

ST. ANNE'S
UNIVERSITY
HOSPITAL
BRNO



INTERNATIONAL CLINICAL RESEARCH CENTER

“CREATING THE FUTURE OF MEDICINE”

EVOLUTION OF A TRANSATLANTIC COLLABORATION IN ADVANCED MEDICAL RESEARCH

– THE MAYO-ICRC EXPERIENCE

Tomas Kara MD, PhD

Virend K. Somers MD, DPhil

And the Mayo-ICRC Team

21 October 2010







WHY AN ICRC

(INTERNATIONAL CLINICAL RESEARCH CENTER)?

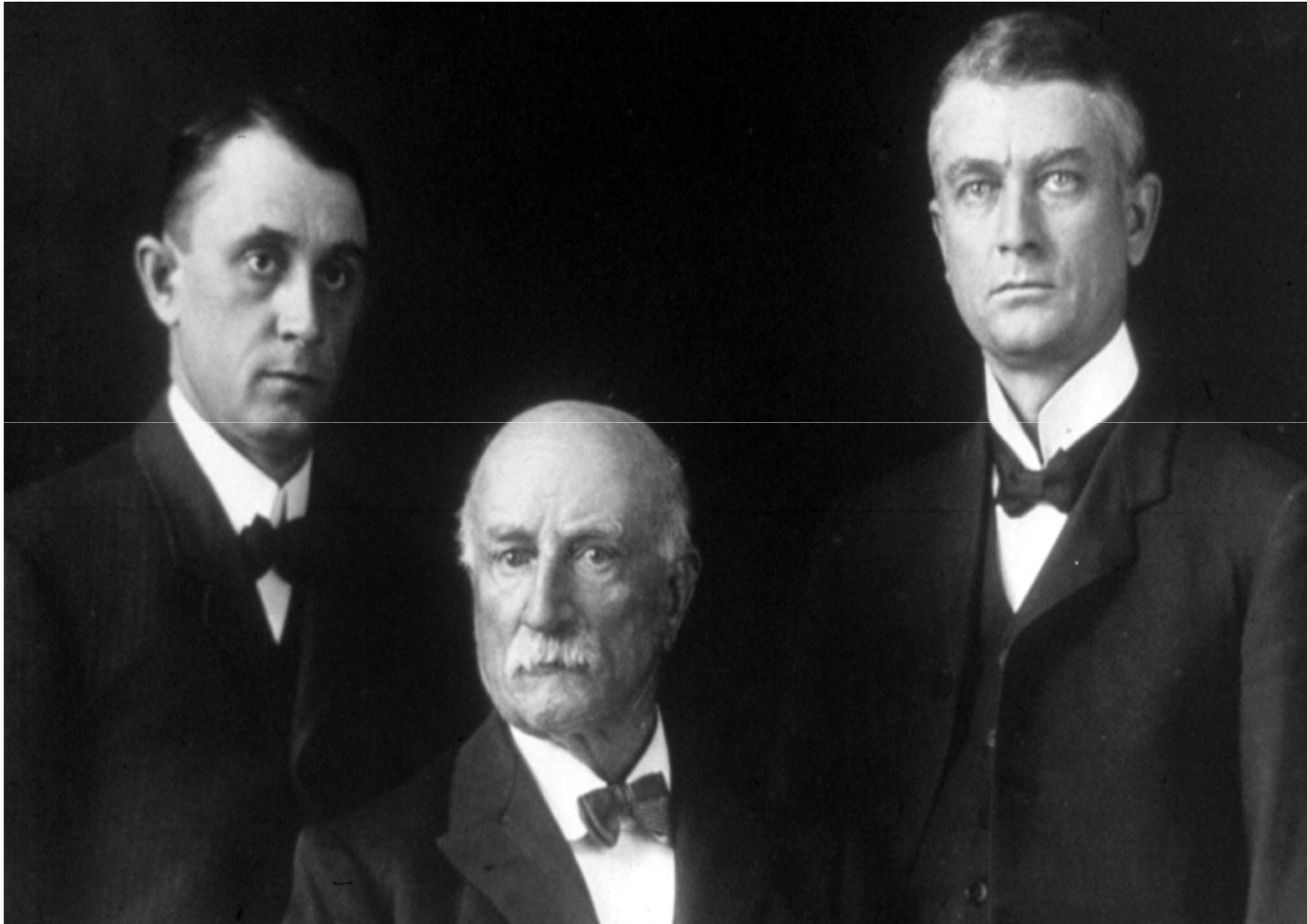
- International Scientific Networking is a key concept of medical research in the 21st century
- High flexibility and capability to accelerate research and translation of results into clinical practice
- ICRC is *complementary* to Mayo
- **SYNERGY**

WHY MAYO CLINIC?



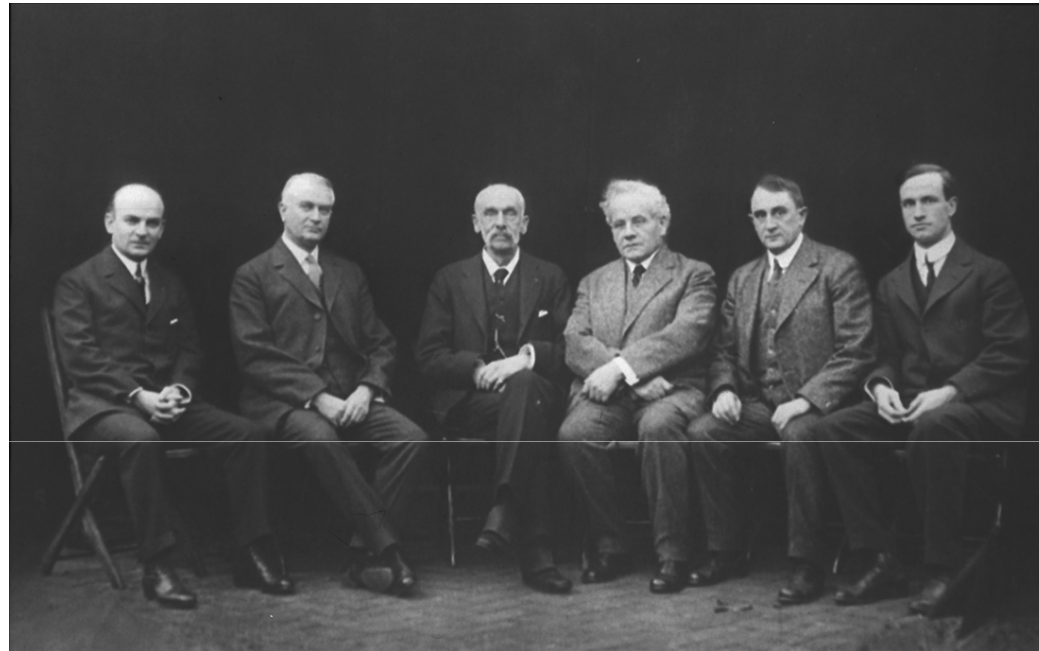


MAYO CLINIC FOUNDERS



W.W. Mayo and Sons, ~1890

MAYO CLINIC - 1907



- “Mayo Clinic” – term used for the first time
- 8 medical staff
- 5,000 patients registered

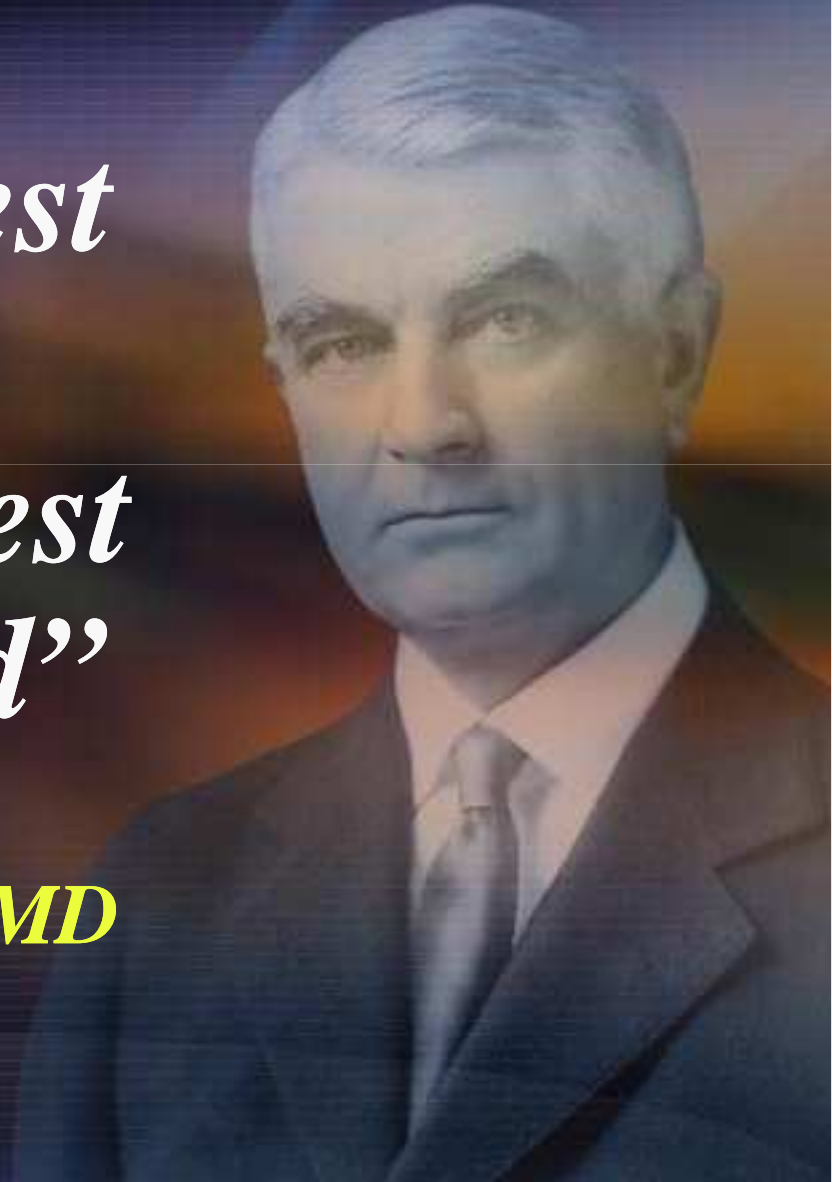


SAINT MARYS HOSPITAL



*“The best interest
of the patient
is the only interest
to be considered”*

William J. Mayo, MD









MAYO CLINIC GONDA BUILDING



- **Total employees** >50,000
- **Students/residents** >3,000
- **Research** >2,500
- **Revenues** >\$6B
- **Assets** \$3.5B



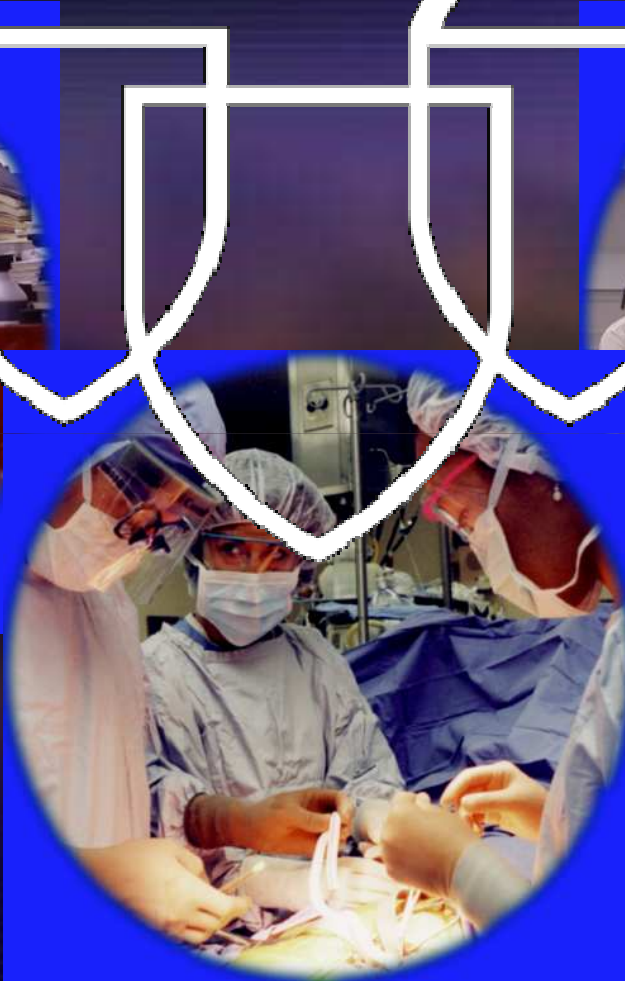
- Research – approx. \$ 400 million
 - > 8,000 research projects
 - > 3,000 grants/contracts
- Employee Education – >\$ 150 million
 - > 300 courses/year

- **>400 invention disclosures per year**
- **49% commercialization success rate**
- **\$117 million NOI since 1986**
- **>2,600 patents filed**
- **>1,700 active files**
- **>560 active license agreements**
- **47 start-up companies**

mayo



Research



Clinical Practice



Education

CONTRIBUTION OF MAYO CLINIC TO ICRC PROJECT

- Essential contribution to ICRC **concept development**
- Comprehensive Research Project
Management and **direct participation of leading Mayo specialists in R&D programs**
- Substantial contribution to joint research **project financing and realization**
- Special **educational** programs – mentoring of Czech/European Young Investigators

WHY BRNO?

- Essential contribution of St. Anne's University Hospital specialists to development of the ICRC concept





- **Proactive international scientific networking**
- **Flexible laboratory track system**
- **Dynamic Research Team**



International Space Station (ISS)

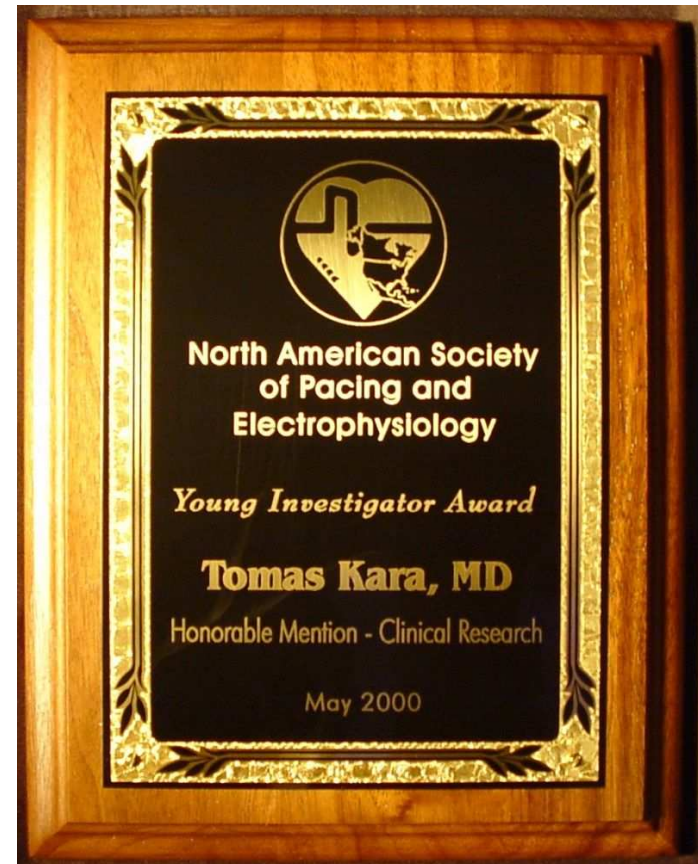
WHY BRNO?

- **Essential contribution of Brno specialists to development of the ICRC concept**
- ***Long-term track record of successful scientific collaboration, publications, intellectual property development and mutual trust***

HISTORY OF COLLABORATION

Brno/Washington/Mayo 2000

History of collaboration began in 2000 when Pavel Jurak and Tomas Kara visited Mayo after receiving the Young Investigator Award of the North American Society of Pacing and Electrophysiology for their work on neural circulatory control in vasovagal syncope.



SUMMARY OF RESEARCH COLLABORATION MAYO & ISI/ST. ANNE'S HOSPITAL (2001-2010)

- 18 completed research projects
- **35 papers [IF >150], 2 book chapters and 1 book published**
- **5 manuscripts in preparation/submission**
- 8 functional prototypes and 4 software packages developed for high- resolution data acquisition and processing
- 1 U.S. Patent Awarded
- 8 U.S. Patent Applications submitted/pending/ in preparation (Mayo Clinic Health Solution)
- **Contribution to Mayo Clinic – Hewlett-Packard monitoring technology development**
- 3 scientific awards (ISH, CSH, **Mayo Outstanding Research Award**)

Myocardial Infarction

Day–Night Variation of Acute Myocardial Infarction in Obstructive Sleep Apnea

Fatima H. Sert Kuniyoshi, PhD,*† Arturo Garcia-Touchard, MD,* Apoor S. Gami, MD,*
Abel Romero-Corral, MD, MSc,* Christelle van der Walt, RPSGT,* Snigdha Pusalavidyasagar, MD,*
Tomas Kara, MD, PhD,‡ Sean M. Caples, DO,§ Gregg S. Pressman, MD,¶ Elisardo C. Vasquez, PhD,†
Francisco Lopez-Jimenez, MD, MSc,* Virend K. Somers, MD, PhD, FACC*

Rochester, Minnesota; Vitoria, Brazil; Brno, Czech Republic; and Philadelphia, Pennsylvania



American College of Cardiology

Cardiosource Review Journal

Formerly *ACC Current Journal Review*

“The diurnal variation in the onset of MI in obstructive sleep apnea (OSA) patients is strikingly different from the diurnal variation in non-OSA patients. Patients having nocturnal onset of MI should be evaluated for OSA, and future research should address the effects of OSA therapy for prevention of nocturnal cardiac events.”

See Journal Scan, page 15.

Heart Failure/Transplant
Interventional Cardiology
Noninvasive Cardiology
Prevention/Vascular

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kB/s



Circulation

JOURNAL OF THE AMERICAN HEART ASSOCIATION



Sleep Apnea and Cardiovascular Disease. An American Heart Association/American College of Cardiology Foundation Scientific Statement From the American Heart Association Council for High Blood Pressure Research Professional Education Committee, Council on Clinical Cardiology, Stroke Council, and Council on Cardiovascular Nursing Council

Virend K. Somers, David P. White, Raouf Amin, William T. Abraham, Fernando Costa, Antonio Culebras, Stephen Daniels, John S. Floras, Carl E. Hunt, Lyle J. Olson, Thomas G. Pickering, Richard Russell, Mary Woo and Terry Young

Circulation published online Jul 28, 2008;

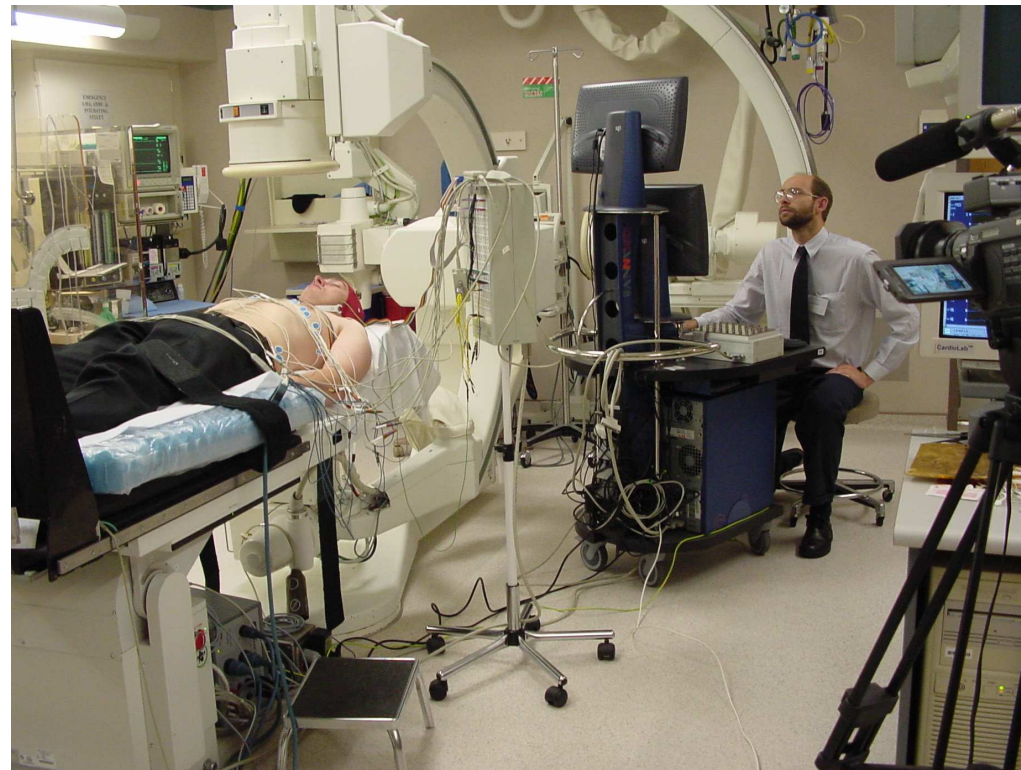
DOI: 10.1161/CIRCULATIONAHA.107.189420

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RESULTS OF RESEARCH COLLABORATION

System for Cardiac and Brain Electrophysiology ANNALab[®] MI-2 Testing in EP Lab @ MAYO



Novel Technology for Non-Invasive Detection of Vagus Nerve Stimulator Signal from Body Surface Area



U.S. Patent # 821,778

MEMORANDUM OF UNDERSTANDING

- signed between Mayo Clinic, Ministry of Health and St. Anne's University Hospital

**Memorandum of Understanding
on Collaboration
on the International Clinical Research Center Brno Project**

between

Mayo Foundation for Medical Education and Research,
200 First Street, SW, Rochester, Minnesota, USA, 55905

on one side

and

Ministry of Health of the Czech Republic,
Palackého place 4, 128 01 Prague 2, Czech Republic

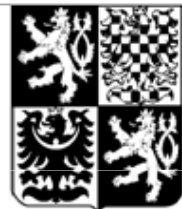
and

St Anne's University Hospital,
Pekařská 53, 602 01 Brno, Czech Republic

WHY BRNO?

- Essential contribution of Brno specialists to development of the ICRC concept
- Long-Term track record of successful scientific collaboration, publications, intellectual property development and mutual trust
- *Outstanding support of European, federal and local government and organizations*

VLÁDA ČESKÉ REPUBLIKY



USNESENÍ

VLÁDY ČESKÉ REPUBLIKY
ze dne 8. března 2006 č. 239

k přípravě a realizaci Projektu Mezinárodního centra
klinického výzkumu Brno

Combination of:

- Next-generation clinical research base
- State-of-the-art clinical center for treatment of cardiovascular and CNS diseases
- International educational center
- Technological cluster
- Integral part of St. Anne's University Hospital

**PLATFORM FOR MULTIDISCIPLINARY
INTERNATIONAL COLLABORATION** integrating
clinical research, clinical care, medical education
and TT



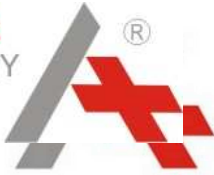
ICRC is Already Under Construction



MINIICRC LABS AT ST. ANNE'S HOSPITAL

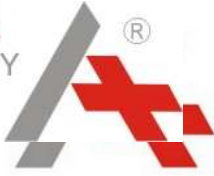
- 2 polysomnographic labs
- 1 shielded lab for daytime hemodynamic studies
- 1 ultrasound lab
- 2 control room



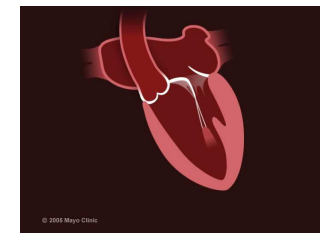


3 RESEARCH PROGRAMS:

- **CARDIO program:** Development of novel strategies for early detection and advanced treatment of cardiovascular diseases
- **NEURO program:** Development of novel strategies for early detection and advanced treatment of neurological diseases
- **RESEARCH platform:** Integrated multidisciplinary platform for experimental medicine and biotechnology



- CARDIO 1:** Cardiovascular and transplant surgery, heart failure treatment and transplant programs - development of novel diagnostic and therapeutic strategies
- CARDIO 2:** Interventional cardiology and acute coronary syndromes - development of novel strategies for early detection and advanced treatment
- CARDIO 3:** Cardiac electrophysiology and pacing - development of advanced diagnostic and therapeutic strategies
- CARDIO 4:** Cardiovascular and metabolic disorders - identification of novel risk factors and development of novel therapeutic methods
- CARDIO 5:** Non-invasive cardiovascular imaging - development of novel methods and technologies
- CARDIO 6:** Development of novel methods and interventions to reduce risk factors and cardiovascular diseases in the general population
- CARDIO 7:** Tissue engineering in cardiovascular research



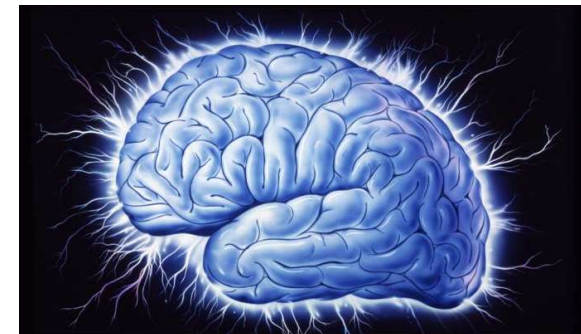


NEURO 1: Cerebrovascular disease - Development of Novel Strategies for Early Detection and Advanced Treatment of Cerebrovascular Disease

NEURO 2: Neuroepidemiology (with pilot projects of stroke and dementia)

NEURO 3: Development of Advanced Neuroimaging

NEURO 4: Multiple Sclerosis



AC: Animal Center

CBCE: Center of Biomolecular and Cellular
Engineering

ICCT: Integrated Center of Cellular Therapy and
Regenerative Medicine

BME: Center of Biomedical Engineering

CMI: Center of Molecular Imaging

CPU: Clinical Pharmacology Unit



EDUCATION: MAYO CLINIC – ICRC BRNO YOUNG TALENT INCUBATOR

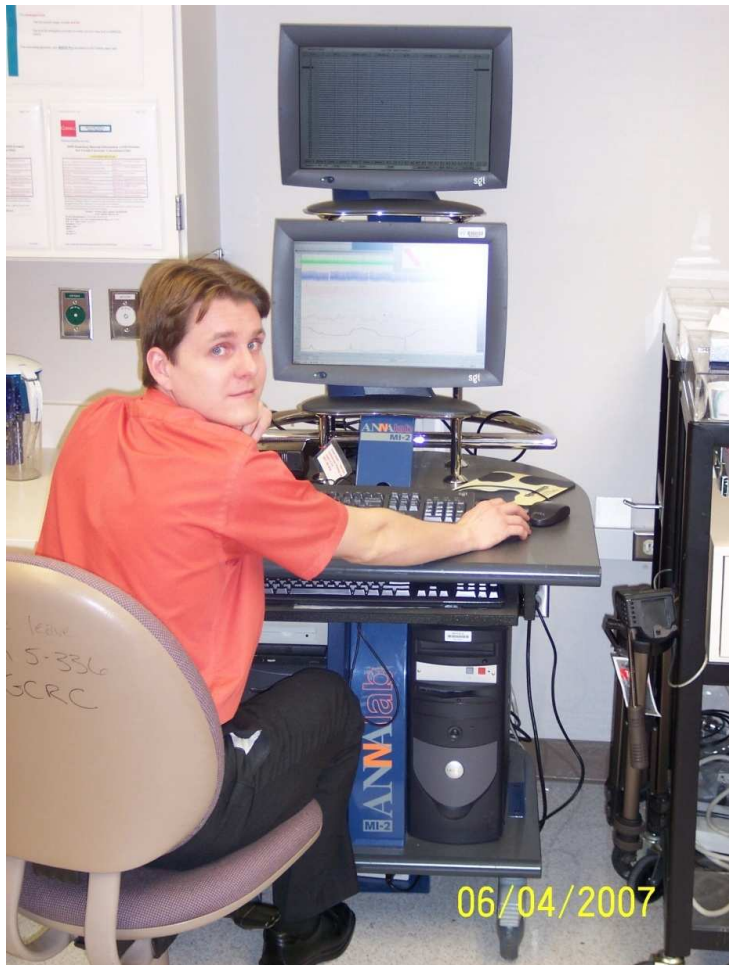
- **Scientific Training Programs for Young Czech/European Researchers at Mayo Clinic**
- **Long-term Training Programs (1-3 years)**
- **Short-term Training Programs (1-3 months)**



NO TALENT LEFT BEHIND!



Dr Marek Orban and Ing Pavel Leinveber at the Mayo Center for Translational Research





BRNO CREW @ MAYO CLINIC



The Mayo Clinic – Brno Human Bridge

- **Over 20 colleagues from Mayo Clinic visited Brno**, namely Dr. Samuel Asirvatham, Dr. Charles Beatty, Dr. Yonas Geda, Dr. Bernard Gersh, Dr. David Holmes, Dr. Brooks Edwards, Dr. Paul Friedman, Dr. Sherine Gabriel, Dr. Christopher McGregor, Dr. Francesco Lopez-Jimenez, Dr. Alexander Schirger, Dr. Virend Somers, Dr. Zallem Temesgen, Dr. Santhi Vege, Dr. Eric Wieben and others
- The current **CEO of St. Anne's Hospital** Petr Koska as well as his predecessors have been guests at Mayo
- **Over 40 junior colleagues from Brno visited Mayo Clinic as part of the collaboration**
 - **Consultants:** Dr. Jiri Vitovec, Dr. Jindrich Spinar, Dr. Lenka Spinarova, Dr. Miroslav Soucek, Dr. Jaroslav Meluzin, Dr. Petr Nemeč, Dr. Robert Mikulik, Dr. Jan Sitar, Dr. Ota Hlinomaz, Dr. Ladislav Groch, – cardiology
 - Dr. Ivan Rektor, Dr. Robert Mikulik – neurology
 - Dr. Rostislav Vyzula, Dr. Martin Klabusay – oncology
 - Dr. Pavel Jurak, Ing. Josef Halamek, Dr. Vlastimil Vondra – Biomedical Engineering
 - Dr. Miroslav Svoboda, Dr. Michal Vlasin – Veterinary medicine/animal research
 - Dr. Jan Adam – nanotech research
 - **Research fellows at CVD** (Dr. Virend Somers): Ing. Jiri Nykodym, Dr. Marek Orban, Ing. Pavel Leinveber, Ing. Jan Bukartyk, Dr. Pavla Balcarkova, Dr. Vladimír Horvath, Dr. Frantisek Lehar, Dr. Viktor Musil, Dr. Martin Novak, Dr. Martin Plachy, Dr. Zbynek Pozdisek, Dr. Ondrej Toman,
 - **Research fellows at GI** (Dr. Santhi Vege: Dr. Veronika Pribramska, Dr. Jan Trna
 - **Other Study stays:** Dr. Ondrej Sochor, Dr. Martin Pesl
 - **Residents:** Dr. Tomas Konecny, 3rd year resident at Mayo Graduate School of Medicine and appointee in Mayo Cardiovascular Fellowship Training Program July 2010
 - **Medical students:** 6 medical students completed 2-3 months study stay at Mayo

- **ISS** - International Space Station
- **CERN** (*Switzerland*)
European Organization for Nuclear Research
- **ICRC Brno** (*Czech Republic*)
International Clinical Research Center Brno
- **ITER** (*France 2010*)
International Thermonuclear Experimental Reactor



EUROPEAN CENTERS COLLABORATING WITH THE ICRC

- **University of Barcelona**
- **Universite Libre de Brussels**
- **Medical University of Gdansk**
- **University College London**
- **University of Milan**
- **More planned! BIOCEV, CEITEC, CePT...**



SUGGESTIONS ON HOW TO SUCCEED IN BUILDING TRANSATLANTIC COLLABORATION

- **Develop the vision**
- **Establish mutual trust, understanding and perhaps even friendship**
- **Build a people-bridge between institutions**





ANIMAL LABORATORY FOR ADVANCED CARDIOVASCULAR AND CNS INTERVENTIONS

