



COST ACTION B28
«ARRAY TECHNOLOGIES FOR BSL3 AND BSL4
PATHOGENS»

2th Management Committee and WG1, WG2, WG3, WG4, WG5
Meetings
November 21 & 22, 2005

Meeting Venue:

**Institute of Virology,
Slovak Academy of Sciences
Dubravska cesta 9
845 05 Bratislava
Slovakia**

Local Organiser:

Rudolf TOMAN
Laboratory for Diagnosis and Prevention
of Rickettsial and Chlamydial Infections
Institute of Virology
Slovak Academy of Sciences
Dubravska cesta 9
845 05 Bratislava
Slovakia
Tel: +421 2 593 02418
Fax: +421 2 547 4284
E-mail: virutoma@savba.sk

WORKING GROUP Meetings

Monday 21 November

9.00 - 9.30

- Registration, welcome and Opening of the WG meetings

9.30 - 10.45

Working Group 1 : Array technologies

- Presentation of the partners in WG1
- U. Nübel, E. Ehrentreich-Förster, F. Bier, W. Witte: DNA microarray for parallel detection of 14 bacterial biothreat agents.
- J. Frey: Low-cost micro-arrays for the rapid identification and detection of a panel of virulence and antibiotic-resistance genes in Gram-positive pathogens. ([reschedule WPgenomics](#))
- Jacques Schrenzel: **Non-cognate hybridization systems (NCHS), an open strategy to identify the genetic background of the analyzed strains.**
- G.W. Griffith, J.P. Day, H.M. Davey: **Use of flow cytometry for the detection of airborne fungal spores.**
- E. Piskin: Detection of pathogenic bacteria by novel nanotechnology based biochips.

WG1 Participants to reimburse:

1.	Karl Walravens	Belgium	To be reimbursed as WG1member
2.	Ulrich NUBEL	Germany	To be reimbursed as WG1member
3.	Åke LUNDKVIST Replaced by Mats Forsman as WG member	Sweden	To be reimbursed as MC member
4.	Henrik NORDSTROM	Sweden	To be reimbursed as WG1member
5.	Garteth Wyn Griffith	UK	To be reimbursed as WG1member
6.	Joachim FREY	Switzerland	To be reimbursed as MC member
7.	Erhan Piskin	Turkey	To be reimbursed as external invited expert
8.	Jacques SCHRENZEL	Switzerland	To be reimbursed as MC member
9.	Michael Muvey	Canada	Not to be reimbursed
10.	Martien Broekhuijsen	The Netherlands	To be reimbursed as WG1member
11.	Levente BODROSSY REPLACED AS WG MEMBER BY BERND APPEL	Austria	To be reimbursed as MC member

10.45-11.15

- Coffee break

11.15-12.30

Working group 2: Antigenicity

- Presentations of the partners in WG2
- N. H. Beyer, N. Heegaard: Immunochemical and mass spectrometric identification of polypeptide and protein biotoxins.
- P. Renesto: Post –genomic analysis of intracellular pathogens.
- M. Sakarellos-Daitsiotis: **Sequential Oligopeptide Carriers (SOCn) for anchoring multiple copies of antigenic/immunogenic peptide epitopes for immunoassays and vaccines.**
- Stefan de Buck, M. Putz and C.P. Muller: "Conjugate vaccines based on peptides and low molecular weight molecules: antigenicity, immunogenicity, monoclonal antibodies"
-

WG2 Participants to reimburse

1.	Maria SAKARELLOS-DAITSIOTIS	Greece	To be reimbursed as MC member
2.	Niels HEEGAARD	Denmark	To be reimbursed as MC member
3.	Claude MULLER	Luxemburg	To be reimbursed as MC member
4.	Patricia RENESTO-AUDIFFREN	France	To be reimbursed as MC member
5.	Jaroslav URBAN Replacement by Frangoulidis Dimitrios as a WG member	Czech Republic	To be reimbursed as MC member
6.	Axel Cloeckart	France	To be reimbursed as WG2 member

12.30-14.00

Lunch

14.00-15.15

Working group 3: Proteomics and glycomics

- Presentations of the partners in WG 3
- J. Stulik, A. Macela: Proteome study of Francisella tularensis.
- V. Veljkovic, G. Alavantic: Identification of conserved information encoded by primary structure of the surface glycoproteins of H5 influenza viruses: application in development of diagnostic tests and vaccine for H5N1 virus?
- R. Toman, L. Skultety: **Structure and function of lipopolysaccharide antigens of *Coxiella burnetii*, the causative agent of Q fever.**
- L. Skultety, R. Toman: Identification of *Coxiella burnetii* proteins using MALDI and ESI MS/MS techniques.
- M. Ducatez, J. Kremer, D. Revets, W. Ammerlaan, F. Fack, C. P. Muller: Differential proteomics to identify biomarkers of infectious agents in human and animals.

WG3 Participants to reimburse

1.	Jiri STULIK	Czech Republic	To be reimbursed as MC member
2.	Ales MACELA	Czech Republic	To be reimbursed as WG3 member
3.	N. Helena BEYER	Denmark	To be reimbursed as WG3 member
4.	Rudolf TOMAN	Slovakia	Not to be reimbursed
5.	Ludovit SKULTETY	Slovakia	Not to be reimbursed
6.	Fred FACK	Luxemburg	To be reimbursed as WG3 member
7.	Veljko VELJKOVIC	Serbia and Montenegro	To be reimbursed as MC member
8.	Pedro Anda	Spain	To be reimbursed as WG3 member
9.	Constantinos SAKARELLOS	Greece	To be reimbursed as WG3 member

15.15-15.45

- Coffee break

15.45-17.00

Working Group 4: Genomics

- Presentations of the partners in WG 4
- P. Wattiau, D. Fretin, P. Butaye. Development of a multi-species detection strategy.
- Sergei N. Shchelkunov et al. "Sequencing and phylogenetic analyses of the target genes and development of oligonucleotide microarray techniques for identification of variola, monkeypox, cowpox, vaccinia, and chickenpox viruses"
- J. Frey: Low-cost micro-arrays for the rapid identification and detection of a panel of virulence and antibiotic-resistance genes in Gram-positive pathogens.

WG4 Participants to reimburse

1.	Pierre Wattiau	Belgium	To be reimbursed as WG4 member
2.	J.L. Gala	Belgium	To be reimbursed as MC member
3.	Gargan Alavantic	Serbia and Montenegro	To be reimbursed as WG4 member
4.	Anders ALDERBORN	Sweden	To be reimbursed as WG4 member
5.	Stefan Panaiotov	Bulgaria	To be reimbursed as WG4 member
6.	Ivan IVANOV	Bulgaria	To be reimbursed as WG4 member
7.	Bart van Rotterdam	The Netherlands	To be reimbursed as WG4 member
8.	Sergei N. Shchelkunov	Russia	To be reimbursed as invited expert
9.	Michel Zygmund	France	To be reimbursed as WG4 member
10.	Heinrich Neubauer Replaced by Tomaso	Germany	To be reimbursed as WG4 member
11	M. David ALBERT	France	To be reimbursed as WG4 member

WORKING GROUP Meetings Tuesday 22 November

9.00- 10.15

Working group 5: Microbiology (Bacteriology, Mycology and Virology)

- Presentations of the partners in WG 5
- Ivanov, P. Padeshki, T. Kantardjiev, S. Panaiotov: A seronegative case of oculoglandular tularemia confirmed with PCR.
- Ivanov, T. Kantardjiev, R. Nenova, S. Panaiotov, P. Padeshki: Detection of human brucellosis with PCR directly in serum samples.
- **M. Elschner, A. Rassbach, F. Melzer:** The German reference laboratories for Anthrax, Glanders and Brucellosis.
- Pierre-Alain Fonteyne. Molecular markers for identification of BSL3 fungi.
- D. Albert, N. Madani, B. Garin-Bastuji: The French reference laboratories for Brucellosis and Tularemia; Missions, Activities and Research objectives.
- Nigel Silman: Development of Multipathogen DNA Microarrays

WG5 Participants

1.	Frank Vandenbussche	Belgium	To be reimbursed as WG5 member
2.	Todor Kantardjev	Bulgaria	To be reimbursed as MC member
3.	Plamen PADESHKI	Bulgaria	To be reimbursed as WG5 member

4.	Mandy ELSCHNER	Germany	To be reimbursed as MC member
5.	Richard SUMMERBELL	The Netherlands	To be reimbursed as WG5 member
6.	Anders SJÖSTEDT	Sweden	To be reimbursed as MC member
7.	Patrick Butaye	Belgium	To be reimbursed as MC Chair
8.	Nigel J. Silman	UK	To be reimbursed as WG5 member
9.	Veljko VELJKOVIC	Serbia and Montenegro	To be reimbursed as MC member
10.	Isabel Jado	Spain	To be reimbursed as WG5 member
11.	Raquel Escudero	Spain	To be reimbursed as WG5 member
12.	Bruno Garin Bastuji	France	Not to be reimbursed
13.	Manfred WEIDMANN	Germany	To be reimbursed as MC member
14.	Pierre-Alain FONTEYNE	Belgium	To be reimbursed as WG5 member
15.	Nora MADANI	France	To be reimbursed as WG5 member

10.15-11.00

- Coffee break

11.00 – 17.00

2th Management Committee Meeting

1. Welcome to participants : P. Butaye
2. Adoption of the agenda : P. Butaye
3. Approval of the Minutes of the 1-th M.C. meeting (Brussels): P. Butaye
4. Information from the Chair: P. Butaye
 - a. STSM: election of the selection committee P. Butaye
 - b. Web site installation P. Butaye
 - c. Annual report
5. Information from the Scientific Officer M. Pascu
6. Election of chair of the Working Group 1
7. Election of chair of the Working Group 2
8. Election of chair of the Working Group 3
9. Election of chair of the Working Group 4
10. Election of chair of the Working Group 5
11. Working plans for the future P. Butaye
12. Place and date of the next meetings P. Butaye

13. Any other business

COST ACTION B28

“Array technologies for BSL3 and BSL4 pathogens”

LIST OF NOMINATED MANAGEMENT COMMITTEE MEMBERS

Version: 23 January, 2007

AUSTRIA

Hr. Dr. Levente BODROSSY

TO BE REIMBURSED

ARC Seibersdorf research GmbH, Abt. Biogenetics
A-2444 Seibersdorf
Tel.: +43 50550 3548
Fax.: +43 50550 3444
e-mail: levente.bodrossy@arcs.ac.at

BELGIUM

Jean-Luc GALA

TO BE REIMBURSED

Université catholique de Louvain
Laboratoire de Technologies Moléculaires Appliquées
Clos Chapelle-aux-Champs 30,46
1200 BRUXELLES
Tel : +32-2-64 31 65
Fax : +32-2-64 31 66
E-mail : gala@lbcm.ucl.ac.be

Pierre-Alain FONTEYNE (Substitute)

TO BE REIMBURSED AS WG5 MEMBER

Scientific Institute of Public Health
Mycology Section
Juliette Wytsmanstraat 14

1050 BRUSSELS
Tel : +32-2-642 55 33
Fax : +32-2-642 55 19
E-mail : PAFonteyne@iph.fgov.be

Patrick BUTAYE

Veterinary and Agrochemical Research Center
Dept of Bacteriology and Immunology
Groeselenberg 99
B-1180 Brussels
Tel : +32 2 379 04 28
Fax : +32 2 379 04 01
E-mail : pabut@var.fgov.be

TO BE REIMBURSED

BULGARIA

Mr. Todor KANTARDJIEV

National Center of Infections and Parasitic Diseases
26 Janko Sakasov str.
1504 Sofia,
Tel.: (+359 2) 9446999
E-mail: kantardj@ncipd.netbg.com

TO BE REIMBURSED

Stefan PANAIOTOV, PhD

Bulgarian Association of Microbiologist
Department of Microbiology
Janko Sakazov 26
1504 Sofia, Bulgaria
tel./fax: (+359 2) 8465520
fax: (+359 2) 9861724
e-mail: spanaiotov@yahoo.com

TO BE REIMBURSED

CZECH REPUBLIC

Dr. Jaroslav URBAN

Transport Research Centre
Lisenska 33a
CZ-636 00 BRNO
Tel: +420 549429312
Fax: +420 548423711

TO BE REIMBURSED

Dr. Jiri STULIK

University of Defence
Facility of Military Health Service
Trebesska 1575
CZ- 500 01
Hradek Kralove
Czech Republic

TO BE REIMBURSED

Tel: + 420 495518833
Fax: +420 495512451
E-mail: jstulik@pmfhk.cz

DENMARK

Niels HEEGAARD

Department for Auto Immunology
Statens Serum Institut 81/536
Artillerivej 5
DK-2300 Copenhagen S
Denmark
Tel:+45 32683378
Fax: +45 32683876
NHE@ssi.dk

TO BE REIMBURSED

FRANCE

Dr. Patricia RENESTO-AUDIFFREN

Unité des Rickettsies – CNRS UMR 6020
Faculté de Médecine
27 boulevard Jean Moulin
13385 MARSEILLE
tel: 0491324625
fax: 0491387772
gsm: 06 2271 2347
patricia.renesto@medecine.univ-mrs.fr

TO BE REIMBURSED

GERMANY

Prof. Dr. Frank HUFERT

Institut für Virologie
Universitätsklinikum Göttingen
Kreuzberggring 57
37075 Göttingen
Tel: + 49 (0)551-39-5872
Fax: + 49 (0)551-39-4471
Mobil: +49-177-277-33-71
Mobilfax + 49-177-99-277-33-71
e-mail: fhufert@gwdg.de

NOT TO BE REIMBURSED

Dr. Manfred WEIDMANN (Replacement)

Universitätsklinikum
Unit for Microbiological Preparedness and
Emerging Infectious Diseases
Stefan-Meier-Str. 19
79104 Freiburg

TO BE REIMBURSED

Tel.: +49 (0)761 203 5436
Fax: +49 (0)761 203 5434
manfred.weidmann@uniklinik-freiburg.de

Dr. Mandy ELSCHNER

Bundesforschungsinstitut für Tiergesundheit
Institut für Bakterielle Infektionen und Zoonosen
Naumburger Straße 96a
07743 Jena
Tel.: +49 (0)3641 804-262
E-mail: mandy.elschner@fli.bund.de

TO BE REIMBURSED

GREECE

Dr. Maria SAKARELLOS

University of IOANNINA
IOANNINA
E-mail: msakarel@cc.uoi.gr

TO BE REIMBURSED

LUXEMBOURG

Claude MULLER

Laboratoire National de Santé
Département d'Immunologie
20 A. rue Auguste Lumière
P.O. Box 1102
L-1011 LUXEMBOURG
Tel : +352 49 06 04
Fax : +352 49 06 86
E-mail : claude.muller@lns.etat.lu

TO BE REIMBURSED

NETHERLANDS

Wieger HOMAN

National Institute of Public Health and the Environment
Antoni van Leeuwenhoeklaan 9
3721 MA Bilthoven
Tel : +31 300 2742909
E-mail : wieger.homan@rivm.nl

TO BE REIMBURSED

Sybren DE HOOG

Centraal Bureau voor Schimmelcultures
Uppsalalaan 8
3584 CT Utrecht
Tel : +31 30 2122663

TO BE REIMBURSED

E-mail : de.hoog@cbs.knaw.nl

SERBIA AND MONTENEGRO

Dr. Veljko VELJKOVIC

Senior Scientist

Center for Multidisciplinary Research and Engineering

Institute of Nuclear Science VINCA

Mihajla Petrovica Alasa 24

P.O. BOX 522

11001 BELGRADE

tel: +381 11 2440 781

fax: +381 11 453 686

E-mail: druid@vin.bg.ac.yu

E-mail2: veljko01@hotmail.com

TO BE REIMBURSED

SLOVAKIA

Dr. Rudolf TOMAN

Laboratory for Diagnosis and Prevention

of Rickettsial and Chlamidial Infections

Institute of Virology

Slovak Academy of Sciences

Dubravska cesta 9

SK – 845 05 Bratislava

Slovakia

Tel: +421 2 593 02418

Fax: +421 2 547 4284

E-mail: Virutoma@savba.sk

NOT TO BE REIMBURSED

SPAIN

SWEDEN

Åke LUNDKVIST

Karolinska institutet

Mikrobiologiskt och tumörbiologiskt centrum

Box 280

171 77 Stockholm

Tel : 08-524 863 20

E-mail : ake.lundkvist@mtc.ki.se

TO BE REIMBURSED

Anders SJÖSTEDT

Umeå Universitet

Universitetssjukhuset

TO BE REIMBURSED

901 85 Umeå
Tel : +46 090 785 11 20
E-mail : anders.sjostedt@climi.umu.se

SWITZERLAND

Mr. Prof. Jacques SCHRENZEL
Hôpitaux universitaires de Genève HUG
Laboratoire de Génomique Fonctionnelle
Division des Maladies infectieuses
21, rue Micheli-du-Crest
CH-1211 Genève 14
Tél.: +41 22 372 93 37
Fax: +41 22 372 98 30
E-mail: jacques.schrenzel@hcuge.ch

TO BE REIMBURSED

Mr. Prof. Dr. Joachim FREY
University of Berne
Institute of Veterinary Bacteriology
Laenggassstrasse 122
CH-3012 Berne
Tél.: +41 31 6312 414
Fax: +41 31 6312 634
E-mail: joachim.frey@vbi.unibe.ch

TO BE REIMBURSED

UNITED KINGDOM

ESF-COST OFFICE

Professor Mihail PASCU
ESF-COST Office
149, Av. Louise
PO Box 12
B-1050 Brussels
Tel: +32-2-533 38 16
Fax: +32-2-533 38 90
E-mail: mpascu@cost.esf.org

NON-COST COUNTRIES

CANADA

Dr. Michael MULVEY
Canadian Science Centre for Human and Animal Health
National Microbiology Laboratory

NOT TO BE REIMBURSED

1015 Arlington Street
Winnipeg
MANITOBA R3E 3R2
Canada

TOTAL NUMBER OF PARTICIPANTS : 53
TOTAL NUMBER OF PARTICIPANTS TO REIMBURSE : 49

CVs and ABSTRACTS

I

IDENTIFICATION OF CONSERVED INFORMATION ENCODED BY PRIMARY STRUCTURE OF THE SURFACE GLYCOPROTEINS OF H5 INFLUENZA VIRUSES: APPLICATION IN DEVELOPMENT OF DIAGNOSTIC TESTS AND VACCINE FOR H5N1 VIRUS

Veljko Veljkovic

Center for Multidisciplinary Research and Engineering
Institute of Nuclear Sciences VINCA
P.O.Box 522, 11001 Belgrade
Serbia and Montenegro

The variability of antigenic determinants of the H5N1 avian influenza virus represents the main obstacle in development of a safe and effective vaccine against this highly pathogenic virus. We previously demonstrated that primary structures of variable proteins encode specific information which is responsible for their biological function. This information, which is insensitive on mutations, also allows recognition of these proteins by the host immune system. The bioinformatics analysis performed by the informational spectrum method, a virtual spectroscopy method for analysis of nucleotide and protein sequences, revealed the highly conserved information encoded by primary structure of the hemagglutinin HA1 subunit of H5N1 virus. Possible application of this information in development of diagnostic tests and an effective protective vaccine against H5 influenza viruses has been considered.

Curriculum vitae

Personal Data:

Name: Veljko Veljković

Date of Birth: January 17, 1947

Place of Birth: Belgrade, Yugoslavia

Address: Institute of Nuclear Science VINCA, Center for Multidisciplinary
Research, P.O. BOX 522, 11001 Belgrade, Yugoslavia

E-mail address: druid@vin.bg.ac.yu

Phone: (+381) 11 2440 871

Fax: (+381) 11 245 36 86

Education:

PhD, 1973, Theoretical Physics, University of Belgrade.

MS, 1971, Chemical Engineering, University of Belgrade.

BSc, 1969, Metallurgy, University of Belgrade.

Professional Experience

Laboratory for Theoretical Physics, Institute of Nuclear Science Vinca
Belgrade, Yugoslavia (1969 – 1985)

Research area: Solid state physics, Material science, Biophysics

Center for Multidisciplinary Research, Institute of Nuclear Science Vinca, Belgrade,
Yugoslavia (1986 – present)

Research area: Bioinformatics, Protein engineering, AIDS research, Material science

Scientific interest

1969-1975 Solid state physics: Development of the general model pseudopotential and its application in research of electronic properties, phonon spectra and superconductivity of metals and intermetallic compounds.

1976-1980 Biophysics: Chemical carcinogenesis, toxicology and molecular pharmacology

1981-1987 Bioinformatics: Development of the informational spectrum method and its application in structure/function analysis of nucleotide and protein sequences

1988-present AIDS research: Interactions between HIV envelope protein and immune system and role of the molecular mimicry in pathogenesis of AIDS.

Bioinformatics: Structure/function analysis of protein and nucleotide sequences.

Nuclear waste management and remediation: Investigation of stability of solid matrix – impurity systems

SELECTED REFERENCES

Monographs

Veljković V. Theoretical approach to preselection of cancerogens and chemical carcinogenesis. Gordon & Breach, New York, 1980.

Ho M.W., Veljkovic V., Burcher S. Unraveling AIDS, Vital Health Publishing, Danbury, 2005.

Review articles

Veljkovic V., Johnson E., Metlas R. Analogy of HIV-1 to oncogenic viruses : implications for the pathogenesis of AIDS. *Cancer J.* **8**, 308 (1995).

Veljkovic V., Kohler H., Muller S. Aids vaccine: state of the art at the beginning of the third millennium. *Int. Rev. Immunol.*, **23**, 369 (2004).

Veljkovic V., Veljkovic N., Metlas R. Molecular makeup of HIV-1 envelope protein. *Int. Rev. Immunol.*, **23**, 383 (2004).

Metlas R., Veljkovic V. HIV-1 gp120 and immune network. *Int. Rev. Immunol.*, **23**, 413 (2004).

Veljkovic V., Metlas R. Application of VIP/NTM reactive natural antibodies in therapy of HIV disease. *Int. Rev. Immunol.*, **23**, 437 (2004).

Prljic J., Veljkovic N., Veljkovic V. Recombinant properties of the HIV-1 gp120 gene. *Int. Rev. Immunol.*, **23**, 447 (2004).

- Veljkovic V., Prljic J., Veljkovic T. Safety and ethical consideration of AIDS vaccine. *Int. Rev. Immunol.*, **23**, 465 (2004).
- Veljkovic V. HIV vaccine or stopping AIDS. (u monografiji: AIDS vaccine and related topics. Bourinbaiar A.S, edit., Research Signpost, Kerala, 2004 (ISBN: 81-7736-112-0).

Articles published in peerreviewed journals

Solid State Physics

Pseudopotential theory

- Veljković V, Slavić I. Simple general-model pseudopotential. *Phys. Rev. Lett.*, 29, 105 (1972).
- Veljković V. The dependence of the Fermi energy on the atomic number. *Phys. Lett.*, 45A, 41 (1973).
- Veljković V., Lalović D. General model pseudopotential for positive ions. *Phys. Lett.*, 45A, 59 (1973).

Superconductivity

- Veljković V., Lalović D., Superconductivity and the periodic system. *Phys. Rev.*, 11, 4242 (1975).
- Veljković V., Janjić J., Tošić B. Ion-ion interaction and superconductivity of metals and intermetallic compounds. *J. Mater. Sci.*, 13, 1138 (1978).
- Veljković V., Lalović D., A stoichiometry criterion for high T_c superconductors. *Phys. Lett. A*, 142 528 (1989).

Material science

- Veljković V., Tošić B., Janjić J., Chemical bond in intermetallic compounds and its influence on electrical properties. *Scr. Metall.*, 9, 459 (1975).
- Blažon M., Stanojević B., Veljković V., Effect of alloying elements on the formation of boride layer on steel. *Scr. Metall.*, 9, 1153 (1975).
- Vukajlović F., Zeković S., Veljković V., Resistivity calculations for liquid metals. *Physica*, 92B, 66 (1977).
- Davidović M., Vukajlović F., Zeković S., Veljković V. The temperature dependence of the resistivity of liquid lead. *Phil. Mag.*, 36, 1257 (1977).

Zeković S., Vukajlović F., Veljković V. Phonon spectra of alkali metals, *Physica*, 114B, 316 (1982).

Nuclear waste management

Raicevic S., Wright J., Veljkovic V., Conca J. Theoretical stability assessment of uranyl phosphates and apatites: selection of amendments for in situ remediation of uranium. *Sci. Total Env.* (in press)

Biophysics

Chemical carcinogenesis and molecular pharmacology

Veljković V., Lalović D., Theoretical prediction of mutagenicity and carcinogenicity of chemical substances. *Cancer Biochem. Biophys.*, 1, 295 (1976).

Veljković V., Lalović D., Simple theoretical criterion of chemical carcinogenesis. *Experientia*, 33, 1228 (1977).

Veljković V., Lalović D., Correlation between the carcinogenicity of organic substances and their spectral characteristics. *Experientia*, 34, 1342 (1977).

Veljković V., Ajdačić V., Cytostatic activity of organic compounds and their average quasi-valence number. *Experientia*, 34, 639 (1977).

Ajdačić V., Veljković V. Antibiotic activity of organic compounds and their average quasi-valence number. *Experientia*, 34, 633 (1977).

Bioinformatics

Veljković V., Ćosić I., Dimitrijević B., Lalović D., Is it possible to analyze DNA and protein sequence by the method of digital signal processing?. *IEEE Trans.*, BME-32, 337 (1985).

Veljković V., Ćosić I., A novel method of protein analysis for prediction of biological function. *Cancer Biochem. Biophys.*, 9, 139 (1987).

Veljković V., Lalović D. The global average DNA base composition of coding regions may be determined by the electron-ion interaction potential. *Biosystems*, 23, 311 (1990).

AIDS Research

Veljković V., Metlaš R., Identification of nanopeptide from HTLV3, LAV and ARV-2 envelope gp120 determining binding to T4 cell surface protein. *Cancer Biochem. Biophys.*, 10, 191 (1988).

Veljković V., Metlaš R., Sequence similarity between HIV-1 envelope protein gp120 and human proteins: a new hypothesis on protective antibody production. *Immunol. Lett.*, 26, 193 (1990).

Metlaš R., Veljković V., Paladini R., Pongor S., Protein and DNA sequence similarity between the V3 loop of HIV-1 envelope protein gp120 and immunoglobulin variable region. *Biochem. Biophys. Res. Commun.*, 179, 1056 (1991).

Veljković V., Metlaš R., Identification of immunoglobulin recombination elements in HIV-1 envelope gene. *Immunol.Lett.*, 31, 11 (1991).

Veljković V., Metlaš R., HIV and idiotypic T-cel regulation: another view., *Immunol. Today*, 15, 39 (1992).

Veljković V., Metlaš R., Raspopović J., Pongor S., Spectral and sequence similarity between VIP and the second conserved region of HIV envelope glycoprotein gp120: possible consequences on prevention and therapy of AIDS., *Biochem. Biophys. Res. Commun.*, 189, 705(1992).

Veljković V., Metlaš R., Potentially negative effects of AIDS vaccines Based on recombinant viruses carrying HIV-1 derived envelope gene: a warning on AIDS vaccine development., *Vaccine*, 11, 291 (1993).

Veljković V., Metlaš R., Vojvodić D., Čavor Lj., Pejinović N., Dujčić A., Zakhariev S., Guarnaccia C., Pongor S., Natural autoantibodies cross-react with a peptide derived from the second conserved region of HIV-1 envelope glycoprotein gp120., *Biochem. Biophys. Res. Commun.* 196, 1019 (1993).

Metlaš R. Veljković V., Does HIV-1 gp120 manipulate human immune network. *Vaccine* 13, 355 (1995).

Metlaš R., Skerl V., Colombatti A., Pongor S., Veljković V. Reactivity of AIDS patients sera with peptide derived from HIV-1 NY5 gp120 V3 loop and consensus sequence of collagens. *AIDS Res. & Human Retrovir.* 10, 1421 (1994).

Metlaš R., Skerl V., Veljković V., Colombatti A., Pongor S., Immunoglobulin-like domain of HIV-1 envelope glycoprotein gp120 encodes putative internal image of some common human proteins. *Viral Immunol.* 7, 215 (1994).

Metlaš R., Skerl V., Veljković V., Pongor S., Further evidence for the relationship between HIV-1 gp120 V3 loop and T cell receptor delta-chain structures. *Immunol. Lett.* 47, 25 (1995).

Veljković V., Johnson E., Metlaš R. Analogy of HIV-1 to oncogenic viruses: possible implications for the pathogenesis of AIDS. *Cancer J.* 8, 308 (1995).

Veljković V., Johnson E., Metlaš R. Molecular basis of the inefficacy and possible harmful effects of AIDS vaccine candidates based on HIV-1 envelope glycoprotein gp120. *Vaccine* 15, 437 (1997).

Prljic J., Veljković N., Doliana R., Colombatti A., Johnson E., Metlaš R., Veljković V. Identification of an complete and active recombinational hot spot within the HIV-1 gp120 gene: possible implications for the AIDS vaccine development. *Vaccine*, 17, 1462 (1999).

Metlaš R., Trajkovic D., Srdic T., Veljković V., Colombatti A. Human immunodeficiency virus V3 peptide-reactive antibodies are present in normal HIV-negative sera. *AIDS Res. Hum. Retrovir.*, 15, 671 (1999).

Metlaš R., Trajković D. Srdic T., Veljković V. Colombatti A. Anti-V3 and anti-IgG antibodies of healthy individuals share complementarity structures *J. Acquir. Immune. Defic. Synd.*, 21, 266 (1999).

Veljković V., Metlaš R., Kohler H., Urnovitz H.B., Prljic J., Veljković N., Johnson E., Muller S. AIDS epidemic at the beginning of the third millennium: time for a new AIDS vaccine strategy. *Vaccine*, 19, 1855 (2001).

Veljković V., Metlaš R., Jevtović Dj., Stringer W. The role of passive immunization in hiv-positive patients : a case report. *Chest*, 120, 662 (2001).

Kohler H., Muller S., Veljković V., No hope for an AIDS vaccine soon. *AIDScience*, 2, 5 (2002).

Veljković V., Muller S., Kohler H. Does VaxGen hide the breakthrough Infections. *Lancet*, 361, 1743 (2003).

Veljković V., Branch D.R., Metlaš R., Prljic J., Vlahovicek K., Pongor S., Veljković V. Design of peptide mimetics of HIV-1 gp120 for prevention And therapy of HIV disease. *J. Pep. Res.*, 62, 1 (2003).

Veljković V., Muller S., Kohler H. AIDSVAX results: an important open question. *Vaccine*, 21, 3528 (2003).

Veljkovic N., Metlas R., Prljic J., Manfredi R., Branch D., Stringer W. Veljkovic V. Antibodies reactive with C-terminus of the second conserved region of HIV-1gp120 as possible prognostic marker and therapeutic agent for HIV disease. *J. Clin. Virol.* 31, 39 (2004).

Patents

Veljković V., Prljic J., Veljković N., Metlaš R.

NUCLEOTIDE SEQUENCE FOR DETECTION AND CHARACTERIZATION OF THE HIV-1 FIELD ISOLATES PARTICIPATING IN THE RECOMBINATION PROCESSES DIRECTED BY THE CHI SEQUENCE. EP01043407A3, 10/18/2000.

Veljković V., Metlaš R., Marković D.

POLYPEPTIDES MIMICKING THE ACTIVITY OF HUMAN ERYTHROPOIETIN. EP00928292A1, WO09749729A1, CA02258871AA, AU03435397A1, 07/14/1999.

Veljković V., Metlaš R., Marković D.

POLYPEPTIDER SOM ETTERAPER AKTIVITETEN TIL HUMANT ERYTROPOIETIN. NO00985993A, 02/24/1999.

Veljković V., Metlaš R.

POLYPEPTIDES INVOLVED IN THE INTERACTION OF HIV GP120 WITH THE FUSIN, AND THE CC-CKR-5 CO-RECEPTORS THEREOF. GB02319252A, 05/20/1998

Veljković V., Metlaš R.

PEPTIDES WHICH REACT WITH ANTIBODY REPRESENTING THE PROGNOSTIC MARKER FOR HIV DISEASE PROGRESSION. EP00808846A3, GR98300031T1, CA02205077AA, JP10237100A2, 08/26/1998

Veljković V., Metlaš R.

PEPTIDE, DIE MIT ANTIKOERPERN REAGIEREN, DIE DEN FORTSCHRITT DER HIV-ERKRANKUNG MARKIEREN. EP00808846TD, 06/25/1998.

Veljković V., Metlaš R.

PEPTIDOS QUE REACCIONAN CON ANTICUERPOS QUE REPRESENTAN EL MARCADOR DE PRONOSTICO DE LA PROGRESION DE LA ENFERMEDAD DEL SIDA. ES02113333T1, 05/01/1998

Veljković V., Prljic J., Veljković N., Metlaš R.

SEQUENZA NUCLEOTIDICA PER LA RIVELAZIONE E CARATTERIZZAZIONE DI ISOLATI OSPEDALIERI DI HIV-1 CHE PARTECIPANO NEI PROCESSI DI RECOMBINAZIONI. ITMI980776A0, 04/10/1998

Veljko Veljkovic earned his doctoral degree in theoretical physics from the Institute of Nuclear Science VINCA in 1973. He has conducted research and published numerous papers in this area and in his other major areas of interest: Material Science, Biophysics, Bioinformatics, Protein Engineering, and AIDS Research. Currently working as an AIDS researcher at the Center of Multidisciplinary Research and Engineering at VINCA, Dr. Veljkovic has contributed considerably to the understanding of the HIV virus, its protein envelope, and how the immune system recognizes or fails to recognize the HIV virus by its protein signature. His current research is oriented toward the development of a more effective AIDS therapy and prevention.

II

DNA Hybridization Electrical Detection for Concentrations Lower Than 1nM Target ssDNA, Based on Interdigitated Al/Al₂O₃ Capacitors

Luis Moreno, JL Gala, Denis Flandre on behalf of the NANOTIC group

Abstract

Several electrical methods have been studied for the detection of DNA hybridization on silicon chips, using capacitance or resistance changes of micro-arrays of electrode fingers. In this work, we study the possibility of detecting DNA hybridization using 1 micron thick aluminum interdigitated capacitors structures covered by metal oxides (obtained by anodization), i.e. Al₂O₃, fabricated on Si substrate. Silver precipitation over Au-nanoballs labeled target DNA is used for hybridization signal enhancement. Devices are prepared for low and high frequency measurements. Electrical variables under study are the resonance frequency shift, the capacitance between electrode fingers, and the effect on the MOS capacitance through the substrate. All methods show capability for detecting down to the 0.1 nM target ssDNA concentration, which makes it competitive with traditional fluorescent labeled target probes method but with potentially much

lower cost under mass-volume production, as well as unique miniaturization and portability features. The ongoing project is to assess the detection B. anthracis specific DNA targets by use of this new nanodevice.

CV Luis Moreno

Luis Moreno Hagelsieb, born in Guadalajara, Mexico. Chemical Engineer. He obtained his Master of Science in Electrical Engineering in 1999 from the Instituto Politécnico Nacional (IPN – CINVESTAV) in Mexico. From 1992 to 2001 he worked as a new product introduction, problem solving, line transfers, product/process design at Motorola Inc in Guadalajara, Mexico in different areas like Wafer processing, Front and Back packaging processes and Metal finishing in the semiconductor areas specially on Schottky diodes, Thyristor, SCR and TMOS devices. Currently he is working towards the PhD as a researcher in the microelectronics department of the Université Catholique de Louvain (UCL) in Belgium, on Sensor technologies and CMOS processing, focusing on DNA biosensors.

Publications, Conferences and Presentations:

G. Berger, L. Moreno, I. Martinez, A. Akheyar, R. Harboe Sørensen, G. Ryckewaert, D. Flandre; “Edge Effects and Tilt Dependency of Heavy Ion Irradiation SEE Characterization In PN junctions”; RADECS conference Padova, It, September 2002.

P;E; Lobert, D. Bourgeois, R. Pampin, A. Akheyar, L. Hagelsieb, D. Flandre, J. Remacle, “Immobilization of DNA on CMOS compatible materials”, Sensors and Actuators B, 92, 2003, pp. 90-97

R. Pampin, L.M. Hagelsieb, P.E. Lobert, L. Géry, J.-P. Raskin, J. Remacle and D. Flandre, “Integrated Low-Cost Micro-Sensors for DNA Sensitive Electrical Detection”, ASM Conference on Bio-, Micro-, and Nanosystems, New York, NY, July 7-10, 2003, 2 posters.

G. Laurent, L. M. Hagelsieb, D. Lederer, P. E. Lobert, D. Flandre, J. Remacle and J.-P. Raskin, “DNA electrical detection based on inductor resonance frequency in standard CMOS technology”, 33rd European Solid-State Device Research Conference – ESSDERC 2003, Estoril, Portugal, Sept. 16-18, 2003, pp. 171-174.

R. Pampin, L. M. Hagelsieb, G. Laurent, B. Fouttier, P. E. Lobert, J.-P. Raskin, J. Remacle, D. Flandre, “Micro-Capteurs à faible coût pour la détection électrique d’ADN”, Feynman Workshop, UCL, Louvain-la-Neuve, Belgium, Septembre 2003.

L. Moreno-Hagelsieb , P. E. Lobert , R. Pampin , D. Bourgeois , J. Remacle and D. Flandre, “Sensitive DNA electrical detection based on interdigitated Al/Al₂O₃ microelectrodes”, Sensors and Actuators B: Chemical, Volume 98, Issues 2-3, 15 March 2004, pp 269-274

L. Moreno-Hagelsieb, P.E. Lobert, R. Pampin, J. Remacle, and D. Flandre, “DNA Detection Based On Capacitive Al₂O₃/Al Microelectrodes”, IEEE MEMS 2004 Conference Proceedings, January 2004, Pages 308-311.

L. Moreno-Hagelsieb, B. Fouttier, G. Laurent, C. Poleunis, P. Bertrand, J.P. Raskin, J. Remacle, D. Flandre, “Aluminum Anodizing Process Characterization for DNA Attachment and Electrical Detection”, The Eight international Conference on Miniaturised Systems for Chemistry and Life Sciences MicroTAS 2004, Malmö, Sweden, 26-30 September 2004.

N. Deneff, L. Moreno-Hagelsieb, G. Laurent, B. Fouttier, J. Remacle, D. Flandre and J.-P. Raskin, “RF Detection of DNA Based on CMOS Inductive and Capacitive Sensors”, The 34th European Microwave Conference (EuMC) as part of the European Microwave Week 2004, Amsterdam, The Netherlands, October 12-14, 2004.

B. Fouttier, L. Moreno-Hagelsieb, D. Flandre and J. Remacle, "Comparison of DNA Detection Methods Using Nanoparticles and Silver Enhancement”, IEE Proc.-Nanobiotechnology, Vol. 152, No. 1, February 2005.

L. Moreno-Hagelsieb, B. Fouttier, C. Poleunis, B. Olbrechts, A. Pallandre, B. Nysten, J.P. Raskin, P. Bertrand, J. Remacle, D. Flandre, “Materials Surface and Silanization Characterization for DNA Attachment”, Feynman Workshop, UCL, Louvain-la-Neuve, Belgium, February 2005.

L. Moreno-Hagelsieb, R. Pampin, G. Laurent, C. Poleunis, P. Bertrand, J.P. Raskin, D. Flandre, B. Foultier, J. Remacle, "Investigation of the Electrical Detection of Hybridized DNA Concentrations lower than 1 nM, based on CMOS Compatible Al Capacitors Coated with Metal Oxides", Second Focused Workshop on Electronic Recognition of Bio-molecules ERBM2, Beckman Institute for Advanced Science and Technology University of Illinois in Urbana, Illinois, USA September 7-9, 2005.

III

CURRICULUM VITAE

SHCHELKUNOV, SERGEI NIKOLAEVICH

Present Titles: Head of the Department of Molecular Biology of Genomes, State Research Center of Virology and Biotechnology «Vector», Koltsovo, Novosibirsk region, Russia

Professor of the Department of Molecular Biology, Novosibirsk State University, Novosibirsk, Russia

Address:

Work: Institute of Molecular Biology, State Research Center of Virology and Biotechnology «Vector», KOLTSOVO, Novosibirsk Region 630559, RUSSIA.

Phone/Fax: +7(383)3366428;

E-mail: snshchel@vector.nsc.ru

Date and Place of Birth:

March 7, 1951, Blagoveshchensk-on-Amur, Russia

Marital Status:

Married to Galina A. Shchelkunova (Ph.D., Virology) and has two sons (Nikolai and Nikita)

Education and Experience:

1968-1973; Student, Novosibirsk State University, Faculty of Natural Sciences, Department of Biochemistry, Novosibirsk, Russia; *biochemistry*.

1973-1975; Post-graduate student, Institute of Organic Chemistry, Russian Academy of Sciences, Novosibirsk, Russia; *biochemistry*.

1975-1977; Senior Scientists, All-Union Research Institute of Molecular Biology, NPO Vector, Koltsovo, Novosibirsk region, Russia; *molecular biology*.

1977-1986; Head of the Laboratory of Genetic Engineering, All-Union Research Institute of Molecular Biology, NPO «Vector», Koltsovo, Novosibirsk region, Russia.

1986 - present time; Head of the Laboratory of Poxvirus Molecular Genetics, 1993 - present time; Head of the Department of Molecular Biology of Genomes; Institute of Molecular Biology, State Research Center of Virology and Biotechnology «Vector», Koltsovo, Novosibirsk region, Russia.

1980-1984; Lecturer, Department of Molecular Biology, Novosibirsk State University, Novosibirsk, Russia; *genetic engineering*.

1984-1991; Assistant Professor, Department of Molecular Biology, Novosibirsk State University, Novosibirsk, Russia; *microbiology, genetic engineering*.

1991 - present time; Professor, Department of Molecular Biology, Novosibirsk State University, Novosibirsk, Russia; *microbiology, genetic engineering*.

1994 - Soros Professor.

1998 - corresponding member of the Russian Academy of Natural Sciences.

List of the most important recent publications:

1. Shchelkunov, S.N., Stavitskii, S.B., Batenko, L.I., Gashnikov, P.V., Shchelkunova, G.A., Kostyrev, O.A. and Sandakhchiev, L.S. Viral chimeric protein including a determinant of myelin basic protein is capable of inducing allergic encephalomyelitis in guinea pigs. 1991. Biomedical Science, vol. 2, p. 493-497.

2. Shchelkunov, S.N., Blinov, V.M., Totmenin, A.V., Marennikova, S.S., Kolykhalov, A.A., Frolov, I.V., Chizhikov, V.E., Gutorov, V.V., Gashnikov, P.V., Belanov, E.F., Belavin, P.A., Resenchuk, S.M., Andzhaparidze, O.G. and Sandakhchiev, L.S. Nucleotide sequence analysis of the region of variola virus HindIII M,L,I genome fragments. 1993. Virus Research, vol. 27, p. 25-35.

3. Shchelkunov, S.N., Ryazankina, O.I. and Gashnikov, P.V. The gene encoding the late nonstructural 36K protein of vaccinia virus is essential for virus reproduction. 1993. Virus Research, vol. 28, p. 273-283.

4. Ryazankina, O.I., Muravlev, A.I., Gutorov, V.V., Mikrjukov, N.N., Cheshenko, I.O. and Shchelkunov, S.N. Comparative analysis of the conserved region of the orthopoxvirus genome encoding the 36K and 12K proteins. 1993. *Virus Research*, vol. 29, p. 281-303.
5. Shchelkunov, S.N., Blinov, V.M., Resenchuk, S.M., Totmenin, A.V. and Sandakhchiev, L.S. Analysis of the nucleotide sequence of 43 kbp segment of the genome of variola virus India-1967 strain. 1993. *Virus Research*, vol. 30, p. 239-258.
6. Senkevich, T.G., Muravnik, G.L., Pozdnyakov, S.G., Chizhikov V.E., Ryazankina, O.I., Shchelkunov, S.N., Koonin, E.V. and Chernos, V.I. Nucleotide sequence of XhoI fragment of ectromelia virus DNA reveals significant differences from vaccinia virus. 1993. *Virus Research*, vol. 30, p. 73-88.
7. Shchelkunov, S.N., Blinov, V.M. and Sandakhchiev L.S. Genes of variola and vaccinia viruses necessary to overcome the host protective mechanisms. 1993. *FEBS Letters*, vol. 319, p. 80-83.
8. Shchelkunov, S.N., Blinov, V.M. and Sandakhchiev, L.S. Ankyrin-like proteins of variola and vaccinia viruses. - *FEBS Letters*, 1993, vol. 319, p. 163-165.
9. Shchelkunov, S.N., Resenchuk, S.M., Totmenin, A.V., Blinov, V.M., Marennikova, S.S. and Sandakhchiev, L.S. Comparison of the genetic maps of variola and vaccinia viruses. - *FEBS Letters*, 1993, vol. 327, p.321-324.
10. Shchelkunov, S.N., Resenchuk, S.M., Totmenin, A.V., Blinov, V.M. and Sandakhchiev, L.S. Analysis of the nucleotide sequence of 48 kbp of the variola major virus strain India-1967 located on the right terminus of the conservative genome region. - *Virus Research*, 1994, 32, 37-55.
11. Shchelkunov S.N., Blinov V.M., Resenchuk S.M., Totmenin A.V., Olenina L.V., Chirikova G.B. and Sandakhchiev L.S. Analysis of the nucleotide sequence of 53 kbp from the right terminus of the genome of variola major virus strain India-1967. - *Virus Research*, 1994, v. 34, p. 207-236.
12. Shchelkunov S.N. and Totmenin A.V. Two types of deletions in orthopoxvirus genomes. - *Virus Genes*, 1995, v. 9, p. 231-245.
13. Shchelkunov S.N. Functional organization of variola major and vaccinia virus genomes. - *Virus Genes*, 1995, v. 10, p. 53-71.
14. Shchelkunov S.N., Massung R.F., Esposito J.J. Comparison of the genome DNA sequences of Bangladesh-1975 and India-1967 variola viruses. - *Virus Research*, 1995, v. 36, p. 107-118.
15. Shchelkunov S.N., Totmenin A.V., Sandakhchiev L.S. Analysis of the nucleotide sequence of 23.8 kbp from the left terminus of the genome of variola major virus strain India-1967. - *Virus Research*, 1996, v. 40, p. 169-183.

16. Seregin S.V., Babkina I.N., Nesterov A.E., Sinyakov A.N., Shchelkunov S.N. Comparative studies of gamma-interferon receptor-like proteins of variola major and variola minor viruses. - FEBS Lett., 1996, v.382, p. 79-83.
17. Massung R.F., Loparev, V.N., Knight, J.C., Totmenin, A.V., Chizhikov, V.E., Parsons, J.M., Safronov, P.F., Gutorov, V.V., Shchelkunov, S.N., Esposito, J.J. Terminal region sequence variations in variola virus DNA. - Virology, 1996, v. 221, p. 291-300.
18. Miller C.G., Shchelkunov S.N. and Kotwal G.J. The cowpox virus-encoded homolog of the vaccinia virus complement control protein is an inflammation modulatory protein. - Virology, 1997, v. 229, p. 126-133.
19. Sugimoto C., Kitamura T., Guo J., Al-Ahdal M.N., Shchelkunov S.N., Otova B., Ondrejka P., Chollet J.-Y., El-Safi S., Ettayebi M., Gresenguet G., Kocagoz T., Chaiyarasamee S., Thant K.Z., Thein S., Moek., Kobayashi N., Taguchi F., and Yogo Y. Typing of urinary JC virus DNA offers a novel means of tracing human migrations. - Proc. Natl. Acad. Sci. USA, 1997, v. 94, p. 9191-9196.
20. Howard, J., Justus, D.E., Totmenin, A.V., Shchelkunov, S. and Kotwal, G.J. (1998) Molecular mimicry of the inflammation modulatory proteins (IMPs) of poxviruses: evasion of the inflammatory response to preserve viral habitat. - J. Leukoc. Biol. 64, p. 68-71.
20. Kotwal, G.J., Blasco, R., Miller, C.G., Kuntz, S., Jayaraman, S., and Shchelkunov, S.N. (1998) Strategies for immunomodulation and evasion by microbes: Important consideration in the development of live vaccines. In: Symposium in Immunology VII, Eibl, M.M. and Huber, C. eds., Berlin: Springer Verlag, p. 25-47.
21. Shchelkunov S.N., Safronov P.F., Totmenin A.V., Petrov N.A., Ryazankina O.I., Gutorov V.V., and Kotwal G.J. (1998) The genomic sequence analysis of the left and right species-specific terminal region of a cowpox virus strain reveals unique sequences and a cluster of intact ORFs for immunomodulatory and host range proteins. - Virology 243, p. 432-460.
22. Shchelkunov S.N., Totmenin A.V., Loparev V.N., Safronov P.F., Gutorov V.V., Chizhikov V.E., Knight J.C., Parsons J.M., Massung R.F., Esposito J.J. (2000) Alastrim smallpox variola minor virus genome DNA sequences. // Virology, v. 266, p. 361-386.
23. Shchelkunov S.N. (2000). Structure-function genome organization of orthopoxviruses pathogenic for humans. – In: Advances in Animal Virology (Shahid Jameel and Luis Villarreal, eds) Oxford & IBH Publishing Co. Pvt. Ltd. New Delhi-Calkutta. pp. 3-24.
24. Smith S.A., Mullin N.P., Parkinson J., Shchelkunov S.N., Totmenin A.V., Loparev V.N., Srisatjaluk R., Reynolds D.N., Keeling K.L., Justus D.E., Barlow P.N., Kowal G.J. (2000). Conserved surface-exposed K/R-X-K/R motifs and net

- positive charge on poxvirus complement control proteins serve as putative heparin binding sites and contribute to inhibition of molecular interactions with human endothelial cells: a novel mechanism for evasion of host defense. // *J. Virol.* V. 74, p. 5659-5666.
25. Uvarova E.A., Shchelkunov S.N. (2001). Species-specific differences in the structure of orthopoxvirus complement-binding protein. // *Virus Res.* V. 81, p. 39-45.
 26. Shchelkunov S.N., Totmenin A.V., Babkin I.V., Safronov P.F., Ryazankina O.I., Petrov N.A., Gutorov V.V., Uvarova E.A., Mikheev M.V., Sisler J.R., Esposito J.J., Jahrling P.B., Moss B., Sandakhchiev L.S. (2001). Human monkeypox and smallpox viruses: genomic comparison. // *FEBS Lett.* V. 509, p. 66-70.
 27. Shchelkunov S.N. (2001). Species-specific differences in organization of molecular virulence factors of variola, cowpox, and vaccinia virus. // *The Infectious Disease Review. Suppl.* 3, p. 16-25.
 28. Lapa S., Mikheev M., Shchelkunov S., Mikhailovich V., Sobolev A., Blinov V., Babkin I., Guskov A., Sokunova E., Zasedatelev A., Sandakhchiev L., Mirzabekov A. (2002) Species-level identification of orthopoxviruses with an oligonucleotide microchip. // *J. Clin. Microbiol.* V. 40, p. 753-757.
 29. Shchelkunov S., Totmenin A., Kolosova I. (2002). Species-specific differences in organization of orthopoxvirus Kelch-like proteins. // *Virus Genes.* V. 24, p. 157-162.
 30. Shchelkunov S.N., Totmenin A.V., Safronov P.F., Mikheev M.V., Gutorov V.V., Ryazankina O.I., Petrov N.A., Babkin I.V., Uvarova E.A., Sandakhchiev L.S., Sisler J.R., Esposito J.J., Damon I.K., Jahrling P.B., Moss B. (2002). Analysis of the monkeypox virus genome. // *Virology.* V. 297, P. 172-194.
 31. Laassri M, Chizhikov V, Mikheev M, Shchelkunov S, Chumakov K. (2003) Detection and discrimination of orthopoxviruses using microarrays of immobilized oligonucleotides. // *J. Virol. Methods.* V. 112, P. 67-78.
 32. Olson V.A., Laue T., Laker M.T., Babkin I.V., Drosten C., Shchelkunov S.N., Niedrig M., Damon I.K., Meyer H. (2004) Real-time PCR system for detection of orthopoxviruses and simultaneous identification of smallpox virus. // *J. Clin. Microbiol.* V. 42, P. 1940–1946.
 33. Shchelkunov S.N., Gavrilova E.V., Babkin I.V. (2005) Multiplex PCR detection and species differentiation of orthopoxviruses pathogenic to humans. // *Molecular and Cellular Probes*, V. 19. Issue 1. P. 1-8.
 34. Meyer H., Totmenin A., Gavrilova E., Shchelkunov S. (2005) Variola and camelpox virus-specific sequences are part of a single large open reading frame identified in two German cowpox virus strains. // *Virus Res.* V. 108. P. 39-43.

35. Shchelkunov S.N., Sandakhchiev L.S. (2005) Differential PCR diagnostic of orthopoxviruses. In: Radiation Inactivation of Bioterrorism Agents. L.G. Gazso and C.C. Ponta (Eds.) IOS Press, 2005. P. 137-145.
36. Kochneva G. , Kolosova I. , Maksyutova T. , Ryabchikova E., Shchelkunov S. Effects of deletions of *kelch*-like genes on cowpox virus biological properties. *Arch. Virol.* 2005. V. 150. No. 9. P. 1857-1870.

Current research interests and achievements:

The main fields of research interests are study of structure-function organization and evolution of orthopoxvirus genomes, their genes involved in overcoming of the host defense mechanisms and developing by genetic engineering methods microbiological strains which produce individual viral proteins with immunomodulating and antiinflammatory activities for basic studies of the features of these proteins and using them for medical purposes.

Conducts experiments on construction of bacterial and baculoviral strains producing variola, monkeypox, cowpox, and vaccinia virus proteins with antiinflammatory and immunosuppressive activities. Carries out PCR amplification, sequencing and comparative analysis of some chosen genes of cowpox, monkeypox, ectromelia, vaccinia and variola viruses. Have been created different types of recombinant vaccinia viruses, candidate DNA vaccines and edible vaccines on basis of transgenic plants. Developed a number of modern methods for species-specific identification of orthopoxviruses.

Author of the monographs: «Gene Cloning» (1986, Nauka), «Construction of Hybrid DNA Molecules» (1987, Nauka) , «Orthopoxviruses Pathogenic for Humans» (Coauthor - S.S. Marennikova, R.W. Moyer) (2005, Springer) and the handbook for Universities «Genetic Engineering» in two parts (1994, 1998; 1st edition, Novosibirsk State University) and 2nd edition (2004, Siberian University Publisher).

ABSTRACT

Sequencing and phylogenetic analyses of the target genes and development of oligonucleotide microarray techniques for identification of variola, monkeypox, cowpox, vaccinia, and chickenpox viruses

Sergei N. Shchelkunov, Alexander N. Sinyakov, Vladimir A. Ryabinin, Maxim V. Mikheev, Leonid A. Shundrin, et al.

*State Research Center of Virology and Biotechnology “Vector”,
Koltsovo, Novosibirsk region, 630559 Russia*

S.N. Shchelkunov: snshchel@vector.nsc.ru

A microarray-based method that detects simultaneously and discriminates six orthopoxvirus (OPV) species (variola/smallpox, monkeypox, cowpox, camelpox, vaccinia and ectromelia

viruses) and distinguishes them from varicella-zoster virus (VZV), herpes simplex virus type 1 (HSV-1) and type 2 (HSV-2) have been developed. The OPV gene *C23L/B29R* (encoding the CC-chemokine binding protein) sequenced for 86 strains and OPV gene *B19R* (interferon binding protein) sequenced for 72 strains were used to design oligonucleotide probes. Oligonucleotide zonds for determination of VZV, HSV-1, and HSV-2 based on GenBank data: gene *ORF31* (glycoprotein B, 20 strains), genes *US4*, *US5* (glycoproteins G, 192 strains), gene *US4* (glycoprotein G-2, 17 strains), respectively. The microchip contained unique oligonucleotide probes specific to each virus species to ensure redundancy and robustness of the assay. A region approximately 1100 bases long for gene *B29R*, 1300 bases long for gene *B19R* of orthopoxviruses and 270–340 bases for glycoproteins' genes of herpes viruses were amplified from samples of viral DNAs and fluorescently labeled with Cy3. Hybridization was carried out under plastic coverslips, resulting in a fluorescent pattern that was quantified using a confocal laser scanner. 52 samples of OPV DNAs, representing different OPV species, two VZV, two HSV-1 and three HSV-2 isolates were tested. The oligonucleotide microarray hybridization technique identified reliably and correctly all tested samples.

IV

Erhan Pişkin, Ph.D.

ADDRESS: Hacettepe University, Chem.Eng.Dept., Beytepe, 06532 Ankara, Turkey
Phone: 90 312 2977400/01
Fax: 90 312 2992124
E-mail: piskin@hacettepe.edu.tr or erhanpiskin@biyomedtek.com

DATE AND PLACE OF BIRTH: May 6, 1948, Muş, Turkey

CITIZENSHIP: Turkey

EDUCATION:

Ph.D.	CHEM.ENG.	1976	Hacettepe University, Ankara, Turkey
B.Sc. & M.Sc.	CHEM.ENG.	1970	Ankara University, Ankara, Turkey

PRESENT POSITION:

Director, Center of Bioengineering, Hacettepe University
Director, TÜBİTAK-University-Industry Collaborative Research Center: BİYOMEDTEK-
Center for Biomedical Technologies
Chairman of the Board: TÜBİTAK-Institute of Genetic Engineering and Biotechnology

EDITORIAL BOARDS:

Journal of Bioactive and Compatible Polymers,
Journal of Artificial Cells, Blood Substitutes and
Biomedical Biotechnology
Trends in Biomaterials and Artificial Organs
Plastik Mecmuası(in Turkish)

Biyotek (in Turkish)

- AWARDS: The Scientific & Technical Research Council of Turkey (TÜBİTAK), Junior Science Award in 1981
C.P. Sharma International Award in Biomedical Engineering, 1997
Hacettepe University, Science Awards 1999
The Scientific & Technical Research Council of Turkey (TÜBİTAK), Science Award 2000
- THESIS DIRECTED: About 70 M.Sc thesis & 32 Ph.D. thesis
- PUBLICATIONS: More than 200 scientific papers + about 20 chapters in books + more than 200 presentation in International and National Meetings + Editor/author of 10 Books (6 in English and 4 in Turkish),
CITATIONS: more than thousand
- ORGANIZATIONS: Chairman/organizer of 8 International and 3 National symposia or workshops.
- MEMBERSHIPS: The Scientific and Technical Research Council of Turkey (TÜBİTAK), Science Board Member (2001-2005)
Turkish Academy of Sciences, Full Member, 2000-
- INTERNATIONAL EXPERIENCE: 1979-1980 McGill Univ., Canada; 1984 Berlin Free Univ., Germany; 1984 Strathclyde Univ., Scotland; 1987 Univ. Washington, Seattle, USA; 1990 Inst.Oncology, Kiev; 1992 UCLA, Los Angeles, USA; 1994 Univ. Krems, Austria.

Publication 2000-2004

1. Ayhan, H., and **Pişkin, E.**, Collagen Immobilization onto P(EGDMA/HEMA) Microbeads for Cell Affinity Systems, *J.Bioactive & Compatible Polym.*, **15**: 27-42, 2000.
2. Ayhan, H., Kesenci, K., and **Pişkin, E.**, Protein A Immobilization and HlgG Adsorption onto Porous/Nonporous and Swellable HEMA-Incorporated PolyEGDMA Microspheres, *J.Biomater. Sci.Polymer Edn.* **11**: 13-25, 2000.
3. Ayhan, H., **Pişkin, E.**, and Gürhan, I., Attachment of 3T3 and MDBK Cells onto Poly(EGDMA/HEMA) Based Microbeads and Their Biologically Modified Forms, *Art. Cells Blood Subs.,and Immob. Biotechnol.*, **28**: 155-171, 2000.
4. Denizli, A., Kesenci, K., Arıca, Y., and **Pişkin, E.**, Dithiocarbamate Incorporated Monosize Polystyrene Microsphere for Selective Removal of Mercury Ions, *React. & Function. Polym.*, **44**: 235-243, 2000.
5. Kesenci, K., Fambri, L., Migliaresi, C., and **Pişkin, E.**, Preparation and Properties of Poly(L-Lactide)/Hydroxyapatite Composites, *J. Biomater. Sci. Polymer Edn.*, **11**: 617-632, 2000.

6. Koçum, C., Zareie, M.H., Özer, F., and **Pişkin, E.**, Observation of Nanoparticles and Film Formation by Scanning Tunneling Microscopy: Methylmethacrylate/Buthylmethacrylate Nanoparticles Prepared by Microemulsion, *Colloid & Polym.Sci.*, **278**: 587-590, 2000.
7. Demirgöz, D., Elvira, C., Mano, J.F., Cunha, A.M., **Pişkin, E.**, and Reis, R., Chemical Modification of Several Starch Based Biodegradable Polymeric Blends. Effects on Water Up-take, Degradation Behaviour and Mechanical Properties, *Polym. Degrad. Stabil.*, **70**: 161-170, 2000.
8. Zareie, H.M., Bulmuş, V., Gunning, A.P., Hoffman, A.S., **Pişkin, E.**, and Morris, V.J., Investigation of A Stimuli-Responsive Copolymer by Atomic Force Microscopy, *Polymer*, **41**: 6723-6727, 2000.
9. Denkbaş, E.B., Seyyal, M., and **Pişkin, E.**, Implantable 5-Fluororacil Loaded Chitosan Scaffolds Prepared by Wet Spinning, *J.Membrane Sci.*, **172**: 33-38, 2000.
10. Ural, E., Kesenci, K., Fambri, L., Migliaresi, C., and **Pişkin, E.**, Poly(D,L-Lactide/ε-Caprolactone) /Hydroxyapatite Composites as Bone Filler: Preparation and Characterization, *Biomaterial.*, **221**: 2147-2154, 2000.
11. Özer, F., Beşkardeş, O., and **Pişkin, E.**, Methacrylate Based Nanoparticles Produced by Microemulsion Polymerization, *J.Appl.Polym.Sci.*, **78**: 569-575, 2000
12. Pekcan, Ö., Arda, E., Bulmuş, V., and **Pişkin, E.**, Photon Transmission Method for Studying Film Formation from Polystyrene Latexes with Different Molecular Weights, *J.Appl.Polym.Sci.*, **77**: 866-874, 2000.
13. Arda, E., Özer, F., **Pişkin, E.**, and Pekcan, Ö., Film Formation from Nanosized Copolymeric Latex Particles: A Photon Transmission Study, *J.Colloid Interface Sci.*, **233**: 271-279, 2001.
14. Pekcan, Ö., Arda, E., Kesenci, K., and **Pişkin, E.**, Effects of Ageing on Latex Film Formation from Polystyrene Particles: A photon Transmission Study, *J.Appl.Polym.Sci.*, **79**: 2014-2021, 2001.
15. Öktem, T., Seventekin, N., Ayhan, H., and **Pişkin, E.**, Modification of PAN Fabrics by in Situ-Plasma Polymerisation Methods, *Melliand, Textileberichte, Int.Textile Reports*, **3**: 51-53, 2001.
16. Şenköylü, A., Şimşek, A., Şahin, F.I., Menevşe, S., Özoğul, C., Denkbaş, E.B., and **Pişkin, E.**, Interaction of Cultured Chondrocytes with Chitosan Scaffold, *J. Bioact.Biocomp.Polym.*, **16**: 137-144, 2001.
17. Kozluca, A., Ayhan, H., Rabaud, M., and **Pişkin, E.**, Biodegradable Biocomposite Non-woven Matrices Based on PDLLA- and Elastin-Solubilized Proteins/Elastin, *J.Biomater.Sci. Polym. Edn.*, **12**: 559-572, 2001.
18. Bulmuş, V., Patır, S., Tuncel, S.A., and **Pişkin, E.**, Stimuli-Responsive Properties of Conjugates of Poly(N-Isopropyl Acryl Amide-co-Acrylic Acid) with Alanine, Glycine and Serine Mono-, Di- and Tri-peptides, *J.Controlled Release*, **76**: 265-274, 2001.
19. Özer, F., Beşkardeş, M.O., Zareie, H., and **Pişkin, E.**, Nanoparticles Carrying Hydroxyl Groups Produced by Microemulsion, *J.Appl.Polym.Sci.*, **82**: 237-242, 2001.

20. Ayhan, F., Ayhan, H., Pişkin, E., Tanyolaç, A., Optimization of Urease Immobilization onto Non-Porous HEMA Incorporated Poly(EGDMA) Microbeads and Estimation of Kinetic Parameters, *Bioresources Technol*, **81**: 131-140, 2001.
21. Çeken, C., Ayhan, H., Bilgiç, S., and **Pişkin, E.**, A New Embolization Agent: Embolization of the Kidneys with Ethyleneglycol dimethacrylate-Hydroxyethyl methacrylate Copolymer Microbeads, *J. Bioact.Biocomp.Polym.*, 16: 1-11, 2001.
22. Denizli, A., **Pişkin, E.**, Dye-Ligand Affinity Systems, *J. Biochem. Biophys. Methods*, **1512**: , 2001.
23. David, G., Özer, F., Simionescu, B.C., Zareie, and **Pişkin, E.**, Microemulsion Polymerization of Methacrylates Stabilized with Sodium Dodecyl Sulphate and Poly(N-Acetyleneimine) Macromonomers, *Eur. J. Polym.*, 38: 73-78, 2002.
24. Ayhan, F., Ayhan, H., **Pişkin, E.**, and Tanyolaç, A., Optimization of Urease Immobilization onto Non-Porous HEMA Incorporated Poly(EGDMA) Microbeads and Estimation of Kinetic Parameters, *Bioresources Technol*, **81**: 131-140, 2002.
25. David, G., Özer, F., Simionescu, B.C., Zareie, H., and **Pişkin, E.**, Microemulsion Polymerization of Methacrylates Stabilized with Sodium Dodecyl Sulphate and Poly(N-Acetyleneimine) Macromonomers, *Eur. J. Polym.*, **38**: 73-78, 2002.
26. Dinçer, S., Tuncel, A., and **Pişkin, E.**, A Potential Gene Delivery Vector: N-Isopropylacrylamide-ethyleneimine Block Copolymers, *Macromol.Chem.Phys.*, **203**: 1460-1465, 2002.
27. Dinçer, S., Köseli, V., Kesim, H., Rzaev, Z.M.O., and **Pişkin, E.**, Radical Copolymerization of N-Isopropylacrylamide with Anhydrides of Maleic and Citraconic Acids, *Eur.J.Polym.*, **38**: 2143-2152, 2002.
28. Mozafari, M.R., Reed, C.J., Rostron, C., Koçum, C., and **Pişkin, E.**, Construction of Stable Anionic Liposome-Plasmid Particles Using the Heating Method: A Preliminary Investigation, *Cell.Mol.Biol.Lett.*, **7**: 923-927, 2002.
29. Koçum, C., Bulmuş, V., and **Pişkin, E.**, Imaging of Poly(N-isopropylacrylamide-co-acrylic acid)-Amino Acid Conjugates with Scanning Tunnelling Microscopy, *J.Bioact.Comp.Poly.*, **17**: 239-250, 2002.
30. Köktürk, G., Serhatkulu, T.F., **Pişkin, E.**, and Çakmak, M., Evolution of phase behavior and orientation in uniaxially deformed polylactic acid films, *Polymer Eng. Sci.*, 42: 1619-1628, 2002.
31. Öktem, T., Seventekin, N., Ayhan, H., and **Pişkin, E.**, Improving Surface-Related Properties of Poly(ethylene terephthalate)/Cotton Fabrics by Glow-Discharge Treatment, *Indian J. Fiber & Textile Res.*, **27**: 161-165, 2002.
32. **Pişkin, E.**, Biodegradable Polymeric Matrices for Bioartificial Implants, *Int.J.Artif.Organs*, **25**: 434-440, 2002.
33. Tuncel, A., Demirgöz, D., Patır, S., and **Pişkin, E.**, A Novel Approach for Albumin Determination in Aqueous Media by Using Temperature- and pH-Sensitive N-Isopropylacrylamide-co-N-[3-(dimeyhlamino)-propyl]methacrylamide Random Copolymers, *J.Appl.Poly.Sci.*, **84**: 2060-2071, 2002.
34. Yavuz, H., Babaç, C., Tuzlakoğlu, K., and **Pişkin, E.**, L-Lactide and ϵ -Caprolactone Homo and Copolymer Films: Preparation and Degradation, *Polym.Degr.Stab.*, **75**:431-437, 2002.

35. Zareie, M.H., Dinçer, S., and **Pişkin, E.**, Observation of Phase Transition of Thermo-Responsive Poly(NIPA)-PEI Block Copolymers by STM, *J.Coll.Interface Sci.*, **251**:424-428, 2002.
36. Saber, R., Mutlu, S., and **Pişkin, E.**, Glow-discharge Treated Piezoelectric Quartz Crystals As Immunosensors for HSA Dedection, *Biosensors Bioelectronics.*, **17**: 727-734, 2002.
37. Saber, R., Mutlu, S., and **Pişkin, E.**, Investigation of Complexation of Immobilized Metallothionein with Zn(II) and Cd(II) Ions Using Piezoelectric Crystals, *Biosensors Bioelectronics.*, **17**: , 2002.
38. David, G., Alupeı, V., Simionescu, B.C., Dinçer, S., and **Pişkin, E.**, Poly(N-Isopropylacrylamide)/ Poly(N-Acetylmino)ethylene] Thermosensitive Block and Graft Copolymers, *Eur. J. Polym.*, **38**: , 2002.
39. Şenköylü, A., Ural, E., Kesenci, K., Şimşek, A., Ruacan, Ş., and **Pişkin, E.**, Poly(D,L-Lactide/ Caprolactone)/Hydroxyapatite Ccomposites as Bone Substitute: An in vivo Study in Rats, *Int.J.Artif.Organs*, **25**: 1174-1179, 2002.
40. Denizli, A., Say, R., and **Pişkin, E.**, Removal of Aluminium by Alizarin Yellow-Attached Magnetic Poly(2-hydroxyethyl metacrylate) Beads, *React.Func.Poly.* **1**: 2002.
41. Köktürk, G., Serhatkulu, T.F., M. Çakmak, M., **Pişkin, E.**, Evolution of phase behavior and orientation in uniaxially deformed poly lactic acid films. *Polymer Engineering and Science*, **42**, 8, 1619-1628, 2002.
42. Bulmuş, V., Patır, S., Tuncel, S.A., and **Pişkin, E.**, Conjugates of Poly(N-Isopropyl Acryl Amide-co- Acrylic Acid) with Alanine Mono-, Di- and Tri-peptides, *J.Appl.Polym.Sci.*, **88**: 2012–2019, 2003.
43. Çehreli, M.C., Şahin, S., Kesenci, K., Öztürk, S., Tuzlakoğlu, K., Ruacan, Ş., Caner, B., Bozkurt, F., **Pişkin, E.**, Biological Reactions to a Poly(L-lactide)-Hydroxyapatite Composite: A Study in Canine Mandible, *Journal of Biomaterials Applications*, **17**: 265-276, 2003.
44. David, G., Alupeı, V., Simionescu, B.C., Dinçer, S., **Pişkin, E.**, Poly(N-isopropylacrylamide)/ Poly[(N-acethylimino)ethylene] Thermosensitive Block and Graft Copolymers, *European Journal of Polymer*, **39**: 1209-1213, 2003.
45. Denizli, A., Say, R., and **Pişkin, E.**, Removal of Aluminium by Alizarin Yellow-Attached Magnetic Poly(2-hydroxyethyl methacrylate) Beads, *Reactive and Functional Polymers*. **55**:99-107 2003.
46. Dinçer, S., Köseli, V., Kesim, H., Rzaev, Z.M.O., **Pişkin, E.**, Radical Copolymerization of N-isopropylacrylamide with Anhydrides of Maleic and Citraconic Acids, *European Polymer Journal*, **38**: 2143-2152 2003.
47. Duman, M., Saber, R., **Pişkin, E.**, A new approach for immobilization of oligonucleotides onto piezoelectric quartz crystal for preparation of a nucleic acid sensor for following hybridization, *Biosensors and Bioelectronics*, **18**: 1355-1363, 2003.
48. Gürpınar, Ö.A., Tuzlakoğlu, K., Onur, M.A., Tümer, A., Serdar, M.A., Ünal, N., **Pişkin, E.**, BHK Cell Attachment and Growth on EDA-Plasma Treated Poly((L-lactide/Caprolactone) Biodegradable Films, *J.Biomater.Sci., Polym.Ed.*, **14**: 589-600, 2003.
49. Kesim, H., Rzaev, Z.M.O., Dinçer, S., **Pişkin, E.**, Functional Bioengineering Copolymers. I. Synthesis and Characterization of Amphiphilic Poly(N-isopropylacrylamide-co-maleic anyhdride)jj and its Macrobranched Derivatives, *Polymer*, **44**: 2897-2909, 2003.

50. Köseli, V., Rzaev, Z.M.O., Pişkin, E., Bioengineering Functional Copolymers.III. Synthesis of Biocompatible Poly[(*N*-isopropylacrylamide)-co-maleic anhydride]-g-poly(ethylene oxide)]/Poly (ethylene imine) Macrocomplexes and Their Thermostabilization Effect on the Activity of the Enzyme Peniciline G Acylase, *Journal of Polymer Science, Part A: Polymer Chemistry*, **41**: 1580-1593, 2003.
51. Özkara, S., Garipcan, B., Denizli, A., **Pişkin, E.**, Histidine Carrying Pseudospecific Affinity Sorbent for Immunoglobulin G Isolation from Plasma in Column, *Journal of Biomaterial Science: Polymer Edition.*, 1-16, 2003.
52. **Pişkin, E.**, Molecularly Designed Water Soluble, Intelligent, Nanosize Polymeric Carriers, IPTS, 2003.
53. Saber, R., **Pişkin, E.**, Investigation of Complexation of Immobilized Metallothionein with Zn(II) and Cd(II) Ions Using Piezoelectric Crystals, *Biosensors and Bioelectronics*, **18**: 1039-1046, 2003.
54. Şenel, S., Rzaev, Z.M.O., and **Pişkin, E.**, Copolymerization of *N*-Phenylmaleimide with 2-hydroxyethyl and ethyl metacrylates, *Polymer International*, **52**: 713-721, 2003.
55. Kalaycıoğlu, E., Patır, S., **Pişkin, E.**, Poly(NIPA-co-MAH) Copolymers and Their Interactions with Human Immunoglobulin-G, *Langmuir*, **19**: 9538-9541, 2003.
56. Denizli, A., Alkan, M., Garipcan, B., Özkara, S., **Pişkin, E.**, A Novel Metal-Chelate Affinity Adsorbent for Purification of Immunoglobulin-G-from Human Blood Plasma, *Journal of Chromatography B*, **795**:93-103, 2003.
57. Kazımoğlu, C., Bölükbaşı, S., Kanatlı, U., Şenköylü, A., Babaç, C., Yavuz, H., **Pişkin, E.**, A Novel Biodegradable PCL Film for the Tendon Reconstruction: Achilles Tendon Defect Model in Rats, *The International Journal of Artificial Organs*, **22**: 804-812, 2003.
58. Gülüdoğan, Y., Eğri, S., Rzaev, Z.M.O., **Pişkin, E.**, Comparison of Maleic Anhydride Grafting onto Powder and Granular Polypropylene in Melt by Reactive Extrusion, *Journal of Applied Polymer Science*, **92**: 3675-3684, 2004.
59. Güven, G., Tuncel, A. **Pişkin, E.**, Monosized Cationic Nanoparticles by Emulsifier Free Emulsion Polymerization and Their Characterization, *Journal of Colloidal and Interface Science*, **282**: 708-715, 2004.
60. Türk, M., Dinçer, S., Yuluğ, I.G., **Pişkin, E.**, In vitro Transfection of HeLa Cells with Stimuli-Responsive and Polycationic Copolymers, *Journal of Controlled Release*, November, **96**: 325-340, 2004.
61. Kocakulak, M., Küçüksaksu, S., **Pişkin, E.**, Pulsatile Roller Pump Perfusion is Safe in High Risk Patients, *International Journal of Artificial Organs*, **27**:533-439, 2004.
62. **Pişkin, E.**, Molecularly Designed Water Soluble, Intelligent, Nanosize Polymeric Carriers, *International Journal of Pharmaceutics*, **277**: 105-118, 2004.
63. Babaç, C., Güven, G., David, G., **Pişkin, E.**, Microemulsion Polymerization of Methylmethacrylate/Butylmethacrylate in the Presence of Macromers, *European Polymer Journal*, **40**: 1947-1952, 2004.
64. Koçum, C., Kalaycıoğlu, E., **Pişkin, E.**, Imaging of Poly(NIPA-co-MAH)-HIgG Conjugates with Scanning Tunneling Microscopy, *Journal of Biomaterial Science, Polymer Edition*, **15**: 1513-1520, 2004.

65. Aydın, H., Çalimli, A., **Pişkin, E.**, Preparation of Microporous Scaffolds from Poly(L-Lactide/ ϵ -Caprolactone) Copolymers and Their Hydroxyapatite and Tricalcium Phosphate Composites in Supercritical Carbon Dioxide Media, *J. Biocompatible and Bioactive Polymers*, 2004.
66. **Pişkin, E.**, Dinçer, S., Türk, M., Gene delivery-intelligent but just at the beginning *Journal of Biomaterial Science, Polymer Edition*, 2004.
67. Kahraman, G., Beşkardeş, O., Rzaev, Z.M.O., **Pişkin, E.**, Bioengineering Polyfunctional Copolymers. VII. Synthesis and Characterization of Copolymers of *P*-Vinylphenyl Boronic Acid with Maleic and Citraconic Anhydrides and Their Self-Assembled Macrobranched Supramolecular Architectures, *Polymer*, **45**: 5813-5828, 2004

ABSTRACT

Biosensors/Biochips for Detection of Pathogenic Bacteria: Focusing on QCM and SPR

Erhan Pişkin

Hacettepe University, Chem.Eng.Dept. and Bioeng.

and TUBITAK-Biyomedtek: Center for Biomedical Technologies, Ankara, Turkey

Pathogenic bacteria are considered as one of the most import and dangerous elements of bioterorism today. There are several laboratory techniques to determine the type and concentration of these bacteria and their toxins which show their existance in the environment. These conventional techniques for detecting microbiological contamination involves in time consuming enrichment steps and expensive and complicated instrumentation. Determination time of these recognition techniques is somewhat long and consumes a total assay time of up to 1 week in certain cases. Note that even few bacteria may cause important contaminations and therefore important and high risk which may be deadly. In many cases contaminations may include a number of bacteria which makes the analysis highly complex. Over the last decade, a great deal of research has focused on the development of biosensors using biological molecules as ligands for the detection of biological entities including microorganisms, cells and viruses. Quartz crystal microbalance (QCM) systems are quite simple and in expensive systems which measure the interaction between the immobilized ligand and its complementary target molecule (or even microorganism) on the crystal surface. This interaction causes the change of the mass on the crystal surface which in turn results a frequency shift that is measured and therefore the extent of the interaction can be monitored. Surface plasmon resonance (SPR) is a rather a new method for characterizing macromolecular interactions on the sensor surfaces. It is an optical technique that uses the evanescent wave phenomenon to measure changes in

refractive index very close to a sensor surface. The binding reaction between the target in the solution and the ligand immobilized on the sensor surface results in a change in the refractive index. The interaction is monitored in real time and the amount of bound ligand and rates of association and dissociation can be measured with high precision. Both QCM and SPR techniques are label free, and portable systems can be design, which makes them much stronger among the available biosensors. Multi-channel SPR biosensors (maybe called as biochips) may allow recognizing and quantification of various pathogens simultaneously in one assay in a very short period with quite high sensitivity.