

You Have Made an IMPACT

As we reflect on the past year and prepare for the holidays, all of us at Enduring Hearts wanted to make sure you knew how grateful we are for your support.

Your donations are far-reaching, impacting not only children and adults living with a transplanted heart but also those on the transplant list waiting to receive their miracle.

We are sure there are a lot of worthy causes competing for your support, so we wanted to share a few highlights of how your donation dollars are at work to save lives.

Research Saves Lives:

Because of generous donations like yours, this year we were able to fund six research grants, totally over \$650,000 in new projects. We have partnered with esteemed research institutions such as Georgia Tech, Vanderbilt University, John Hopkins and Northwestern University just to name a few.

A research area of interest to both our Scientific Advisory Committee members as well as heart families is the development of accurate, non-invasive methods of detecting all forms of organ rejection. Currently a heart biopsy is the gold standard to detect organ rejection, however this procedure is painful, invasive and potentially dangerous to the young patient.

We are Making Progress:

Recently we have focused funding on a type of rejection this is especially insidious because patients often do not show symptoms until the prognosis is extremely poor. For some reason, the transplanted heart's blood vessels become more and more narrow, restricting blood flow. We call this CAV (Cardiac Allograft Vasculopathy).

Enduring Hearts has dedicated its research power to understanding how to identify CAV's onset, to begin early treatment, as well as understanding what causes CAV to prevent it from occurring.

An Enduring Hearts recently funded research effort headed by Dr. Feingold at U of Pittsburgh's Children's Hospital has identified that CAV affects even the very small blood vessels of the heart, or microvessels, in children that have failing transplanted hearts. From this key set of observations, we now realize we have must now look for these changes in the small blood vessels in the biopsy samples from the transplanted hearts. Importantly, Dr. Feingold's group has noted similarities in the microvessel damage to other conditions unrelated to transplantation opening the door to new prevention strategies.

We are extremely excited about this important advancement. This breakthrough discovery which was published in several esteemed medical journals, will foster additional, research efforts that could unlock the mechanisms of this lethal rejection process.

A Deeper Look: Prevent, Early Diagnose and Treat CAV

Cardiac Allograft Vasculopathy (CAV) is the leading type of rejection causing transplanted hearts to fail.

What is CAV? Cardiac Allograft Vasculopathy (CAV) is a disease affecting the coronary arteries of some transplanted hearts. The coronary arteries supply blood to the heart muscle so it can then pump blood carrying oxygen to our body (Figure 1).

With a "heart attack" that affects adults with so-called hardening of the arteries, the coronary arteries become blocked causing a life-threatening event. By restricting the blood flow thru the largest coronary arteries CAV also causes the transplanted heart to lose function and can be life-threatening (note the multiple narrowings in Figure 2B).

Alarming Facts: The exact cause of CAV is unknown. It is also very difficult to diagnose CAV at its earliest stages, so physicians are not able to treat CAV before the damage to the coronary arteries is irreversible.

Figure 1. Normal Coronary Arteries of the Heart

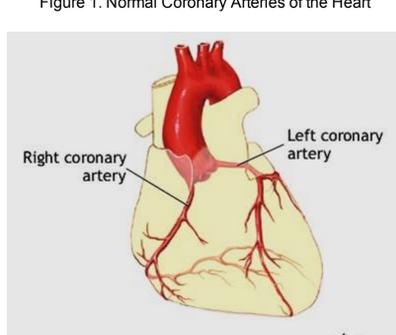
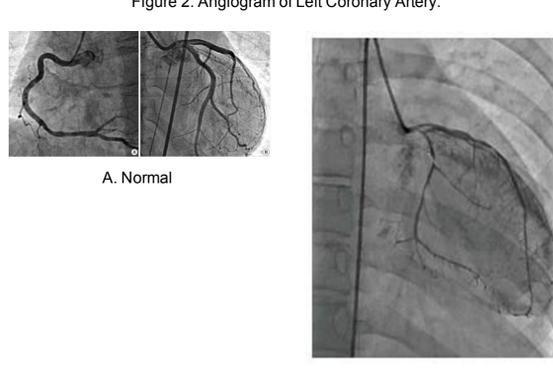


Figure 2. Angiogram of Left Coronary Artery:



Donations Dollars Making a Difference:

Because of your charitable gifts, we are funding 7 important CAV studies which will help to identify early CAV rejection, as well as treatments to mitigate the potential for rejection.

The projected outcomes of these research initiatives by Enduring Hearts are as follows:

- 1. Targeted Ex vivo Nanotherapy for use in Cardiac Transplantation.** This unique "drug", nanotherapy, infused into the coronary arteries of the donor heart, could reduce the pretransplant-related allograft coronary artery injury and, in turn, reduce CAV.
- 2. Functional consequences of antigen specificity in CMV-responsive T cells.** CM Virus infections can occur due to immune suppression following heart transplantation, causing severe coronary artery damage to a transplanted heart. This study will try to reduce CMV-mediated coronary artery injury and, in turn, CAV.
- 3. The Causal Role of Axl in the Acceleration of Cardiac Allograft Vasculopathy.** This experimental study will determine if a molecular signaling pathway contributes to CAV.
- 4. MicroRNA Biomarkers of Allograft Rejection in Cardiac Transplantation.** Damage to the coronary arteries releases signaling molecules into the blood. If unique to CAV-related injury, these biomarkers could contribute to the development of a diagnostic test for early detection of CAV.
- 5. Predictive Modeling.** A unique approach for the detection of early (<6 months post-transplant) microvascular injury is the goal of this project and could lead to early diagnosis of the onset of CAV.
- 6. Developing a Comprehensive Biomedical Imaging Informatics Tool for Precision Care of Pediatric Heart Transplant Patients.** This pilot project will develop a clinical decision support system to assist in quantifying the analyses of the heart biopsy. Such a system will improve the detection and treatment of rejection, resulting in injury which is a likely contributor to CAV.
- 7. Integrating Multi-parametric Echocardiography with Computer Assisted Analyses in Detection for Early Allograft Rejection in Pediatric Heart Transplant Recipients: A Pilot Prospective Multicenter Trial.** Optimizing and standardization supports decision making of echocardiogram to provide more accurate screening/detection of early rejection and reduce injury-related CAV, in pediatric heart recipients.

None of this would be possible if it wasn't for generous donors like you! Thank you for helping us move steps closer to making a new heart last forever. We believe all children should have the chance for a happier and healthier tomorrow. Best wishes for a happy and belssed New Year!

[Support Our Research](#)

2019 Bourbon Gala & Auction special Pricing Ends 12/31/2018!

Please [click here](#) and use our easy Double the Donation lookup tool to find out if your employer will match your 2018 donation. These matching donations are vital to supporting our research.

Saving Lives is Whiskey Business, Reserve your ticket today for the [4th Annual Enduring Hearts Bourbon Gala and Auction](#), 2/15/19, Stave Room, Atlanta, GA. Early Bird pricing ends 12/31

