Myocardial Regeneration Based on Perfusion Decellularized Cardiac Matrix Scaffolds

MASSACHUSETTS GENERAL HOSPITAL

CIMIT Center for Integration of Medicine & Innovative Technology

Harald C. Ott, MD

Young Clinician Award 2009

Investigator Profile

Education
- MD, Leopold Franzens University, Innsbruck, Austria

Clinical/Professional Appointment
- Instructor in Surgery, Harvard Medical School
- Resident in General Surgery, Massachusetts General Hospital

Recent Honors and Awards
- Willard M. Daggett Scholarship for Cardiothoracic Research
- International Faculty, Joint Meeting in Cardiothoracic Surgery, Austria

Impact on Care

- Nearly 5 million people live with heart failure and about 550,000 new cases are diagnosed annually in the United States alone.
- Heart transplantation remains the definitive treatment for end-stage heart failure.
- The supply of donor organs is limited and recipients face life-long immunosuppression.
- Creation of a bioartificial heart could theoretically solve these problems. According to NHLBI up to 100,000 patients in the US per year are potential candidates for such a device.
- Completion of the proposed project will generate a *new collaborative platform* that will enable us to compete for further funding and ultimately enable a vertical step in the treatment of heart failure.

Abstract

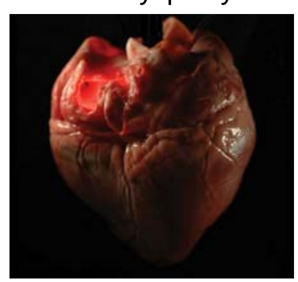
The long term goal of the project is to generate viable, functional heart grafts 'on demand' by seeding perfusion decellularized matrix scaffolds with patient derived stem and progenitor cells.

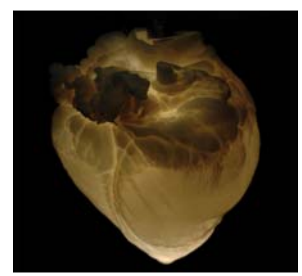
Focus of Dr. Ott's research has been on cell based techniques to repair, regenerate and ultimately replace failing tissues. As an investigator at the Center for Cardiovascular Repair at the University of Minnesota, he completed several projects on approaches to myocardial replacement and learned the need to provide regenerative cells with a blueprint for tissue foundation.

Now at MGH, the research hypothesis is that cardiac matrix scaffolds will support the engraftment of adult derived cells, and the formation of myocardium similar to preliminary results with fetal cell.

Completion of the proposed project will enable generation of the required cell populations for clinically relevant myocardial regeneration. It will also provide the techniques for cell seeding, engraftment, and tissue maturation needed to generate viable and functional myocardium.

The results will have applications not only in regenerative medicine, but will create an important in vitro model of functional, patient-derived myocardium, and facilitate future efforts to identify novel therapies for cardiomyopathy.





Award made possible through the support of: Johnson & Johnson