
St. Anne's University Hospital - International Clinical Research Center background document: Vital information for applicants

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St. Anne's University Hospital (FNUSA)

Current legal status of FNUSA was set on November 25, 1990 by Decision OP-054-25.11.1990 of the Ministry of Health of the Czech Republic and by a deed of incorporation, as amended on May 10, 2007, ref. no. MZDR 2942/2007 for an indefinite period of time as a state-subsidized organization under the full authority of the Ministry of Health, and acts as an independent legal entity.

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FNUSA provides comprehensive diagnostic, therapeutic and healthcare services in an institutional, outpatient and inpatient manner, and carries out comprehensive medical activities.

Other main operations include:

- Carrying out scientific and research projects including clinical trials of pharmaceuticals and medical devices;
- Taking part in the professional training of students from nursing colleges, technical colleges and universities;
- Special education for doctors, dentists and pharmacists, and education programs for people employed in non-medical positions;
- Financial, operating, investment, administrative and other operations in the scope necessary to meet the purposes for which FNUSA was established.

FNUSA as university hospital is a research organization by definition of Community Framework for State Aid for Research and Development and Innovations (2006/C 323/01), that combines clinical practice, clinical research and clinical education. Specialized departments at FNUSA are training and educational facilities for the Medical School of Masaryk University, or other faculties and training facilities for further education of doctors, pharmacists and other experts from the field of medicine.

In the Czech Republic, only university hospitals can provide such wide range of activities related to advanced medical research (mainly applied research). FNUSA is the only university hospital in the Czech Republic that has received funding from the Structural Funds of the European Union for creating a European Center of Excellence (for details please see the next chapter).

About International Clinical Research Center

The International Clinical Research Center is an integral part of St. Anne's University Hospital in Brno; the center uses the acronym FNUSA-ICRC.

FNUSA-ICRC is an innovative science and research center and a top-quality public healthcare center focusing on prevention, early detection and cure primarily of cardiovascular and neurological diseases (for more details about research programs please see the appendix).

FNUSA-ICRC is based on almost ten years of successful cooperation between St. Anne's University Hospital in Brno and the Mayo Clinic in Rochester, Minnesota (USA).

FNUSA-ICRC represents a multi-functioning unit combining the following elements:

- An innovative international research and development center, a European Center of Excellence;
- An international educational center, disseminating the latest knowledge in health care;
- A state-of-the-art center for public health care providing clinical, therapeutic and preventive care in the areas of cardiovascular medicine and neuroscience;
- A technology cluster for companies collaborating in research and development.

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FNUSA-ICRC is being built on principles similar to those established in other international research centers such as the International Space Station (ISS), the European Organization for Nuclear Research (CERN, Switzerland), and the International Thermonuclear Experimental Reactor (ITER, France).

In 2006, the Government of the Czech Republic included FNUSA-ICRC among the priority projects contributing to the development of a knowledge economy in the Czech Republic.

In addition to the allocated resources from the state budget of the Czech Republic, FNUSA-ICRC has received just over 110 million Euro co-financing from the Structural Funds of the European Union, from the Operational Program "Research and Development for Innovation" (the Czech acronym for the program is "VaVpl").

Construction of the project's hard infrastructure started in June 2010. Completion of the first phase is planned for 2012. The majority of the research projects have started already.

Even though the cooperation with Mayo Clinic still represents the most important strategic alliance of FNUSA-ICRC, the network of scientific co-operation has been extended to about a dozen organizations based both in Europe and in the USA.

What is the role of the Chair?

The Chair will lead ICRC towards becoming a European Center of Excellence and implement research programs focused on cardiovascular and neurological diseases, with the long term goal of marked improvement of health care and quality of life through linking clinical care, research and development, education and cooperation with the industrial sector.

Selected key responsibilities of the Chair:

- Serves and a guardian of the ICRC mission and vision;
- Sets goals and priorities in clinical practice, research and education that stem from the ICRC strategy;
- Holds overall responsibility for the clinical practice, scientific, and educational mission of ICRC;
- Ensures research programs meet approved goals;
- Determines resource allocation to research programs and if necessary reallocation of resources so that meeting of set goals and excellence is properly supported;
- Facilitates collaborative relationships among existing and potential research partners.

Topics of special interest in cardiology include development of novel methods, technologies and therapeutic strategies for prevention, early detection and individualized treatment especially of heart failure, coronary heart disease, cardiac arrhythmias, hypertension and metabolic syndrome. Special attention is dedicated to development of novel technologies for cardiovascular and transplant surgery. All research and clinical programs are expected to be high-tech oriented, including utilization of biotechnologies and nanotechnologies.

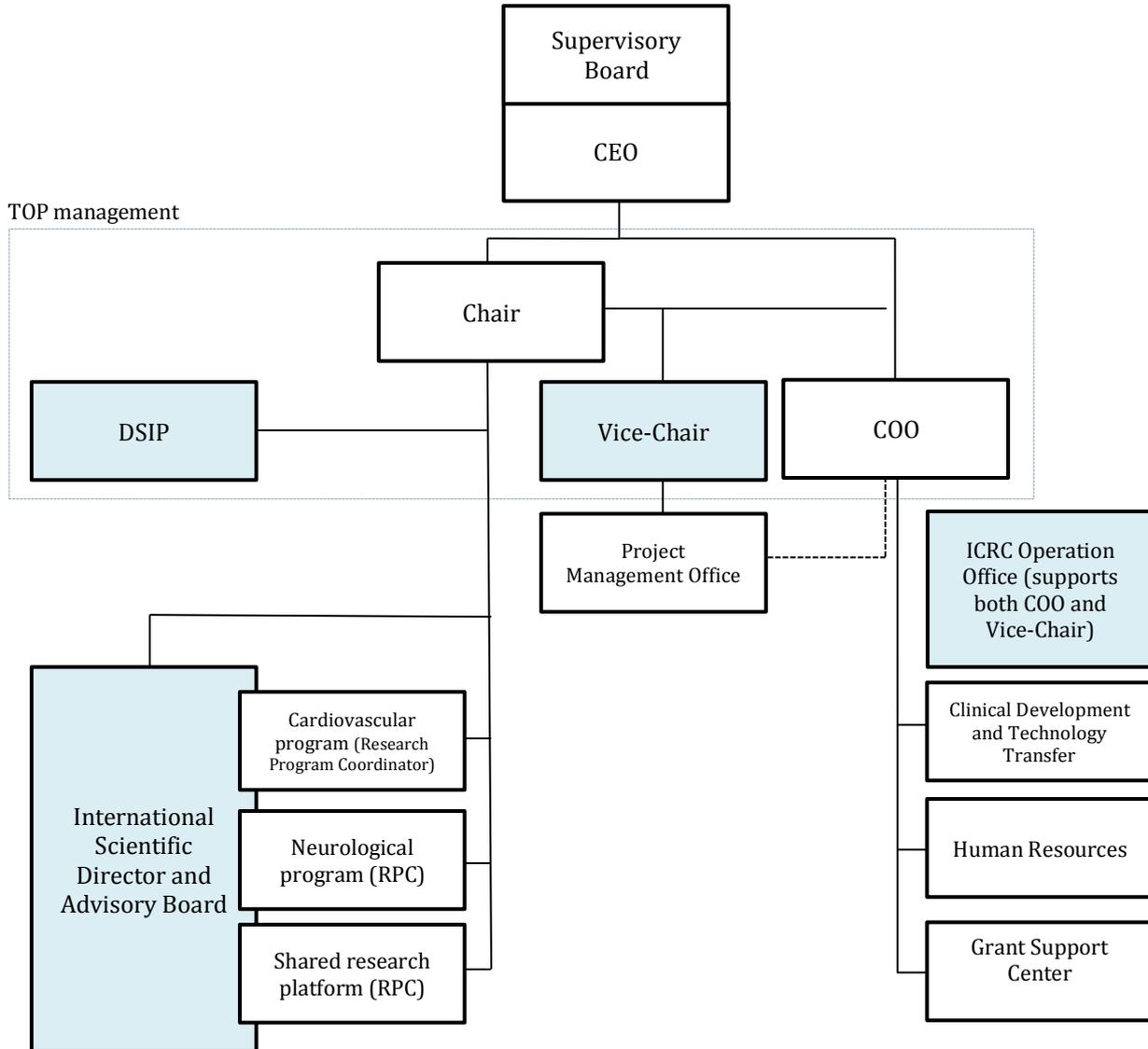
Topics of special interest in neurology include the development of new technologies and methods for prevention, early diagnostics and treatment of cerebrovascular diseases, Alzheimer's disease, and multiple sclerosis.

The Chair position ought to be held by an accomplished individual who has a demonstrated track record of internationally recognized research, a commitment to clinical research, and the leadership and management skills to build and sustain international research center supporting excellence, high-performance and corresponding corporate climate based on mutual respect, recognition and trust.

Applicants must possess an M.D., Ph.D., or equivalent degree. For details please see below the advertisement.

The internal management structure of FNUSA / FNUSA-ICRC is shown in the abbreviated organization chart below¹.

¹ The internal management structure of FNUSA / FNUSA-ICRC is currently subject to a formal change management review by MEYS.



The Chair reports into the ICRC Supervisory Board that has 9 members (at least 3 foreigners) and is chaired by the Hospital Director. The decisions of the ICRC Supervisory Board are binding both for the Hospital Director and the Chair.

The internal reporting structure of ICRC is intentionally flat and research programs (see appendix) report directly to the Chair. The Chair can delegate tasks / responsibility at his / hers discretion to Chief Operation Officer, Director for Strategic International Partnerships and Vice-Chair so that the Chair can devote its focus to activities of the highest importance.

The above description clearly indicates that two important internal interfaces exist:

- Interface between the Hospital Director and the Chair and,
- Interface between FNUSA-ICRC as an integrate part of the hospital and added value creating and support functions of the hospital (i.e. FNUSA).

The importance of the above mentioned interfaces stems from the following factors:

- The Hospital Director has the ultimate responsibility for all aspect of the hospital (as stipulated by the current Czech legislation), the responsibility is delegated to a large extend, however, to the Chair via the ICRC Rules of Organization,
- FNUSA-ICRC communicates, co-operates and is supported by existing FNUSA internal departments and their respective processes, the obtained / exchanged information / data is integrated by FNUSA-ICRC internal functions into documents and such as per the requirements of Operational Program "Research and Development for Innovation" and reported both externally and internally, this represents a major and highly complex effort / process that has to produce results of a very high quality.

Local environment

Vital information about the city of Brno and South Moravian Region can be found here:

<http://survival.rrajm.cz/>

Additional relevant information

Mission of FNUSA-ICRC: To contribute to health care and quality of life through research leading to breakthrough discoveries in medicine, an innovative education system, and clinical care respecting the needs of the patient.

Vision of FNUSA-ICRC: Marked improvement of health care and quality of life through linking clinical care, research and development, education and cooperation with the industrial sector.

We are convinced that a qualitative change in health care and quality of life can be attained above all through the development of strong international partnerships enabling true systemic changes to the environment. To attain this goal, we foster cooperation with research specialists of leading organizations in the Czech Republic and abroad, including the renowned Mayo Clinic.

Corporate motto of FNUSA-ICRC: "Creating the future of medicine"

FNUSA-ICRC web presentation: <http://www.fnusa-icrc.org/en/>

Appendix: Research programs

Research programs of FNUSA-ICRC consist of two main research programs, each of which is divided into several sub-programs, and a shared multi-disciplinary support platform for experimental medicine and biotechnologies. Each of the sub-programs is staffed by multinational teams led by top specialists from the Czech Republic, Mayo Clinic, and other renowned institutions.

CARDIOVASCULAR program: *Development of Novel Strategies for Early Diagnostics and Advanced Treatment of Cardiovascular Diseases*

The program focuses on research in the fields of cardiovascular and transplant surgery as well as diagnostics and therapy of cardiovascular diseases, such as the development of novel technologies and methodologies for the diagnostics and treatment of ischemic cardiomyopathy, heart failure, and cardiac arrest, and the area of heart transplantation including the utilization of biotechnologies and nanotechnologies. One of the sub-programs is focusing on the development of novel top-quality imaging technologies. A wide range of activities is focused on the development of novel methods for the prevention of cardiovascular diseases.

Sub-programs:

1. **Cardiovascular and a Transplant Surgery, Heart Failure Treatment and Transplant Program - Development of Novel Diagnostic and Therapeutic Strategies:**

- The development of a new regulatory feedback system for a ventricular assisting device, to mimic the physiological variability of cardiac output/blood flow.
- The development of novel stem cell technologies for improving myocardial regeneration.
- The development of novel peptide molecules for enhanced myocardial protection and regeneration.
- The development of novel therapeutic strategies for reduction in the left ventricular mass and attenuation of allograft vasculopathy following cardiac transplantation: a therapeutic and mechanistic approach.
- The establishment and long-term support of databases for acute heart failure and heart transplant programs.

2. **Interventional Cardiology and Acute Coronary Syndromes - Development of Novel Strategies for Early Detection and Advanced Treatment:**

- The development of new coronary stents using hi-tech bio- and nanotechnologies to prolong stent durability and ensure better stent acceptance.
- The development of new artificial vessels using hi-tech bio- and nanotechnologies to prolong artificial vessel durability and to ensure better vessel acceptance.

- The development of an original register enabling the comparison of different types of treatment in patients with acute myocardial infarction with simultaneous significant stenosis at non-infarct coronary arteries and a Prague 13 study.

3. Cardiac Electrophysiology and Pacing - Development of Advanced Diagnostic and Therapeutic Strategies:

- Cardiac electrophysiology and central nervous system applications: use of cardiac electrophysiology experiences to develop novel technologies for the treatment of stroke, epilepsy, and other central nervous system disorders.
- The development of a novel generation of mechanical heart pump to support systemic circulation and aid management of intractable congestive heart failure, manage ventricular fibrillation with painless therapy, and to substitute for surgically implanted cardiac valves.
- The development of novel technologies to prevent complications of cardiac arrhythmias, particularly thromboembolic stroke in patients with atrial fibrillation.

4. Cardiovascular and Metabolic Disorders - Identification of New Risk Factors and Development of Novel Therapeutic Methods:

- Studying the significance of risk factors, such as breathing disorders in sleeping, or “sleep apnoea”, and their connection with obesity and other cardiovascular diseases including myocardial infarction.
- The development of novel technologies allowing the exploration of links between the cardiovascular and central nervous systems.

5. Non-Invasive Cardiovascular Imaging - Development of Novel Methods and Technologies:

- Providing technology and training for the integration of ultrasound and biophotonics based imaging guidance with Magnetic Resonance Imaging (MRI), Computed Tomography (CT) and Positron Emission Tomography (PET) to define the specifications of an Interventional Imaging Operating Network.
- The development of new strategies in the assessment of myocardial perfusion through the comparison of MRI and PET results.
- The development of new contrast agents with specific features for the assessment of myocardial perfusion as well as for drug delivery or stem cell treatment.
- The development of new syringe pumps for the administration of contrast agents at defined rates.

6. Development of Novel Methods and Interventions to Reduce Risk Factors and Cardiovascular Diseases in the General Population:

- Screening for risk factors in an unselected sample of the general population in the City of Brno and development of an advanced system of preventive intervention with the primary target of changing the lifestyle and behavior of the population in order to decrease the incidence of the major risk factors.

7. Tissue Engineering in Cardiovascular Research:

- The development of novel artificial biological valves which due to their new structure will have a much lower risk of calcification and therefore a significantly lower risk of early degeneration or rejection.

NEUROLOGY program: *Development of Novel Strategies for Early Detection and Advanced Treatment of Neurological Diseases*

Four strategic sub-programs have been selected in the area of neurosciences. These aim at solving the priority problems of neurological research. The sub-programs are focusing on the development of new technologies and methods for prevention, early diagnostics and treatment of cerebrovascular diseases, epilepsy, Alzheimer's disease, and multiple sclerosis.

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Sub-programs:

1. Cerebrovascular Disease - Development of Novel Strategies for Early Detection and Advanced Treatment:

- Development of new diagnostic algorithms for stroke: implementation of at least three research protocols in total related to biomarkers of stroke and CT-based diagnosis of stroke.
- Development of new therapeutic algorithms for stroke: development and initiation of at least five research protocols related to: superior recanalization methods, improvement of collateral flow, interventional treatment, and rehabilitation after stroke.

2. Neuroepidemiology (with pilot projects focusing on stroke and dementia):

- Creation of a database of stroke patients to study the epidemiology of stroke. During the first years the database will include a catchment area ICRC/FNUSA and later can be extended to other cooperating organizations from the Southern Moravian region.
- Establishment of a data repository (ICRC/FNUSA, The Motol University Hospital, Mayo Clinic) that describes longitudinal changes in the brain structure and metabolism in healthy elderly patients, mildly cognitive-impaired patients, and Alzheimer's disease patients.

- Creation of a biological sample bank where blood samples will be collected and stored for future genetic analysis and CSF samples for biomarker evaluation in Alzheimer disease patients.
- Creation of cognitive data repository using specific neuropsychology protocols and tools for testing hippocampus-related memory impairment as an early specific sign of Alzheimer's disease.
- Creation of an MRI database for the longitudinal study of brain atrophy in patients with cognitive impairment; implementation of advanced MRI techniques in the differential diagnosis of dementia and normal pressure hydrocephalus.

3. Development of Advanced Neuroimaging:

- Utilization of advanced computer systems and other tools for experimental imaging of the central nervous system and its application in diagnosis and treatment.

4. Multiple Sclerosis - Development of Novel Strategies for Early Diagnostics and Advanced Treatment:

- The development of relevant animal models of the disease in order to test cell therapy approaches, with an intrathecal application of stem cells.
- The development of a protocol for assessing cell bio-distribution, cell tracking, stem cell implantation, and molecular imaging in MS animal models
- The investigation of different types of stem cells (neural stem cells, bone marrow derived stem cells, mesenchymal stem cells, and induced pluripotent stem cells) in the repair mechanism in animal models of MS.
- The assessment of the biodistribution, viability, and differentiation of cells delivered in animal models by direct and indirect methods
- The investigation of the conditions of the immune system of MS models and patients, including locally-acting cytokines and co-stimulatory molecules, under the influence of various therapeutic approaches, and to develop, based on the results from animal models, complex clinical studies on human subjects for the cellular treatment of MS
- Obtaining of information on the feasibility, bio-distribution, safety, and efficacy of stem cells on animal models of MS and to obtain data on the design of the first human clinical trial.

RESEARCH PLATFORMS: *Integrated Multidisciplinary Platforms for Experimental Medicine and Biotechnology*

The fundamental pre-requisite for the stimulation of clinical research's potential is the integrated multidisciplinary research platform consisting of research sub-platforms which serve as research support units or as units of (basic) research for applied clinical research within research programs. Integrated research sub-platforms are units enabling synergy and interdisciplinary overlap between research programs.

To support accomplishment of priority goals of FNUSA-ICRC in the areas of cardiology and neurosciences, 6 sub-platforms have been created. These provide high-quality facilities in the areas of animal research (pre-clinical models), development of new biomolecules and new technologies in cell engineering, development of new types of stem cells, bio-medical engineering and clinical pharmacology unit for the development of new pharmaceuticals.

AC: Animal Center:

- The development of advanced diagnostic and therapeutic strategies for cardiovascular and neurological diseases on animal models.

CBCE: Center of Bio-molecular and Cellular Engineering:

- The development of a robust, reproducible, and efficient platform for culturing pluripotent cells and testing synthetic compounds.
- Engineering of versatile tagging technology for in vitro and in vivo experiments.
- Engineering small molecules affecting genomic stability via newly defined targets.
- Engineering of bioactive surfaces – “molecular lawns”.

ICCT: Integrated Center of Cellular Therapy and Regenerative Medicine:

- Use of adult stem cells and induced pluripotent stem cells for generating mature and functional cardiac or neuronal cells in vitro.
- Use of bioimaging and nanoimaging techniques for tracking of transplanted cells in vivo.
- Identification of cell differentiation, survival, integration, and functional restitution in damaged tissues in animal models.
- Scaling-up of stem cell based products for clinical therapies.

BME: Center of Biomedical Engineering:

- Organizing, processing, archiving, and securing of data acquired during all kinds of research protocols.
- Introduction of advanced cellular cardiac electrophysiology.
- Development of blood pressure control evaluating methods based on noninvasive beat-to-beat recording of circulatory variables in human subjects.
- Development of advanced technologies for rehabilitation.
- Development of signal processing methods for advanced ultrasound cardiovascular imaging.

CMI: Center of Molecular Imaging:

- Development of new protocols for positron emission tomography imaging for the cardio and neuro research programs.
- Development of new radiopharmaceuticals for positron emission tomography imaging.

CPU: Clinical Pharmacology Unit:

- Implementation of Clinical Pharmacology Unit dedicated to perform first-in-man and other types of Phase I clinical trials for development of new pharmaceuticals and medical devices.

These sub-platforms provide a very strong basis for inter-disciplinary cooperation enabling creation of dynamic international research teams according to the needs of individual research projects. International teams composed of specialists from sub-programs of Cardiovascular and Neurology programs will thus be able to seek solution for any scientific/research project or conduct development of any new technology. Such multidisciplinary projects underline the basic focus of the FNUSA-ICRC project, to serve as a platform for the globalization of medical science.