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3rd International NanoBio Conference 2010, ETH Zurich, Switzerland August 24-27 2010

Welcome to the NanoBio-2010 Zurich Conference abs

NanoBio-Tokyo 2006 (chaired by Prof. Kazunori Kataoka Seoul 2008 (chaired by Prof. Kyung-Hwa Yoo) were outstan with 500 – 1000 participants and an excellent scientific prog

The Third International NanoBio Conference was held at ET 24-27, 2010. For this 4-day conference, there we internationally renowned speakers for plenary and two par well as poster sessions and an industrial exhibition.
There were also ca. 650 participants, 460 posters and 17 conference was held in the Main Building of the Swiss Fe Technology Zurich (ETH Zurich) providing ample space f exhibition, and located very close to Zurich City Center.

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Synopsis

Nanobiotechnology is the discipline of the future that is taking over the role of being the motor of economic growth from information technology. Biology is inherently nano. Just think of a cell, which is a warehouse of structures and functional units that are finely harmonized on the nanometer scale. The new tools of nanotechnology allow us to address biological and medical problems with unprecedented accuracy and sensitivity because now it has become possible to interact with the bio-world at the length scale at which it operates. New intelligent drug delivery vehicles, novel nanobiosensors, nanomedical imaging tools and other nanobio-devices, and new nanostructured biomaterials are expected to speed up quantitative biological and medical research, boost our diagnostic capabilities, and increase the length and quality of our lives. At the same time nanostructures inspired by nature or created using biological processes are expected to reduce the production costs of new nanodevices making them accessible for the public.

Such unique possibilities also come along with large, often unrealistic expectations and fears in the society. This meeting gathered the leaders of this progressive field from all over the world helping scientists to get an update on the most recent achievements in the different topics of nanobiotechnology, to discuss, to network, to exchange stimulating new ideas, and to take responsibility in forming public opinion about nanobiotechnology.

Zurich, August 2010.

On behalf of the Scientific Committee and the Local Organizing Committee

Co-Chairs: Janos Vörös, Marcus Textor

and Local Organization Committee
Géraldine Coullerez, Mirren Charnley, Lucio Isa

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Perspectives of Novel Poly(D,L-lactide-*co*-glycolide)/Hydroxyapatite Core-shell Nanoparticles as Carriers of Antibiotics

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INTRODUCTION: Local drug delivery for the treatment of infectious bone tissue diseases is a high-importance topic in the field of biomedicine for a last two decades. [1] In general, some of the main problems related to controlled drug delivery of antibiotics are: (i) high initial burst effect with toxic outcome and (ii) low concentration of released drug during extended period of time with possibility for development of resistant spaces.[2] There are some examples suggesting that core-shell particles applied as carriers of drug are able to provide high control over the process of drug release and to prevent burst effect.[3,4] Therefore, the main goal of our work is to design material which will be able to provide these characteristics.

METHODS: Loading of the drug within poly(D,L-lactide-*co*-glycolide/hydroxyapatite (PLGA/HAp) was performed by modified ultrasonic processing method.[5] Cell responses were analyzed using MRC-5 cell line by standardized methods.

RESULTS: PLGA/HAp particles with loaded antibiotic showed morphology of nanostructured core-shells (Fig. 1a). Characteristics of the surface of material obtained after 24h in medium with MRC-5 cells provided their attachment onto the material (Fig 1b). Histological analyses showed absence of the changes in the shape and texture of vital cells and they had high affinity for interaction with material (Figs. 1c and 1d). According to the testes based on the mitochondrial activity (MTT) and compactness of the cells' membrane (DET), after cells interactions with PLGA/HAp with different contents of antibiotic during first 24h, high percents of survival were obtained (Table 1). Agar test showed no detectable zone of decoloration around the samples and no observable signs of cell lysis indicating 0/0 cell response meaning absence or very low cytotoxicity effect (Table 1).

DISCUSSION & CONCLUSIONS: PLGA/HAp core-shells gave satisfied outcome during their interaction with human-like MRC-5 cells showing high level of compatibility and bioactivity of material which opened interesting field for the future *in vivo* research. Concerning biodegradable PLGA shell able to control process of drug release and osteoconductive HAp core able to promote bone reparation process so far this material showed promising properties for delivery of antibiotics.

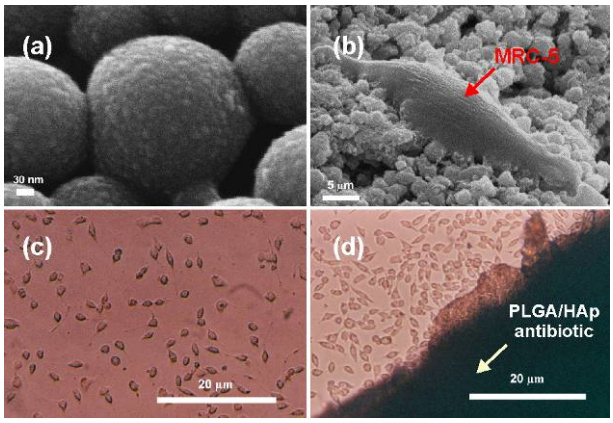

Fig. 1: PLGA/HAp/antibiotic core-shells (a); cell attachment onto the surface of material (b); histological analysis of cells responses: control (c) and PLGA/HAp/antibiotic (d).

Table 1. MRC-5 cell line responses obtained after 24h of incubation with PLGA/HAp/antibiotic.

Antibiotic (wt. %)	MTT (survival %)	DET (survival %)	Agar test
0	92.9±1.2	93.6±2.3	0/0
1	80.9±0.3	91.2±5.0	0/0
5	74.1±2.9	89.6±2.8	0/0
10	68.8±1.4	85.3±2.4	0/0

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