



Management of Bioartificial Heart

Final Report of Mr. Martin Pesl, MD

Background

I have been involved in research dealing with genetic background of cardiovascular diseases since 2003. Later I became involved in novel heart ultrasound diagnostic tools as pregraduate researcher. After completing my MD degree in 2007 I shifted my main interest to stem cells and ultrasound diagnostics. In 2006, Prof. Meluzin offered me a PhD research post in his team, a leading authority in successful clinical stem cell research.

I am convinced healthcare professionals need more than medical knowledge to complete successfully their research projects. Since 2006 I have been a member of Young Project Manager Group (YPMG)- focused on project management training. This represents advanced planning, resource allocation and staff coordination. I used my training to real international projects. After passing international exams in April 2008 I became a certified project manager associate, recognized by International Project Management Association (www.ipma.ch).

I am deeply involved in social academic activities, student responsibility and representation and I continue my work as a member of Eurodoc, European Doctoral Candidates Association.

The project of the International Centre of Clinical Research (ICRC Brno) creates an optimal environment for cooperation of Czech scientists with the world-renowned – Mayo Clinic and the University of Minnesota (UMN). ICRC Brno is a strategic project of the Czech Republic in medical research, healthcare and education. It is based on the cooperation of top academic institutions and industry in advanced medical research. A part of this cooperation is a cardiology research project which focuses on basic and preclinical research with drug, instrument, and technology development. Recently, major efforts focus on stem cell therapy, where also I take my place.

I learned about the American Fund through personal connections, especially I am grateful to my friend Richard Salzmann who participated in AFCSLS program as well.

In the preparation of my application I used my theoretical knowledge and experience with various project applications. I got full support from ICRC representatives and thanks to Tomas Kara I could visit my American partners in April 2009. According to the situation I had to change my mentor at Stem Cell Institute, University of Minnesota. I could introduce myself to Professor Dan Kaufman and further specify my work.

After nomination by the American Fund, I arranged my travel and prepared professionally at the campus stem cell facility in Brno. The visa forms could not be issued on time due to technical issues beyond my control. Because of the shortening of stay period I decided to remain at the Stem Cell Institute for the whole period of my project, which turned out to be a great decision. I asked for approval of change and shifted my stay beginning four weeks later. Before my departure I arranged the final interview at the US Embassy in Prague and received visa.

American Partners

University of Minnesota and Mayo Clinic have developed a unique partnership cluster. Researchers from the Stem Cell Institute (UMN) are working in collaboration with researchers in the Departments of Medicine, Cardiovascular Surgery and Biomedical Engineering, as well as researchers associated with the Lilliehei Heart Institute. Objective of the Stem Cell Institute is to promote the understanding of the potential of stem cells to improve human and animal health.

Prof. Dan S. Kaufman, M.D., Ph.D. is an associate director of the Stem Cell Institute. Trained in hematology and immunology, his postdoctoral study took place at the University of Wisconsin — Madison, where the first human embryonic stem cells were isolated. He was the first who produced blood cells from human embryonic stem cells. He is involved in both laboratory and clinical studies using cell therapy to treat cancer and blood diseases. His team is considered one of the American leaders in the field of stem cells research. Institute researchers are making great strides in this emerging field of stem cell biology.

The internship program was the best way to get the insight of managing and leading research team and to follow strategies and principles used there. As an MD I could get the unique opportunity to learn new methods in stem cells research and cell treatment, using high technologies and this way to improve not only my management skills. It was a great learning experience for me to work at one of the best research laboratories in the world.

Brief Evaluation Statement

- to get insight into the management and coordination of stem cell facility;
- to learn advanced transferable techniques in the research and applied clinical practice;
- to join hESC training and laboratory work in the international group;
- to establish a link between the Stem Cell Institute of UMN and ICRC - Cardiology department of St. Anne's University Hospital of the Masaryk University; and
- further develop my management skills in the area of research and clinical coordination.

Professor Kaufman's lab was highly technologically equipped with effective work results of all researchers in his team. I had the opportunity to work in a small team on my own project which included management and basic administrative work. The goal of my research project was to produce beating cardiomyocytes. Following the completion of my stay, I stay in close professional contact with my American counterparts.

Detailed Description

To establish a working link between the Stem Cell Institute of UMN and Cardiology of St. Anne's University Hospital was my most important goal. So was to develop my professional network with staff of the Stem Cell Institute and observers from other countries.

My training offered me hands-on engagement in the culture of human embryonic stem cells (hESC). I received written training materials, laboratory instructions and practice, as well as lectures from experts in stem cell research and its clinical applications. I got in contact with six participants from the US, Brazil and India. I had access to know-how in all project phases. In the preparation I trained planning skills combined with the financial planning and theoretical week course of the basic stem cells methods organized for researchers and doctors involved in the stem cell research in US.

My project phase was based on the research, communication with my mentor prof. Kaufman and his team, most of my time I spent with junior scientists Katherine Hill and Piradeep Surlinghatam. These people taught me a lot about both HESC and IPS and allowed me experience without any barriers. I am very thankful for their care.

At the final phase I focused on results evaluation. The project hasn't ended yet in fact. Nowadays we plan a cycle of lectures about the basic methods used in stem cells research for biology and medicine students as well as lectures about the system and possibilities for Czech medicine students in US. I applied to present my results at several conferences in the Czech Republic.

Organization and Time Schedule

Arranging accommodation took approximately a week, using online and personal contacts. Finally I chose a facility specialized for long-term housing for international researchers and students. The proximity to university campus gave me numerous opportunities for full fitness and cultural life.

The theoretical part at UMN took place in the late Autumn of 2009. HESC training started on 3rd November and was a great opportunity to meet leading professionals of the Stem Cell Institute. This opportunity may be also available in future.

Every week I participated in lecture series at Lillehei Heart Institute and also at Stem Cell Lessons with leading world scientists. Most interesting was meeting with Professor Fukuda from Keio University, Tokio. He introduced his own work to us as well as the latest progress made by the topmost stem cell teams. As a result of the cooperation with the Lillehei Heart Institute I established contacts with prof. Jay Zhang, who specializes in the field of cardiology.

I also met and participated in a few meetings of local Czech Sokol and the Czech and Slovak Cultural Center. The last but not least important was the contact with professor emeritus and former Czech ambassador Josef Mestenhauer, who established Prosek-Fulbright program for medical researchers. I was pleased to meet some important visitors from the Czech Republic — from The Ministry of Health, director of the St. Anne's Hospital Ing. Koska and Dr. Tomas Kara, the leader of the ICRC project. I also met young Cardiology fellow/colleague from Mayo Clinic, Tomas Konecny MD with whom we plan to carry out informational seminars for Czech students.

Program Cost: The following chart compares initial cost estimate with the actual cost of my program:

| Item | Cost Estimate in US\$ | Actual Cost in US\$ |
|---|-----------------------|---------------------|
| Executive training seminars | 2,500 | 1,560 |
| Internship | | |
| Administrative fees (visa, registration fees, etc.) | 150 | 350 |
| International travel | 1,500 | 2,000 |
| Local transportation | 1,000 | 1,000 |
| Health insurance | 350 | 376 |
| Monthly maintenance | 3x2,500 | 5,800 |
| Contingency | 2,000 | 2,350 |
| Total | 15,000 | 13,436 |

Administrative fees amount includes SEVIS fee in addition. Changing the timing resulted in higher expenses in travel, maintenance and contingency.

Program Benefits

I am convinced medical and research professionals with American experience could change the thinking in research and healthcare management in the Czech Republic. Minnesota lab and clinical fellowships and internships offer valuable educational opportunities in a medical center dedicated to research, care and education. My attendance in the observership program enhances already established cooperation between the ICRC and University of Minnesota. Such cooperation will surely lead to new joint research projects and publications in scientific journals with impact factors and application of new ideas into a lab and healthcare management in the Czech Republic.

Experience in Professor Kaufman's lab will allow me to reproduce and implement the particular stem cell methods in my own research in Czech Republic. It means we can independently use the best technologies and equipment at University Campus Brno and international clinical research. Professor Kaufman recently became international director of the Center of Integrated Cell Therapies, ICRC, Brno.

I would like to transfer knowledge in research management and take part in future establishing of an educational program for research assistants, the position that is now missing in Czech educational system. I found that cooperation would be possible on this matter with Mgr. Janouskovcova at Masaryk University and this may become real in just a few months.

I would like to continue my *beating cardiomyocytes* project, but we plan another one which would be more specialized in Cardio-Stem cell field for the second half of 2010. I will refer this project at Czech cardiology society annual meeting in May.

Risks

Unpredictable risks were communication problems with prearranged acceptance of documents and inter-organizational relationships which play a crucial role in acceptance itself. To mitigate these problems it would be most important to prearrange these documents in written form before submitting the proposal.

The implementation of the research management experience will take place in the following months. Set of first lectures is scheduled in the first spring weeks. On this occasion I would like to present my experience with the US education and research.

In conclusion, I would like to express my gratitude to many people who helped me realize my project. My great thanks belongs to my family and beloved, to Tomas Kara M.D., Professor Jaroslav Meluzin, Professor Dan Kaufman. and the team of St. Anne Hospital - ICRC in Brno.