



## The Myocarditis Foundation Announces The Award of Two Research Fellowship Grants in 2007

The Foundation awards funds to support research related to all forms of myocarditis. The goal of the Foundation's research program is to advance medical knowledge

on the disease and to save more lives. Candace Moose, Director: "We are pleased to support the career development of such outstanding young physician

scientists as Drs. Cihakova and Heidecker and look forward to the contribution they will undoubtedly make in the field of myocarditis research."



### "The Role of Monocytes in Autoimmune Myocarditis" – December 2007

For a long time, our laboratory under the leadership of Dr. Noel Rose has been engaged in studying the mechanisms by which inflammation damages the heart. For these investigations, we have established an experimental model in mice using immunization with cardiac myosin, an important component of heart muscle cells. Lately we have concentrated on the cells that are the most abundant in infiltrates both in human giant cell myocarditis and in our experimental mouse model - macrophages. We have discovered recently that there are different types of macrophages in heart infiltrates and that they can either be disease promoting or—surprisingly—suppressing in myocarditis.

Our preliminary data indicate that the types of macrophages that dominate during the course of myocarditis are influenced by products secreted by infiltrating T cells. Our experiments suggest a product of T cells; IL-17 does not induce proinflammatory functioning macrophages. Since myocarditis in the mouse model is driven by IL-17 cells, this could indicate that IL-17 activated macrophages are not pathogenic in myocarditis but might even be beneficial. A successful mapping of the role of different macrophage subpopulations during myocarditis could have direct implication for novel potential therapies for myocarditis. **Daniela Cihakova, MD, PhD, Johns Hopkins University**

### "Gene Expression Profiling for Detection of Myocarditis" – December 2007

Over the past 10 years, our group intensified its research in inflammatory heart disease or myocarditis. Myocarditis is estimated to account for about 10-30% of cases with heart failure. Given that heart failure is a severe disease often resulting in poor clinical outcome, early detection of myocarditis becomes extremely important to induce specific treatment that can cure patients. While current diagnostic standards for inflammatory heart disease have insufficient accuracy, our group addresses this issue with a highly sensitive technique, namely gene expression profiling or microarray technology. With this explorative technique, we identified a biomarker, containing 39 genes that distinguish very accurately patients with myocarditis from other types of cardiomyopathy from a single heart biopsy. Besides important improvements in diagnosis of inflammatory heart disease, our findings also offer insight into the pathophysiology of myocarditis on the genetic level and may create the base for new evolving therapies.

Based on our preliminary data, we are currently enrolling patients for a prospective clinical trial, in which we will test the accuracy of our novel biomarker in 150 patients. In order to assure the best possible diagnostic reference to which we will compare our results, state-of-the-art assessment for myocarditis will be combined with novel tools, such as screening for serum antibodies, viral nucleic acids and magnetic resonance imaging. Furthermore, we are seeking to discover markers in corresponding blood cells of our patients, which may allow the use of blood samples as surrogate for heart biopsies. This would be extremely beneficial both for patients and the health care system in terms of time, cost and practicality. **Bettina Heidecker, MD, The University of Miami**



*Thank You Donors!*

The MYOCARDITIS FOUNDATION  
4708 Norbury Place  
Raleigh, NC 27614

## Christian's Story



This is the story about our son, Christian. We loved taking him places. He loved the park and the beach. We were really enjoying being parents.

At 18 months, Christian had an illness in which he had a high fever, cough and difficulty breathing. We took him to the emergency room at our local hospital, because we thought his breathing seemed labored. They told us that it was just an upper respiratory infection and his lungs were clear, and to follow up with his pediatrician the next day. The hospital did not perform a chest x-ray at this visit, because a chest x-ray is not considered a part of the standard testing procedure. We followed up with the pediatrician the next day, and the pediatrician agreed that it was just an upper airway illness and gave him antibiotics. The fever and coughing went away, but Christian was never the same. He was irritable, he couldn't sleep, and cried a lot more than before.

Unknowingly, we believe that was the turning point in Christian's life. We thought that maybe there was still a breathing "difference" with Christian, but as first time parents, we couldn't be sure and every time we brought him to the pediatrician, he was given a clean bill of health.

Christian had his 2 year old "well" visit at the pediatrician, he was thoroughly examined and, given a clean bill of health. The next week, Christian caught a cold. He was miserable. He was crying uncontrollably, and began to have difficulty breathing again. We took him back to the pediatrician. A chest x-ray was done. The radiologist told us not to go home, but sent us directly back to the pediatrician's office. We were so nervous and scared!

The pediatrician immediately sent us to a local cardiologist who told us that Christian's heart was extremely enlarged. The cardiologist told us that we had to take Christian immediately to the local Children's Hospital, where more tests could be done. We were told that his heart was extremely enlarged, barely functioning, and that he was in congestive heart

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## A Word from the President of The Myocarditis Foundation

by Dr. Leslie T. Cooper, Professor of Medicine, Mayo Clinic College of Medicine and Consultant in Cardiovascular Diseases at Mayo Clinic, Rochester, MN

What is Myocarditis?

Myocarditis is a disease that often attacks otherwise healthy people. The disease is characterized by marked inflammation and damage to the heart muscle. Several thousand patients per year are diagnosed in the US. Approximately 5% to 20% of all cases of sudden death in young adults are due to myocarditis. There are many causes, including viral infections, autoimmune diseases, environmental toxins and adverse reactions to medications.

What Are the Long Term Consequences?

Although long term consequences in severe cases include death or heart transplantation, many cases of acute myocarditis have no symptoms and are identified only by an EKG or a blood test to detect heart injury. The prognosis is variable but chronic heart failure is the major long term complication. Myocarditis and the resulting complication of an enlarged heart are the cause of approximately 45% of all heart transplants in the US.

When Does Myocarditis Appear?

Clinical presentations of myocarditis range from having no symptoms to EKG abnormalities to severe heart failure to cardiogenic shock. Typically, the heart tissue becomes involved 7 to 10 days after a systemic viral illness. The majority of patients have no specific cardiovascular complaints. Symptoms include fatigue, shortness of breath, palpitations and chest pain.

Why Should I Go To The Doctor?

Heart failure is the most frequent presentation of myocarditis

which leads people to seek medical attention. Most patients recover from viral myocarditis within weeks, although EKG abnormalities persist for months. The clinical course of myocarditis is highly variable. In a majority of patients, the disease is self-limited and there is complete recovery without any further consequences.

When Should I Seek Medical Attention?

Heart failure of recent/sudden onset due to an enlarged heart represents one of the most dramatic and clinical relevant presentations of acute myocarditis. Patients should go to an Emergency Room where an EKG, chest x-ray and blood work will be performed. A cardiac biopsy is the only definitive procedure for unequivocally establishing the diagnosis. Those patients presenting with fulminant myocarditis are at increased risk of death or need for heart transplant. Giant cell myocarditis is the most fatal form of the disease with an average time to death or transplantation of 5 months.

What is Needed to Change the Outcome of Myocarditis?

Effective forms of treatment and better diagnostic techniques are urgently needed as well as a better understanding of the disease and a more complete understanding of the various types of myocarditis.

What Does the Myocarditis Foundation Do?

The Myocarditis Foundation seeks to hasten progress in understanding the disease by awarding research grants to help guarantee that new and innovative avenues are thoroughly funded and explored.

**Thank you for your support. Together we can make a difference.**



## 'Little Fish' makes big splash at marathon for his brother

finishing 10 minutes ahead of my projected finish time."

Fishman finished in 4 hours, 20 minutes. And although the race is over, he said he continues to receive support and donations for the foundation.

"Even though the race is over the effort is going to be continued," he said.

Beyond the donations that will go to the foundation, Fishman hopes to continue to raise awareness about the disease.

"One of the things I've realized is that it's hard to get people to donate money when they're not directly receiving something," Fishman said. "(Running the marathon) had more of an awareness effect than raising the money. To me it's more important to increase awareness and educate physicians. Most people have not even heard that term."

Janice Fishman, Jeremy and Brian's mother, said doctors didn't know what was wrong with her older son when he

got sick in 1994. "He had the flu, it was just the flu and nobody ever thought anything was wrong," Janice said. "He got sick on Thursday and died on a Sunday. It was just so fast."

In the 14 years since Jeremy's death, she said the healing process has been a long one for the Fishman family. "It was very sudden. It was very hard for our family," she said.

Brian, who was 10 when Jeremy died, had a particularly hard time dealing with it, she said. "That was his big brother," she said. "I think for a long time he tried to pretend it didn't happen."

Brian decided in July he would run the half-marathon, 13.1 miles. It wasn't until three months later he decided he would tackle the full 26-mile race. "In October, I kind of switched gears a little bit and decided to up the ante," he said.

By Kelsey Perry  
Reprinted with permission from  
*The Arizona Republic*, Jan. 15, 2008



Among the sea of runners that filled the streets over the weekend at the fifth annual PF Chang's Rock 'N' Roll Arizona Marathon swam a "Little Fish."

Brian Fishman, a 24-year-old Chandler man, raised \$1,600 to benefit the Myocarditis Foundation in honor of his big brother, Jeremy, who died of the disease at 14. Myocarditis is a rare disease that causes inflammation of the heart muscles and can lead to sudden death.

Fishman, who got the nickname "Little Fish" from Jeremy as a child, donned the name on his back along with the number 55, Jeremy's hockey number, during Sunday's race.

Except for some soreness in his legs, Brian said it was an amazing experience. "I had a blast," he said. "We ended up

## Christian's Story

Continued from page 1.

failure (CHF). The diagnosis was myocarditis, most likely viral in nature.

That was the day that our lives would change forever. Christian was treated with medications for CHF in an attempt to delay the inevitable need for a heart transplant. After those first few months however, Christian's heart function started to steadily deteriorate and his quality of life became very poor. We could only watch as our playful and happy son became increasingly weak and tired. Unable to sleep, he was awake most of the night, tossing and turning and crying. With each passing day it became evident that the medication was not working, and that he would need a heart transplant. We learned that the myocarditis was just not caught early enough and his heart had an excessive amount of scar tissue, making it impossible for it to pump properly.

Christian received his new heart when he was 3 1/2 years old, and is doing very well. He has just turned 7 and is doing everything a typical 7 year old boy can do. He still enjoys the park and the beach, only now he can run all over and play for long periods of time without becoming exhausted and completely out of breath! It was and continues to be a very long journey. A transplant is not a cure, as with it comes other issues. Christian is enjoying school and playing with other kids his own age. We are grateful that he currently has a high quality of life, and pray that it continues that way for many, many years to come.

Myocarditis is a disease that needs to be diagnosed and treated more accurately and more quickly.

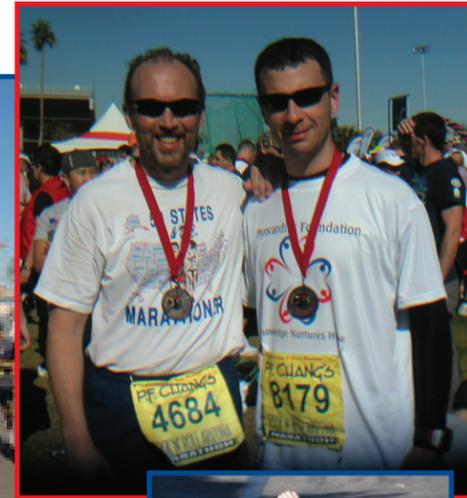
*The above article was written by Christian's parents.*

**The Myocarditis Foundation would like to extend a special thank you to their corporate sponsor XDx, Inc., located in Brisbane, California. XDx is the developer and manufacturer of Allomap<sup>®</sup> molecular expression testing, a noninvasive test which assesses gene expression to determine the risk of rejection in heart transplant recipients.**

### *A Message from the Board of Directors*

As a result of our fall fundraising campaign, The Myocarditis Foundation was able to award two research grants in 2007. Support for research into the causes of and treatment for myocarditis is one of the most important objectives of the Foundation. Through your generosity we are advancing our goals of research, awareness, and education. Thank you for your continued support.

Sincerely,  
James A. Moose  
Director



Brian Fishman

### *Greetings Friends and Supporters,*

Crossing that finish line was great! But to me, this marathon and fundraising experience has been more about the journey than the final destination. Pushing through obstacles, injuries, and mental barriers has taught me a lesson of mind over matter (yes, MIND over mind over matter - it took me the duration of a 20 mile run to wrap my brain around that one!). The inspiring stories of other individuals affected by myocarditis and other diseases. The support of friends and family. The encouragement from people I have never met before. All of this acted as an impelling force throughout training. I couldn't have done it without you!

The Myocarditis Foundation has already granted two research fellowship awards for myocarditis research, and everyone's continued support will allow them to provide one or two more in 2008. Thanks again for your contribution! I anticipate that my efforts working with MF will persist in an effort to increase awareness and support research of this devastating disease.

Who'd like to run it next year with me?



Sincerely,

*Brian Fishman, Chandler, AZ*

John Lent, Ambassador for The Myocarditis Foundation, brother-in-law of Candace Moose, runner of over 100 marathons, ran with Brian to offer support & encouragement.

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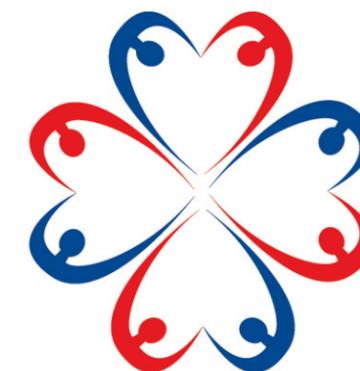
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