

Nanoparticles

RECOOP HST Research Activity Inventory				
Please complete the template for each selected project your organization would like to share with the partners of the RECOOP HST Consortium and would like to invite other organizations to write FP7 or NIH proposals.				
Organization	Institute of Cell Biology			
Area of the Research	Biomarkers, Nanoparticles			
Title of the Research Activity	Use of biofunctionalized nanoparticles for isolation and destruction of pathological cells			
Department (complete address)	Principal Investigator or Head of the Research Group			
Department of Regulation of Cell proliferation and Apoptosis, Drahomanov Str. 14/16, 79005, Lviv, Ukraine	Name: Rostyslav Bilyy			
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Abstract	Maximum 500 characters			
Previously we found that cells undergoing programmed cell death are characterized by increased expression of particular plasma membrane glycoproteins. Specific lectins (carbohydrate-binding proteins) were used as markers of these cells [1-3]. Here we conjugated lectins to superparamagnetic Fe ₃ O ₄ nanoparticles and utilized them for isolation of dying cells from mixed populations. Also, it was shown that influence of alternating magnetic field resulted in the death of cells with bound biofunctionalized nanoparticles.				
Methods used	Maximum 300 characters			
Bioconjugation, light and fluorescent microscopy, cell culturing, affinity chromatography.				
Related references (max 3)	Indicate the impact factor of the cited reference			
1. R.Bilyy, R. Stoika. Search for novel cell surface markers of apoptotic cells / <i>Autoimmunity</i> , 2007, V. 40(4) P. 249 - 253. (invited review, IF ~1.5)				
2. R.O. Bilyy, V.O. Antonyuk, R.S. Stoika. Cytochemical study of role of α -D-mannose- and β -D-galactose-containing glycoproteins in apoptosis / Journal of Molecular Histology , 2004. V. 35(8), P. 829-838 (IF ~ 1, formerly Histochemical journal)				
3.R.O. Bilyy, R.S. Stoika. Lectinocytochemical detection of apoptotic murine leukemia L1210 cells. / Cytometry , 2003, V 56A(2), P.89-95 (IF ~ 2.7)				
Related Inventions Disclosures and Patents				
International PCT Application No. PCT/US2006/42582				
Planning grant application (please mark your selection with X)	FP7	<input checked="" type="checkbox"/>	NIH	
Only participating in projects (please mark your selection with X)	FP7	<input checked="" type="checkbox"/>	NIH	

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Organization	Research Section for Nanotechnology and Individual Molecular Biophysics Department of Biophysics Medical School
Area of the Research	titin, miozin, actin, amyloid, dezmin, fibrin, molecular manipulation, single-molecular-visualisation, motility, molecular structure
Title of the Research Activity	Molecular biophysics; Nanomechanics of the DNA chromatin Nanomechanics of the system of blood clotting
Department (complete address)	Principal Investigator or Head of the Research Group
Department of Biophysics Medical School, University of Pécs H-7624 Pécs, Szigeti út 12, Hungary	Name: Prof. Dr. KELLERMAYER, Miklós
	Title: Prof. Dr
	Tel: +36 72 536271
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	E-mail: miklos.kellermayer.jr@aok.pte.hu Web: http://biofizika.aok.pte.hu/km/
Abstract	Maximum 500 characters
<p>Research area</p> <ol style="list-style-type: none"> 1 Molecular biophysics 2 Nanobiotechnology 3 Nanoelectonics 4 Molecular biomechanics 5 Molecular mechanism of muscle functions 6 Structural dynamics of the cytoskeletal system 7 Molecular pathomechanisms of amyloidosis and Alzheimer's disease 8 The development of technics for visualising and manipulating individual molecules 9 Nanomechanics of the DNA chromatin 10 Nanomechanics of the system of blood clotting <p>Human resources senior research fellow (1), post doctoral researchers (2), PhD students (6), laboratory assistants (2), members of the Students Researchers Association/Students writing-up their thesis (8)</p> <p>Special instruments</p> <ul style="list-style-type: none"> ▪ biotechnological laboratory for the design and preparation of recombinant molecules (DNA, RNA, PROTEINS) and molecular handles ▪ <i>in vitro</i> motility trial work station for the investigation of molecular engines ▪ work station for digital image analysis ▪ molecular atomic force microscopes for nanomechanical measures (10 pN force 	

resolution) <ul style="list-style-type: none"> ▪ two-laser-beam force measuring laser pincers for nanomechanical measures (0.1 pN force resolution) ▪ atomic force microscope scanner (AFM) ▪ total inner reflectional fluorescent microscope (TIRFM) 	
Products and services	
<i>Potential marketable products:</i>	
space and time synchronised TIRF/AFM device and the related software modules optical feedback molecular force measure AFM orientated amyloid fibril based microchip amyloid based nanoelectric circuits	
<i>Measurement and developmental services:</i>	
measurement service for the investigation of the motility of engine proteins measurement service for investigating the topographical structure of biomolecular samples using AFM measurement service for the topographical investigation of nanoscale materials (nanoelectric circuits etc.) developmental service of innovative, combined (e.g. mechanics + fluorescence)	
single molecular biophysical methods	
Methods used	Maximum 300 characters
Related references (max 3)	Indicate the impact factor of the cited reference
Related Inventions Disclosures and Patents	