

## QUESTIONNAIRE

(\*) – mandatory fields

|                                                                                                                                          | <b>Details about organisation</b>                                                                                                   |
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| <b>* Organisation name</b>                                                                                                               | H.Buniatian Institute of Biochemistry                                                                                               |
| Organisation acronym                                                                                                                     | HBIB                                                                                                                                |
| <b>* Organisation Activity Type</b><br>(RES - Research, HE - University, SME - Small and Medium Enterprise, IND - Industry, OTH - Other) | <b>RES</b>                                                                                                                          |
| <b>* Keywords of main research areas</b>                                                                                                 | Biochemistry, neurochemistry, molecular biology, immunology                                                                         |
| <b>* Head of organisation (first name, family name)</b>                                                                                  | Gevorg Gevorgyan                                                                                                                    |
| <b>* Post code</b>                                                                                                                       | 0014                                                                                                                                |
| <b>* Country</b>                                                                                                                         | Republic of Armenia                                                                                                                 |
| <b>* City</b>                                                                                                                            | Yerevan                                                                                                                             |
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| <b>* Description of organisation and its research achievements for the last five years (~ 5000 signs)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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| <p>The development of biochemical studies in Armenia served the basis for founding the Institute of Biochemistry in 1961 within the system of the Academy of Sciences of the Armenian SSR, later named for H.Buniatian (the first director). Earlier, it was a Sector of Biochemistry in the L.Orbeli Institute of Physiology. At present H.Buniatian Institute of Biochemistry (HBIB) comprises 1 Department (with 3 laboratories and 1 group), 8 laboratories and 2 groups, where the scientific staff consists of 103 employees. Young scientists (28) are very active in their explorations and a number of them either have defended their theses, or are in the process of preparation of defending.</p> <p>Since the establishment of the Institute there were collected new data on brain biochemistry, which revealed the role of the CNS in the regulation of metabolic processes. Special attention was paid to problems of the metabolism of carbohydrates, the metabolic role of gamma-aminobutyric acid, the regulation of nitrogen and energetic metabolism, the synaptic activity of mediator amino acids in aging proteins, the formation of the cycle of urea synthesis, the process of ammonia-formation and neutralization, the lipid and proteolipid metabolism in the nervous system, etc. Significant studies were also performed in the field of the biochemistry of specific metal-containing proteins, neurohormones, vitamins, and mineral substances. A great deal of research was devoted to the study of the important physiologically active compounds and their derivatives in the regulation of neurohumoral processes. Over forty years Prof. A.Galoyan and his colleagues developed two new trends: the neurochemistry and neuroendocrinology, as well as the neuroendocrine cardiology and</p> |

neuroendocrine immune system of the brain. This was proved by the synthesis of numerous cardiotrop hormones and the existence of immunomodulators in the neurosecretory granules of the hypothalamus. Thus, the existence of a brain-heart neurohumoral system has been established, which is of great importance in the regulation of the cardio-vascular system in the normal state and in pathology.

In the course of the past fifteen years Prof. A.Galoyan has developed a theory of the neuroendocrine immune system of the brain. Over twenty new immunomodulators and fragments of hemoglobin were isolated from the hypothalamus and neurosecretory granules. Their primary structures are deciphered. They are powerful remedies for hematopoietic diseases, and are used as antiviral, antimicrobial, etc. remedies, as well as a substance against anthrax. One of the proline-rich cytokines is a strong regulator of lympho- and myelogenesis. Hence, the discovery of biologically active peptides and proteins in the brain and the deciphering of their chemical structures represent a new page in the development of neurobiology, the immune system, and a number of medical studies.

The indicated substances served the basis for the ISTC Partner projects directed to the creation of an effective new neurohormonal drug preparation for the treatment of several diseases of hematopoiesis: lymphocytopenia induced by chemotherapy of breast and other cancers, radiation, as well as immune diseases, etc.

|                                                            | <b>Contact Information</b>                           |
|------------------------------------------------------------|------------------------------------------------------|
| <b>* Contact person (first name, family name)</b>          | Karine Gevorgyan                                     |
| <b>* Department / Laboratory</b>                           | Administration                                       |
| <b>* Position</b>                                          | Scientific secretary on international co-operation   |
| <b>* Qualification and research experience</b>             | Expert in applications for grants                    |
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| <b>International co-operation / Participation in EU RTD programmes or other bilateral / multilateral actions</b>  |
|-------------------------------------------------------------------------------------------------------------------|
| INTAS, TACIS, TEMPUS, COST, EUREKA, other RTD programmes (please specify programme/s, project title/s and year/s) |
| During past years the Institute received numerous grants from INTAS, DAAD, ANSEF, FEBS, NATO and ISTC             |

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|                           | <b>* Please, use “X” to indicate the scientific area/s of your potential project</b> |
|---------------------------|--------------------------------------------------------------------------------------|
| CHEMISTRY                 |                                                                                      |
| SOCIAL AND HUMAN SCIENCES |                                                                                      |
| ECONOMIC SCIENCES         |                                                                                      |
| ENGINEERING SCIENCE       |                                                                                      |
| ENVIRONMENT               |                                                                                      |
| AGRICULTURE AND FOOD      |                                                                                      |
| HEALTH                    | X                                                                                    |
| MATHEMATICS               |                                                                                      |
| INFORMATION SCIENCE       |                                                                                      |
| PHYSICS                   |                                                                                      |
| NANOTECHNOLOGIES          |                                                                                      |
| ENERGY                    |                                                                                      |
| TRANSPORT                 |                                                                                      |
| SPACE                     |                                                                                      |

| <b>* Summary of potential research project envisaged hosting of European researcher for the period of between 1 and 2 years</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
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| <p>Bipolar disorder (BD) is a serious pathology of infringement of the brain function under chronic condition inducing development of various mental displays dangerous to life. Over one percent of the world population suffers of that disorder. The treatment of this pathology is connected with application of various preparations, among which in the past 15 years univalent cation lithium is included. Studies of biological action of lithium at a molecular-cellular level showed its inhibiting action on enzymes of signal transduction system as glycogen synthase kinase-3 and neurotrophic signaling cascades, inositol monophosphatase, inositol polyphosphate 1-phosphatase, glycogen synthase kinase-3, fructose 1,6-bisphosphatase, bisphosphate nucleotides, and phosphoglucomutase enzymes. It has been shown lithium’s intracellular downstream targets including adenylate cyclase, the phosphoinositol cascade (and its effect on protein kinase C), arachidonic acid metabolism, and effects on neurotrophic cascades. Many of the new insights of lithium actions may lead to the strategic development of improved therapeutics for the treatment of BD. A number of studies show that the outcome for a high percentage of patients is poor, with a high rate of chronic, residual symptoms, relapse, subsyndromes, cognitive and functional impairment, and psychosocial disability. In addition to the tremendous economic cost, suicide is estimated to be the cause of death in 10–20% of the individuals with BD, and increasingly, mood disorders are associated with many other health-related consequences. The discovery of lithium efficacy as an antimanic agent over fifty years ago revolutionized the treatment of patients with BD. The remarkable efficacy of lithium has served to spark a revolution that has, over time, reshaped not only medical and scientific but also popular concepts of severe mental illnesses. Indeed, the efforts to understand how a simple monovalent cation like lithium can exert such profound beneficial effects has led the investigators to examine the signal transduction pathways involved in BD. After nearly fifty years, lithium continues to be one of the mainstays of treatment for this disorder, both for the acute manic phase and as prophylaxis for recurrent manic and depressive episodes. Adequate lithium treatment, particularly in the context of a lithium clinic (an outpatient clinic dedicated to the treatment of bipolar patients and psychopharmacological management of lithium), also reportedly reduces the excessive mortality observed in the illness. In the last decade, there has been an explosion in the number of options available for the treatment of recurrent mood disorders with a parallel and</p> |

unprecedented increase in the interest in the treatment of BD by pharmaceutical companies, clinicians, researchers, and indeed the general public. Despite the introduction of a number of new anticonvulsants and antipsychotics into the pharmacopeias, the last three years appeared to be of a resurgence of interest not only in lithium utility in the long-term treatment of BD, but possibly also for neurodegenerative disorders. Consistent evidence shows that lithium is effective for reducing the risk of suicide. This renewed interest in lithium has come about largely due to converging evidence from biochemical studies that have identified critical signaling and neurotrophic molecules as targets for lithium actions. Thus, we suggest realizing a project directed to the creation of the effective new Li<sup>+</sup>-content peptide preparation for the treatment of several diseases of pathogenesis of BD, probably, other immune disorders of the brain.

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|                                                                                                                                                                                                                                         | <b>Please, confirm your agreement on data publication and dissemination</b> |
| <b>I agree with the publication of the data</b> on the web-site <a href="http://www.inco-eeca.net">http://www.inco-eeca.net</a> , and <b>dissemination</b> among Mobility National Contact Points of the EU MS and AC <b>(YES / NO)</b> | <b>YES</b>                                                                  |
| <b>Date</b>                                                                                                                                                                                                                             | October 23, 2008                                                            |