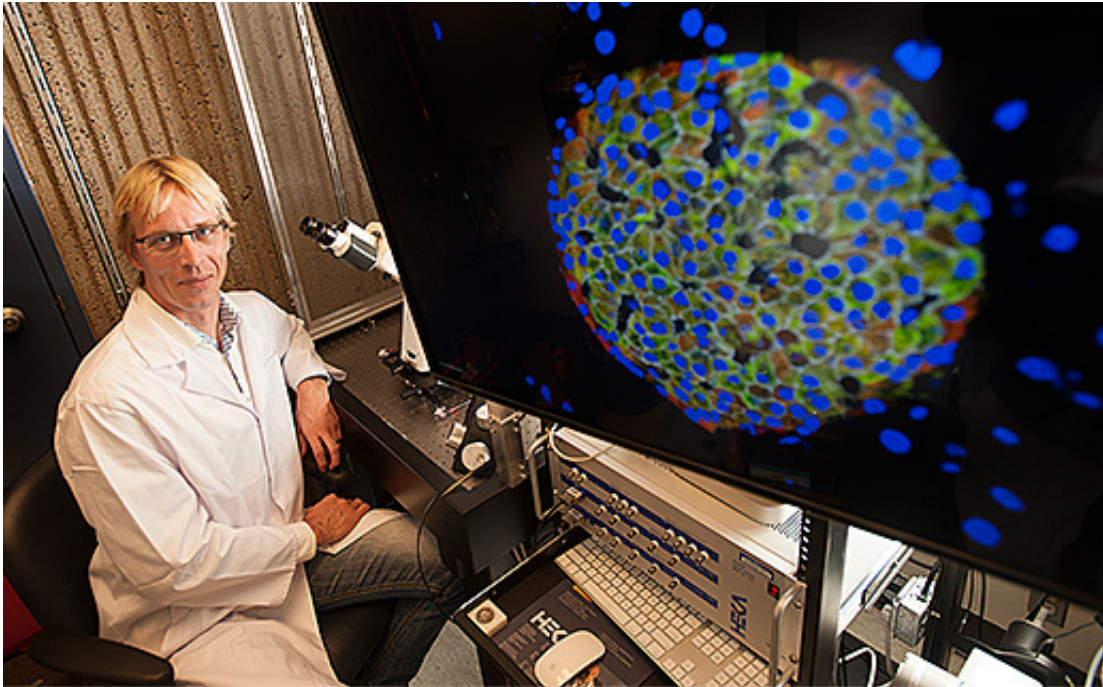


New clues to treat juvenile diabetes

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UC Davis biologist Mark Husing will use the Hartwell Foundation grant to explore signals that cause new insulin-making cells to replace those lost in diabetes. (Gregory Urquiaga/UC Davis photo)

UC Davis Assistant Professor Mark Husing is a recipient of The Hartwell Foundation 2014 Individual Biomedical Research Award to support his early-stage research toward a cure for juvenile diabetes. Diabetes affects 10 percent of the entire United States population, including approximately a million children. Remarkably, 40 children every day receive the diagnosis of diabetes.

Huising, who works in the Department of Neurobiology, Physiology and Behavior at the UC Davis College of Biological Sciences, also holds an appointment in the Department of Physiology and Membrane Biology at the UC Davis School of Medicine. He joined UC Davis in November 2014 having previously worked at the Salk Institute in La Jolla, California. He is interested in how certain cells in the pancreas control the body's response to sugar in diabetes. Achieving a balance between reduction of elevated [blood sugar](#) levels and the need to prevent potentially fatal low sugar levels is critical to maintaining health.

The Hartwell Foundation award will provide \$300,000 in direct cost over three years to support Huising's research looking at the biological signals and triggers affecting a small pool of cells in the pancreas that could be essential in regenerating control of blood sugar in this disease. The Individual Biomedical Research Award to Huising represents the ninth time a researcher from UC Davis has won such recognition from The Hartwell Foundation over the last seven years.

Islets, insulin and diabetes

Diabetes has been a prevalent health problem since ancient times. Two forms of the disease are known—Type 1, or "insulin-dependent" diabetes, and Type 2 diabetes, caused when the body fails to regulate the level of sugar properly, sending it either soaring high or dropping to very low levels.

In juvenile diabetes, the body's own immune system causes damage to a specialized region in the pancreas, called the islets of Langerhans, effectively rejecting the tissue. The damage is significant because the beta cells within the islets make insulin. Normally, increasing blood sugar stimulates insulin production, which causes the body's cells to pull sugar out of circulation. The islets also house alpha cells, which make another hormone, glucagon. When blood sugar falls, alpha cells make

more glucagon, which causes the liver to break out stocks of glycogen and turn it into glucose.

New insight on insulin from immature cells

At diagnosis of diabetes, the body's immune system has already destroyed most beta cells and any ability to produce insulin. The remaining alpha cells build up and release glucagon, which causes a serious side-effect of juvenile diabetes. The majority of scientific strategies focus on means to prevent beta cell death and promote beta cell division. However, efforts to restore lost beta cells have been largely unsuccessful.

Huising has discovered that, in laboratory mice, immature beta cells may spontaneously arise from alpha cells. He proposes to identify the biochemical signals that switch [alpha cells](#) into beta cells and determine in human tissue whether such beta cells are adequately mature and functional. Huising's approach represents a shift in the current paradigm that after birth beta cells arise exclusively through the division of existing [beta cells](#).

If successful, Huising will harness the intrinsic potential for beta cell regeneration that exists within pancreatic islets. This approach has the benefit of blocking a serious side effect of [juvenile diabetes](#) and represents a potential path to a cure for the disease.

Biomedical research that benefits children

"The Hartwell Foundation has a strong commitment to providing financial support to stimulate discovery in early-stage, innovative biomedical research that has potential to benefit children of the United States," said Fred Dombrose, president of The Hartwell Foundation.

"Mark Huising typifies the innovative, young investigator we seek to

fund. We want to make a difference."

Top Ten Center designation

In addition to the individual award, The Hartwell Foundation designated UC Davis as one of its Top Ten Centers for Biomedical Research for the fifth consecutive year.

In selecting each research center of excellence, The Hartwell Foundation takes into account the shared values the institution has with the foundation relating to children's health, the presence of an associated medical school and biomedical engineering program, and the quality and scope of ongoing [biomedical research](#).

The foundation also considers the institutional commitment to support collaboration, provide encouragement, and extend technical support to the investigator, especially as related to translational approaches and technology transfer that could promote rapid clinical application of research results.

Provided by UC Davis

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