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Collaboration: The heart of scientific discovery

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De. Paul Iaizzo and Medtronic founder Earl Bakken in the Visible Heart Laboratory

Within the U of M's Visible Heart® Laboratory, researchers and device manufacturers partner to develop the medical advancements of tomorrow.

In an average lifetime, the human heart will beat more than two and a half billion times, all without ever pausing to rest. That's a lot of responsibility for an organ that's roughly the size of your fist.

But what happens when your heart buckles under the pressure? What kind of options can modern medicine provide?

An attempt to answer those questions is exactly what makes the University of Minnesota home to some of the 20th century's greatest advances in cardiovascular health:

- The world's first successful open-heart surgery using hypothermia
- The invention of the modern pacemaker
- Advancing the potential of heart transplants and muscle-repairing cell-based therapies

Today, in the Visible Heart Laboratory where Medtronic founder Earl Bakken and open-heart surgery pioneer Dr. Walton Lillehei made history 6 decades ago, that legacy continues.

In this laboratory, Dr. Paul Iaizzo and his team collaborate. Surgeons, post-doctoral fellows, medical students, doctoral candidates, and medical device manufactures develop the next generation of therapeutic techniques and devices that might one day be labeled "the best of the next 60 years."

Collaboration inspired innovation

In 1997, Dr. Iaizzo and engineers at Medtronic created a novel heart model to enhance our understanding of functional cardiac anatomy. The model is also highly useful for numerous types of cardiovascular research and product development.

The Visible Heart® approach results in a live beating, large mammalian heart that functions outside the body with the help of an apparatus that mimics the body's internal conditions.

Researchers insert high definition videoscopes into the heart's interior. A clear fluid is pumped through the heart instead of blood, allowing them to see the inner workings of the heart – the valve action, the contractions of atria and ventricles, and the heart's architecture –as it beats on its own.

Fast Fact

In 1949, at age 25, Earl Bakken created Medtronic Inc., a partnership to service medical electronic equipment. It's first month's income was $8.00.

Related Information

The Visible Heart® Lab seeks solutions to muscle atrophy
What if human organs could hibernate like black bears do? Researcher Paul Iaizzo and his team are searching for the answer.

Bear study would help critical care patients
Researchers hope that what they are learning about black bears could help them fight atrophy of the muscles in humans.

The Visible Heart Laboratory
In 1997, Dr. Iaizzo and his colleagues began working on large mammalian isolated heart models, and thus the Visible Heart® laboratory was created in collaboration with Medtronic, Inc.

Building on a legacy
In 1952 we performed the first successful open-heart operation. Nearly 60 years later, we're still revolutionizing the field of cardiology.

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"Our lab has been the only place that can repeatedly show how an actual human heart beats, from the inside," said Iaizzo.

Educating outside of the laboratory

In addition to generating world-class research, numerous textbooks, and educational videos, the Visible Heart® Laboratory develops and updates the Atlas of Human Cardiac Anatomy. This website offers free access to cardiac education, including thousands of downloadable heart images and videos.

This online educational resource is used by medical and biomedical engineering students, researchers, and patients to further their understanding of human heart anatomy and physiology. Medtronic engineers who create and design the latest innovative heart-therapy technologies also use the Atlas.

"The Atlas work that we do is purely philanthropic," Iaizzo said. "The goal is to go out and share these images so that everyone can benefit."

Today, the state-of-the-art lab is a premier place to conduct research involving cellular and tissue systems, organs, and whole body investigations.

The Visible Heart® Laboratory is a highly productive collaboration between the University of Minnesota and Medtronic. A multitude of prototype devices, such as delivery catheters and cardiac tracking units get tested in the lab.

This year, the device company extended its contract with the Visible Heart® Laboratory through 2015 and signed an exclusive 10 year licensing agreement with the University to utilize the patented Visible Heart® methodologies.

"We are very fortunate to have such a long-standing partnership with Medtronic, and we're thrilled with their continuing support of our research," said Iaizzo.

-- Kelly O'Connor