RAPPORTO FINALE SUI RISULTATI DEL PROGETTO COMUNE DI RICERCA
FINAL REPORT ON RESULTS OF JOINT RESEARCH PROJECT

1. Accordo /Agreement

CNR / RAS

years 2008-2010

2. Title of the project
Ligand-binding proteins as a sensitive element of biosensors of high social significance".

Key words (max. 3) Proteins; Biosensors; Fluorescence

(solo per parte italiana)
Area scientifica / Scientific area **5**

3. Project leaders

Responsabile italiano	**Responsabile Russo**
D'auria sabato	Konstantin K Turoverov
Istituto di Biochimica delle Proteine Indirizzo Via Pietro Castellino, 111 80131 Napoli	Institute of Citology, Russian Academy of Science Address Thikoresti, 4 San Pietroburgo Russia

4. Aims of the project

The Laboratory of structural dynamics, stability and folding of proteins (head K.K. Turoverov) of the Institute of Cytology RAS has an effective cooperation with the Laboratory of Molecular Sensing (head S. D'Auria) of the Institute of Protein Biochemistry, CNR, Naples, which is the world leading laboratory in the development and constructing biosensors, for about ten years. The field of joint interest was the investigation of structure, stability and dynamics of the proteins which can be used as a sensitive elements in biosensors systems of high social significance.

5. Achieved results (one page)

In 2009-2010 the cooperation between Russian and Italian laboratories was developed in frame of the Program of Cooperation between Russian Academy of Science (RAS) and Council of National Research (CNR), project " Ligand-binding proteins as a sensitive element of biosensors of high social significance". The investigations of Russian laboratory were also supported by Government Contract between INC RAS and FASI from 10.03.2009 № 02.512.11.2277 in the frame of Federal Goal-oriented Program "Investigations and development of priority fields of science and technology in Russia for 2007-2012", project "Problem-oriented pilot investigations and formation of scientific groundwork in the field of living systems with the participation of Italian scientific organizations" (2008-2010). Scientific investigations were done in close cooperation of Russian and Italian laboratories. In the result of the investigations shows the availability of the use of sugar-binding proteins as a sensitive element of biosensor systems on glucose. The future progress in the development is connected with the construction of mutant forms of recombinant sugar-binding proteins with improved characteristics and constructing of base sheets, which will increase the fluorescence of sugar-binding proteins activated by fluorescent dyes due to plasmon-polarization resonance on the nano-clusters of noble metal incorporated in glass ceramic

6. Results obtained

	n./no.
Pubblicaz. scient. su riviste internaz./ scientific publications on international reviews con IF---------- senza IF	
Pubblicaz. in atti congressi internaz./ publications in international congress proceedings	4
Pubblicazioni in atti congressi nazionali / publications in national congress proceedings	
Pubblicazione libri nazionali / Publication of national books	
Pubblicazione libri internazionali / Publication of international books	
Altre pubblicazioni / other publications	
Brevetti / Patents	
Prototipi / Prototypes	
Strumentazione / Equipment and /or Devices	
Programmi software / Software	
Banche dati / Data bases	
Protocolli / Protocols	
Nuovi Materiali / New Materials	

Nuovi processi / New processes	
Cataloghi/inventari/repertori / Catalogues/Inventories	
Atlanti/Carte/Mappe / Atlases/Charts/Maps	
Progetti di ricerca / Reserch project	
Trasferimento innovazioni / Knowledge transfer	
Laboratori congiunti / Joint laboratories	
Alta formazione / Training	
Altro / Other	

7. Detailed information on obtained results

1. Olga I. Povarova, Olga V. Stepanenko, Anna I. Sulatskaya, Irina M. Kuznetsova, Konstantin K. Turoverov, Maria Staiano, Annalisa Vitale, Sabato D'Auria. **2010**. High stability of trehalose/maltose binding protein from Thermococcus litoralis makes it a good candidate as a sensitive element in biosensor systems for sugar control. ***Spectroscopy.*** Biomedical Applications (IOS Press). 24,3-4: 349-353.
2. Olga V. Stepanenko, Olga I. Povarova, Olesya V. Stepanenko, Alexander V. Fonin, Irina M. Kuznetsova, Konstantin K. Turoverov, Maria Staiano, Sabato D'Auria. **2010**. Structure and stability of D-galactose/D-glucose-binding protein. The role of D-glucose binding and Ca ion depletion. ***Spectroscopy***. Biomedical Applications (IOS Press). 24,3-4: 355-359.
3. Olesya V. Stepanenko, Irina M. Kuznetsova, Vladislav V. Verkhusha, Maria Staiano, Sabato D'Auria, Konstantin K. Turoverov. **2010**. Denaturation of proteins with beta-barrel topology induced by guanidine hydrochloride. ***Spectroscopy.*** Biomedical Applications (IOS Press). 24,3-4: 367-373.
4. Olga V. Stepanenko, Olesya V. Stepanenko, Olga I. Povarova, Alexander V. Fonin, Irina M. Kuznetsova, Konstantin K. Turoverov, Maria Staiano, Antonio Varriale, and Sabato D'Auria **2010**. Structure and unfolding/refolding of D-galactose/D-glucose-binding protein from Escherichia coli. The role of calcium ion in the stabilization of the protein open form. (Submitted)

8. Training of young researchers

Dr. Olga Stepanenko; Dr. Olesya Stepanenko;

9. Reasons for cooperative project developments in the following years, if any
(extension to other countries, multilateral collaboration, national or international contracts

The methodologies developed in this project are of high interest and represent an excellent point to apply to European projects with additional European labs.

(Signature of the Italian project leader)

(Signature of the Russian project leader)

(firma del direttore)

Napoli, 15 September 2010