Derailing diabetes

MCG study looks at genetic risk of disease

By Tom Corwin | *Staff Writer*

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BARNWELL, S.C. --- Daylen Ray sits quietly on the floor studying a puzzle of cut-out shapes, a round piece in her chubby fist, as her four older brothers and sisters race around the Children's Program Room at the Barnwell County Public Library.

Researchers at the Medical College of Georgia hope the 1-year-old might be a piece of the puzzle herself as they try to figure out how children develop type 1 diabetes.

Daylen, who carries genes that put her at high risk for the disease, is among 7,800 children worldwide being followed as part of The Environmental Determinants of Diabetes in the Young study, based at MCG. They were culled from more than 361,000 who were screened at birth for the genes through six centers, three in the United States and one each in Sweden, Finland and Germany.

The study, begun five years ago, was recently renewed for $10 million over the next five years and is projected to run for 10 years beyond that.

"Good job security," said Diane I. Hop-kins, the study's multisite project manager.

Type 1 diabetes is an autoimmune disease in which the immune system mistakenly attacks insulin-producing cells in the pancreas. It most often shows up in children and has been increasing by 3-5 percent each year, doubling during the last 20 years, according to the MCG grant. No one knows why, said the study program director, Jin-Xiong She.

"We know it's not the genetics, because the genetics don't change that fast," he said. "It has to be the environment. That's one of the reasons why TEDDY is so important."

The Environmental Determinants of Diabetes in the Young study is looking at a number of environmental factors, such as diet or viral infections, that could help trigger the disease.

One key theory is the "hygiene hypothesis," a widely held belief that exposure to viruses and bacteria early in life can help train the immune system to respond properly. Without that exposure, the immune system can go off inappropriately and result in allergies or autoimmune diseases such as type 1 diabetes.

"The immune system has to be educated," Dr. She said. "And the way that we educate our immune system is through exposure to the outside."

That is bolstered by a recent find by Dr. She's team that a gene involved in sensing infections is also closely associated with type 1 diabetes. Beyond that, the MCG team has isolated an anti-inflammatory protein that Dr. She believes can alter the function of part of the immune system, which might lead to clinical trials to test it. He hopes to publish the findings in the next few months.

"I'm very hopeful and actually very optimistic now that we will have something within five years," Dr. She said. It will probably require more than one treatment because people with different genetic backgrounds will likely need different cures, he said.

"That is personalized medicine," Dr. She said. "I'm a big fan and a big believer in that. We really have to treat different individuals differently, depending on the genes they have and depending on the outcome of the gene-environment interaction."

More important, it might point the way to prevention.

"We are a big proponent of early diagnosis and prevention," Dr. She said. "That is really the future for medicine from a societal point of view and an economic point of view."

Mrs. Hopkins said: "Especially when you're talking about diseases that affect very young children."

That's why Daylen's mother, Joy Ray, is excited about participating in the study and is willing to drive to Augusta every three months to help the researchers, who are very grateful for the help from the families.

"That's the reason that I participated in it from the beginning," she said. "I did it because if what we do could help anyone in the next 100 years, it was worth it."

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ABOUT DIABETES

WHAT IS IT?

- Type 1 diabetes, an autoimmune disease in which the body's immune system mistakenly attacks the insulin-producing cells. It most often shows up in childhood.

- Type 2 diabetes occurs when the body either stops producing enough insulin or fails to process it properly. It is far more prevalent and most often shows up in adults. It might be linked to obesity and inactivity.

BY THE NUMBERS

- There are an estimated 23.6 million people in the United States with diabetes, nearly 8 percent of the population, according to the American Diabetes Association.

- About 5 percent to 10 percent of them have type 1 diabetes

Source: American Diabetes Association