Biomarkers
# 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.

<table>
<thead>
<tr>
<th>Organization</th>
<th>University of Defence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Area of the Research</td>
<td>TRANSLATIONAL RESEARCH IN OTHER MAJOR DISEASES</td>
</tr>
<tr>
<td>Title of the Research Activity</td>
<td>Identification of new biomarkers in hypertrophic cardiomyopathy</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Department (complete address)</th>
<th>Institute of Molecular Pathology, FMHS UO Trebesska 1575 50001 Hradec Kralove, Czech Republic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Principal Investigator or Head of the Research Group</td>
<td>Name: Jiri Stulik Title: Assoc. Prof., PhD Tel: ++420495518833 Fax: ++420495512451 E-mail: <a href="mailto:jstulik@pmfhk.cz">jstulik@pmfhk.cz</a></td>
</tr>
</tbody>
</table>

## Abstract

Maximum 500 characters

The aim of the project is to find serum protein candidates which could be used as biomarkers for hypertrophic cardiomyopathy. Hypertrophic cardiomyopathy is associated with the changes on genomic level. These genomic alterations should be reflected by the differential spectrum of plasma proteins comparing to the plasma protein patterns obtained from healthy donors. Using combination of modern proteomic approaches the identification of a specific protein or a group of proteins confirming unambiguously the diagnosis of the patient can be expected.

## Methods used

Maximum 300 characters

HPLC with MARS columns for removal of high abundance proteins; labeling of samples containing trypsin-cleaved peptides using 4 isobaric iTRAQ probes; HPLC separation of labeled peptides followed by ESI-QTOF and MALDI-TOF/TOF mass spectrometry analyses; evaluation of data by correlative and explorative statistical tests

## Related references (max 3)


## Related Inventions Disclosures and Patents

- Planning grant application (please mark your selection with X) FP7 NIH
- Only participating in projects (please mark your selection with X) FP7 X NIH X
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<th><strong>Organization</strong></th>
<th>Institute of Molecular Biology and Genetics</th>
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<tbody>
<tr>
<td><strong>Area of the Research</strong></td>
<td>Molecular Biology, Combinatorial Chemistry</td>
</tr>
<tr>
<td><strong>Title of the Research Activity</strong></td>
<td>Design of fluorescent dyes for non-specific product detection in Q-PCR</td>
</tr>
<tr>
<td><strong>Department (complete address)</strong></td>
<td>Department of Combinatorial Chemistry of Institute of Molecular Biology and Genetics 150 Zabolotnogo St, 03143 Kyiv, Ukraine</td>
</tr>
</tbody>
</table>
| **Principal Investigator or Head of the Research Group** | Name: Sergiy M. Yarmoluk  
Title: Prof., Dr.Sci  
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Fax: +380445222458  
E-mail: sergiy@yarmoluk.org.ua |

**Abstract**  
Real-time PCR (Q-PCR) is a powerful technique for detection of nucleic acids that allows quantification of products during the extension step. Majority of fluorescent dyes used in Q-PCR for non-specific product detection are intercalators that inhibit amplification reaction. We propose the development of novel groove-binding, long-wave probes for this application on the base of tri- and pentamethinecyanine dyes. Such probes supposed not to hinder the amplification reaction and to allow the detection in spectral region where no intrinsic fluorescence of biomolecules is observed.

**Methods used**  
Synthesis and modification of polymethine cyanine dyes, NMR analysis, fluorescent and absorption spectroscopy, real-time PCR techniques, computer modeling approach.

**Related references (max 3)**  
Indicate the impact factor of the cited reference


**Related Inventions Disclosures and Patents**  

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<tr>
<td>Area of the Research</td>
<td>Genomics, Proteomics, Molecular diagnostics, Biomarkers, Cancer, Brain and spinal cord related diseases</td>
</tr>
<tr>
<td>Title of the Research Activity</td>
<td>Molecular markers for the typing, diagnostics and gene therapy of human brain tumors</td>
</tr>
</tbody>
</table>

**Department (complete address)**

Department of Biosynthesis of Nucleic acids, Institute of Molecular Biology and Genetics, 150 Zabolotnogo Str. 03143, Kyiv, Ukraine

**Principal Investigator or Head of the Research Group**

Name: Vadym Kavsan
Title: Professor
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Fax: 38 (044) 5260759
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**Abstract**

Maximum 500 characters

Using Digital Gene Expression Displayer, we identified 676 genes differentially expressed in glioblastoma (F ≥ 2, P ≤ 0.05). About 40 of them have more than 10-fold increased expression level in glioblastoma. We are planning multilateral characterization of genes with significantly modified expression in tumors, their interactions with potential protein partners and with signaling cellular pathways. Among overexpressed genes, chitinase 3-like 1 gene encodes glycoprotein HC gp-39 that apparently substitutes the function of insulin-like growth factor I: both activate the cytokine-induced secretion of MMPs, as well as ERK- and AKT-mediated signaling cascades. The new gene encoding putative insulin-like growth factor II associated protein (IGFIIA) expressed at extraordinary high level in ependimomas and meningiomas was discovered. The function and role in oncogenesis of hypothetical protein is completely unknown. The data obtained in such investigation may result in direct improvement of diagnosis and prognosis of brain tumors and gene therapy.

**Methods used**

Maximum 300 characters

SAGE with Digital Gene Expression Displayer (DGED), Northern-hybridization, real-time RT-PCR, Western blotting, immunohistochemistry, cell culture experiments

**Related references (max 3)**


**Related Inventions Disclosures and Patents**

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<tr>
<th>Organization</th>
<th>Danylo Halytsky Lviv National Medical University</th>
</tr>
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<tbody>
<tr>
<td>Area of the Research</td>
<td>Cancer, Chronic diseases: gastrointestinal tract</td>
</tr>
<tr>
<td>Title of the Research Activity</td>
<td>Metabolic biomarkers for the diagnosis and differential prognosis of lung and gastric cancer</td>
</tr>
<tr>
<td>Department (complete address)</td>
<td>Department of Biochemistry, Danylo Halytsky LNMU, Lviv National Medical University, Pekarska str., 69, Lviv, 79010, UKRAINE</td>
</tr>
</tbody>
</table>
| Principal Investigator or Head of the Research Group | Name: Olexandr Sklyarov  
Title: prof., PhD, MD.  
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Fax: 8 10 322 757602  
E-mail: sklyarov@meduniv.lviv.ua |

Abstract  Maximum 500 characters

Due to the lack of the sensitive non-invasive and simple diagnostic tests of the lung cancer at the early stages screening of the metabolic biomarkers of lung neoplasm development is needed. Nowadays, available methods can not provide the complete evaluation both the tumor status and general development of the disease. This is caused of the tumor cells metabolic atypism, which is represented in the peculiarities of the cell metabolism, different metabolites synthesis and secretion. These substances can be used as markers of tumor development.

Methods used  Maximum 300 characters

Spectrophotometric methods: NOx estimation, L-arginine, MDA and diene conjugates, protein oxidative modification, catalase activity, SOD activity, reduced glutathione, glutathione-cycle enzymes activity.

Related references (max 3)  Indicate the impact factor of the cited reference


Related Inventions Disclosures and Patents

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Only participating in projects (please mark your selection with X)  FP7  NIH  X