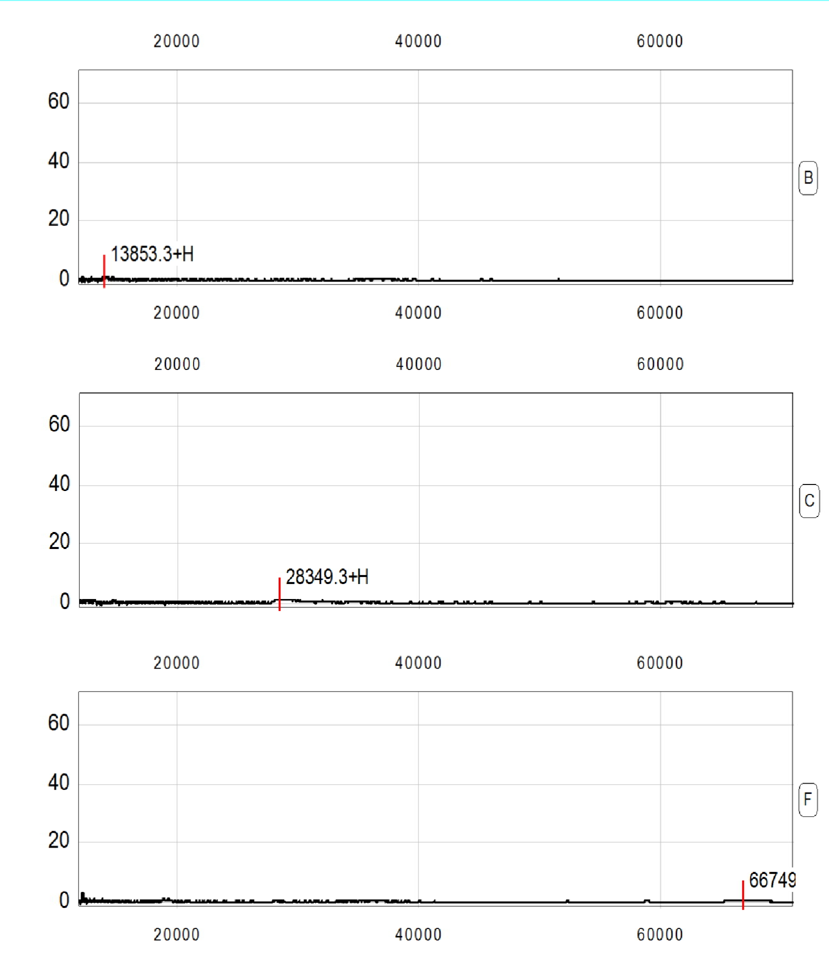


Antobodies – mostly specific receptors.

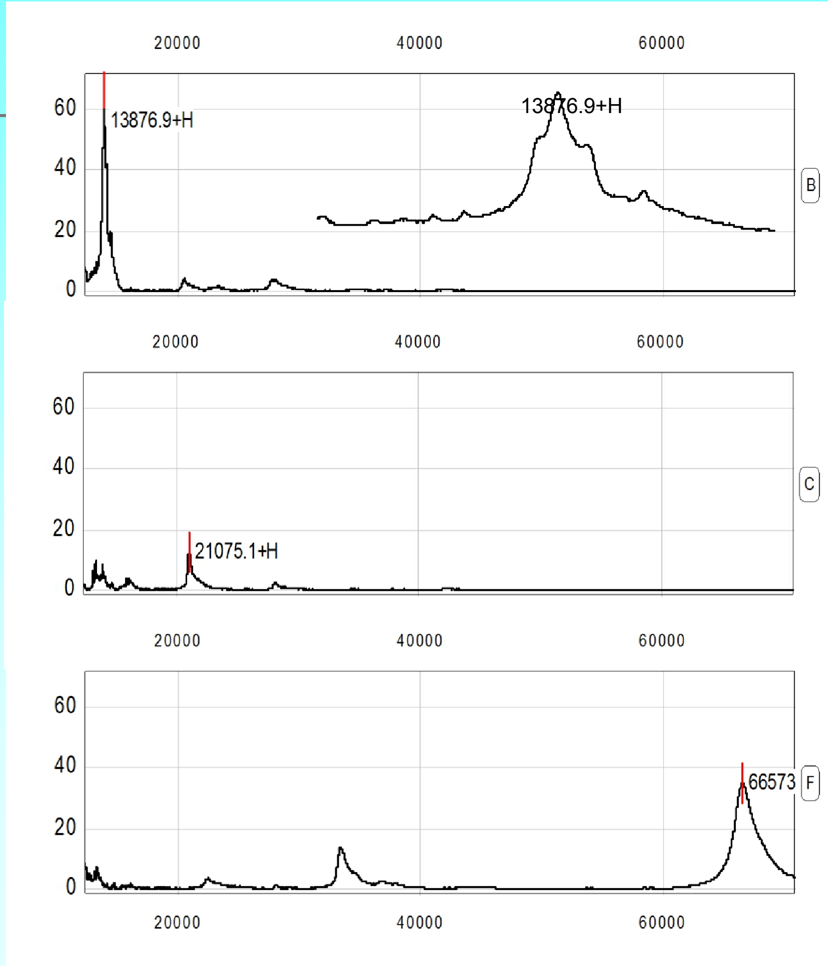
Development of methods for modification of mass-spectrometry targets with specific antibodies.

Results of the project

Ciphergen Surface Modification



Noval Surface Modification



Plans:

1. **Diagnostics and monitoring of diabetes:** from models to real bio-samples.

2. **Mass-spectrometry of proteins:** development of universal bio-affinity surfaces.

3. **Immobilized antibody:** development of innovate bio-analytical systems.

How to enhance co-work?

- Financial support of publications;
- Financial support of short visits;
- Search of partners and information about grants and programs;
- Correct examination of projects;
- Getting young scientists to take part in co-work;
- Parallel financial support;
- Simplification of moving of equipment and materials;
- Changing of approach to participation of small companies in Belarus.

Share results!

- Publications;
- Transfer of materials and methods;
- Seminars.

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5 November 2010 г.

http://www.bcp.fu-berlin.de/chemie/bc/LMK/Vadim_Shmanai.html

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Vadim Shmanai Ph.D.

Institute of Physical Organic Chemistry, Minsk, Belarus

05.11.2010, 12:30 Uhr

"Expanding the toolbox - a proposal of reagents and materials for biochemistry, molecular biology, proteomics and nanotechnology"

Institut für Chemie und Biochemie, Hahn-Meitner-Bau

Lise-Meitner-Hörsaal, Thielallee 63, 14195 Berlin

СПАСИБО ЗА ВНИМАНИЕ!

VIELEN DANK FÜR IHRE AUFMERKSAMKEIT!

THANK YOU FOR YOUR ATTENTION!