## Dr. Yantsevich Aliaksei

### Post-translational modifications of cytochrome P450-dependent monooxygenases: mechanisms and regulatory role

Abstract

The report is dedicated to the investigation of possible posttranslational modifications (PTMs) of the members of cytochrome P450 family. PTM screening scheme was proposed, including experimental methods (tandem mass-spectrometry) and computational interpretation of the data obtained. Proposed scheme was tested on several groups of biological samples and should be widely applied in routine investigations of various biosamples in order to obtain reliable data on monooxygenase systems PTMs and their role in bioregulation.

Biography

PhD in Bioorganic Chemistry, Head of the Laboratory of Protein Engineering, Institute of Bioorganic Chemistry, National Academy of Sciences, Belarus

Area of scientific interests and experience: post-translational modifications of cytochrome P450 family, proteomics, synthetic biology. Author of more than 60 publications.

## Dzichenka Yaraslau

### Human sterol 7a-hydroxylase CYP7B1: purification and characterization of recombinant protein and its polymorphic forms

Abstract

Human cytochrome P450 CYP7B1 (CYP7B1) — a microsomal enzyme that catalyzes 7a-hydroxylation of oxysterols and other steroids. CYP7B1 is associated with several physiological functions depending on tissue localization, including bile acid biosynthesis, metabolism of steroid hormones (including neurosteroids), regulation of immunoglobulin production and metabolism of estrogen and androgen receptor ligands. CYP7B1 dysfunctions are associated with a number of genetic disorders, such as liver failure in newborns and with spastic paraplegia type 5 (SPG5), an autosomal recessive disorder in adults. Currently it is unclear whether this disorder is caused solely by a malfunction of steroid or oxysterol metabolism. So analysis of the differences between wild-type enzyme and its polymorphic forms, associated with SPG5, allowed us to propose molecular mechanism of this disorder.

Lecture plan

1. Overall characteristics of CYPs.
2. Sterol 7a-hydroxylases — main enzymes which are involved in bile acids biosynthesis.
3. CYP7B1: its properties and “blank spots“
4. Obtaining of human recombinant CYP7B1 and its mutant forms.
5. Screening of ligands of CYP7B1 and its mutant forms
6. Analysis of physical properties of CYP7B1 and its mutant forms.

Biography

PhD in Bioorganic Chemistry; In 2010 finished Belarusian State University, Physical Faculty, Biophysics department, specialty Physics (scientific production activity). From 2010 to 2013 was a PhD student, National Academy of Sciences of Belarus, specialty Bioorganic Chemistry; in 2015 defended a PhD thesis: “Physical-chemical characterization and catalytic properties of human sterol 7α-hydroxylases”. From 2010 works as senior researcher, Laboratory of Protein Engineering, Institute of Bioorganic Chemistry, National Academy of Sciences of Belarus. Delivers lectures on “Bioinformatics and computer-aided drug design“ for students of Biology

Faculty of Belarusian State University and MSc students of NAS of Belarus. Author of more than 40 publications.

Scientific interests: Analysis of structure and function of complex membrane multienzyme monooxygenase systems. Computer-aided drug-design. Computer modeling of protein structures. *In silico* and *in vitro* identification of novel ligands of cytochromes P450.

## Shapira Michail

### The shotgun proteomic approach in identification of CYP5A1 protein-protein interactions

Abstract

Thromboxane synthase – CYP5A1 (TXAS) is a protein of cytochrome P450 superfamily responsible for the production of thromboxane A2 (TXA2), a small metastable molecule possessing thrombocytes activating, inducing smooth muscle contraction and some other activities. The half-life period of TXA2 in free form is limited to 30 seconds. That cannot explain the way it interacts with a thromboxane receptor (TXAR) bounded to outer surface of the cell membrane. Possible way to extend the half-life period of TXA2 might be complexation with transport protein. Our work shows the way to find TXAS potential protein partners that might be able to transport TXA2 outside the cell by using specific methodology involving site-specific biotinylation, affinity chromatography and mass-spectrometry methods.

Biography

Master of Science in Biology, PhD student, Junior Researcher in National Academy of Sciences of Belarus, Institute of Bioorganic Chemistry, Laboratory of Protein Engineering.
Current research interests are directed on protein engineering and enzymatic research. Present research goals: obtaining several cholesterol oxidases from *Pseudomonas sp.* and *Streptomyces sp*. and getting affine antibodies to pregnancy-associated glycoproteins (PAGs) using methods of both computational and experimental chemistry.