Welcome Letter

On behalf of the organizing committee of the 3rd Russian-Hellenic Symposium with International Participation and Young Scientists School " Biomaterials and Bionanomaterials:Recent Problems and Safety Issues" included Advanced Research Workshop on Nanotechnologies & Bioanalytical Advances for Improved Public Security and Enviromental Safety and Health, we are privileged to invite you to grace with your presence and participation the works of the Symposium, which is to be held in Heraklion, in the beautiful island of Crete, in May 2012.

Crete is an island with numerous coves, bays, peninsulas, and sandy beaches along the beautifully blue Mediterranean Sea. After all, it's among the finest in the world and has established Crete as one of Europe's most popular holiday destinations. And, of course, the island's historic importance in today's world as Knossos, Phaistos and Gortys, is evidenced by the tens of thousands of visitors to these sites each year. Located almost in the centre of Crete, Heraklion has since the early years played a significant part in the history of the island. The theme of the Symposium concerns one of the most progressing directions of science and technology. BioNanoToxicology Issues lie at the interface of many disciplines, ranging from biology to chemistry, toxicology, computational science chemistry, nanotechnology and biotechnology

The Symposium is a continuation of a long term co-operation between Russian and Hellenic scientists in this field that has been ongoing for the last 20 years, in the frame of the bilateral scientific state programs.
The International Advisory Board of the Symposium is chaired by E.P.Giannelis, Department Chair, Department of Materials Science and Engineering, Cornell University, S.P.Anastasiadis, Professor, Foundation for Research and Technology -Hellas (FO.R.T.H.), Institute of Electronic Structure and Laser (I.E.S.L.), V.Torchilin Professor, Director of Center of Pharm. Biotech & Nanomedicine, Northeastern University, Boston, USA, D.A.Spandidos Professor of Virology, Medical School, University of Crete, Heraklion, Greece, P. Sarkisov Academician of RAS, President of D. Mendeleyev University of Russia, Moscow, Russia and A. Khokhlov Academician of RAS, Vice-Rector of M. Lomonosov Moscow State University, Moscow, Russia.

It is anticipated that scientists from the Russian Academy of Science, the most prominent Universities as well as Technological Institutes and Companies and distinguished field specialists coming form many countries will attend the symposium. Reduced registration rates will be provided, in order to enable more young scientists to attend the Symposium.
At this symposium the attendee will have the chance to meet important representatives of research in the field, discuss with them and exchange ideas. This will accomplish the aim of the symposium, which is the generation of new and vigorous interactions between the different aforementioned disciplines, which will have enormous positive effects in our societies.

We invite you all to participate to our Symposium. Crete will welcome you with its smiling Cretan sun, the sounds of the Cretan lyre, the scents of orange blossom and jasmine, a slice of cool red watermelon and a glass of iced raki.

Co-Chairmen of the Organizing Committee

Aristidis Tsatsakis, PhD, DSc, ERT

Mikhail Shtilman, PhD, DSc

Tuesday, May 8, 2012

08.00-09.30 **Breakfast**

09.30-12.30 ***MORNING SESSION***

Chairmen: Prof. T. Bronich, Prof. Yu. Vladimirov

09.30-10.00 **CHITIN AND CHITOSAN NEW PROSPECTS AND OLD PROBLEMS**
V.P. Varlamov, A.V. Il'ina, S.A. Lopatin, A.N. Levov, D.V. Kurek, A.A. Zubareva
Centre "Bioengineering", Russian Academy of Sciences, Moscow, Russia

10.00-10.30 **SEAWEEDS AND THEIR DERIVATIVES ARE AN INEXHAUSTIBLE SOURCE OF BIOPOLYMERS FOR BIOTECHNOLOGY DRUGS, FOOD SUPLEMENTS AND BIOLOGICALLY ACTIVE ADDITIVES**
AV Podkorytova
Russian Federal Research Institute of Fisheries and Oceanography,
17, V. Krasnoselskaya, 107140, Moscow, Russia, e-mail: podkor@vniro.ru

10.30-11.00 **SYNTHESIZED NANO AND MICROFIBER MATRIX NETWORKS SUPPORT IMMUNOISOLATED PANCREATIC ISLETS FOR IMPLANTATION**
J.A.M. Steele[1], E. Carmona[2], J-P. Halle[2], A.E. Barron[3] and R.J. Neufeld[1]
[1]Queen's University, Kingston, Ontario, Canada (neufeld@queensu.ca)
[2]Université de Montréal, Maisonneuve Rosemont Hospital Research Centre
[3]Stanford University, Palo Alto, CA

11.00-11.30 **IN VITRO HEMOCOMPATIBILITY OF NANOCARRIERS TAILORED FOR BIOPHARMACEUTICAL DRUGS**
Ch. Sevrin, B. Cerda, L. Flebus, F. Lombart and Ch. Grandfils*
Interfacultary Research on Biomaterials (CEIB), University of Liege, Chemistry Institute, B6C, B-4000 Liège (Sart-Tilman), Belgium. C.Grandfils@ulg.ac.be

11.30-12.00 **Coffee break, Poster session**

Chairmen: Prof. V. Varlamov, Prof. A.Podkorytova

12.00-12.30 **THE SYNTHESIS OF METAL NANOPARTICULATE CATALYSTS WITHIN RESPONSIVE MICROGELS**
S. H. Anastasiadis
Institute of Electronic Structure and Laser, Foundation for Research and Technology - Hellas and Department of Chemistry, University of Crete, Greece

12.30-13.00 **"SMART" POLYMERS FOR NUCLEAR MEDICINE**
V.R Duflot, E.A. Dubova, N.M. Bolbit, E.I. Lobanova
Branch of Karpov Institute of Physical Chemistry, Scientific and Production Centre, Obninsk, Russia

13.00-14.00 **Lunch**

14.00-16.30 **Break**

or microfibers around a pancreatic islet within a barium alginate microcapsule. This technique allows for the encapsulation of a porous extracellular protein-like matrix without the limitations of cellular aggregate seeding geometries that preclude their use in microparticles without diffusional limitations. Nanofibers were electrospun, and microfibers were produced from a newly developed vortex-drawn extrusion system with an alginate support matrix. Optimization of the extrusion methodology culminated in a hydrated fiber diameter of 22.3 ± 0.4 μm, a 98% reduction in cross sectional area, while making the process more reliable and less labour intensive. The optimized microfibers were encapsulated at 40 vol% within 294 ± 4 μm 1.6% barium alginate microparticles by an electrostatic-mediated dropwise extrusion system. Pancreatic islets extracted from Sprague Dawley rats were encapsulated within the microparticles, and analyzed over a 21-day study. Acridine orange and propidium iodide fluorescent viability staining and light microscopy indicated a significant increase in viability for the fiber-laden particles at days 7, 14, and 21, relative to fiber-free controls. The fiber-laden microcapsule system reduced the incidence of disrupted islet morphologies from 31% to 8% at day 21, and showed evidence of islet-fiber adhesion after only 1 hour of coincubation and 24 hours of encapsulation. The novel microencapsulation method developed in this investigation could be developed into a modular scaffold system for tissue engineering beyond the field of islet research.

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Abstract
The optimization of nanoparticles (NP) for drug delivery, in particular to target the BBB, imposes to verify their hemocompatibility both for toxicological and efficiency of targeting perspectives. Indeed the large surface they are able to expose to the biological environment promotes their interaction with various biochemicals, in particular proteins which can after adsorption elicit the activation of biological cascades either responsible from NP clearance or/and harmful body reaction (inflammatory / coagulation).
In the frame of the European Integrated Project : "Nanobiopharmaceutics", we have the opportunity to compare the hemoreactivity of about 145 different NP samples differing in core and surface chemistry and classified according to their expected difference in hydrophobicity based on the nature of their core materials. According to this classification, PLGA nanoparticles, polyglycidol-polyethyethylene oxide nanoparticles, polyglycidol thyolated or polyacrylamide nanogels, and polyelectrolyte complexes either based on polyamidoamine or poly(N,N-dimethylamino-2-ethylmethacrylate) have been evaluated within a concentration ranging from 0.3 to 1000 μg/mL. These in vitro tests have been realized for screening purpose adopting normal human bloods and according to Iso 10993.
As a summary of this extensive study, our results clearly highlight that most of the polymeric nanoparticles evaluated give rise to some alterations of the blood components. In particular the platelets, intrinsic pathway of coagulation and complement activation are the most reactive biological parameters in the presence of these nanostuctures.
Although not strictly related to the surface chemistry our classification has also allowed us to derive some clear correlations between nanomaterial properties and their hemoreactivity.
Within the class of polyelectrolyte electrolyte complexes, the modifications brought in the surface chemistry has drastically improved their hemoreactivity.

Keywords
Nanoparticles, blood brain barrier, biopharmaceutical drugs, hemocompatibility, hemoreactivity, complement activation.
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Financial support from the EU FP6 IP NanoBioPharmaceutics as well as CONACYT-Mexico (Grant no. 213606) is gratefully acknowledged.

"SMART" POLYMERS FOR NUCLEAR MEDICINE

V.R Duflot, E.A. Dubova, N.M. Bolbit, E.I. Lobanova
Branch of Karpov Institute of Physical Chemistry, Scientific and Production Centre, Obninsk, Russia

With increasing number of oncological diseases new methods have been searched for and researched to take cancer over control. The most investigated methods in this area are the radionuclide diagnostics and therapy.
An important task of nuclear medicine is to achieve maximum tumor destruction with minimal damage to the surrounding normal tissues.
This problem can be solved through development of the radiopharmaceuticals with a radionuclide bound to the polymer molecule that has a thermotropic transition at the temperature of the human body. In this case radioactive isotopes will be localized in the vicinity of the tumor.
The most promising biocompatible thermo-sensitive polymers for developing self-collapsing therapeutic radiopharmaceuticals include associating polyelectrolytes on the basis of N-isopropylacrylamide (PNIPA) and N-vinyl-