

SIMPLE PLAN, BIG PAYOFF

Could preventing type 1 diabetes be as simple as switching baby formula? Hans-Michael Dosch, MD, PhD, from the Hospital for Sick Children, and colleagues all over the world are trying to find out.

In type 1 diabetes, the body's immune system produces proteins, known as autoantibodies, which are part of the autoimmune attack on the insulin-producing beta-cells in the pancreas. Without insulin, the body tissues cannot absorb sugar for its energy needs.

"Type 1 diabetes changes the lives of children and their families dramatically," says Dr. Céline Huot, a paediatric endocrinologist at CHU Sainte-Justine. It means a special diet, multiple daily injections of insulin (or a pump), and special accommodations at school and daycare.

REGULAR VS. HYDROLYZED FORMULA

After well over a decade of research in patients and animal models, Dr. Dosch and his colleagues crystallized a curious observation: there appears to be a critical window early in life during which dietary exposure to non-human proteins (like those found in cow milk) can trigger the gradual development of autoimmunity to insulin-producing beta cells among genetically diabetes-prone individuals. As a prelude for a massive clinical trial now running on three continents (TRIGR.org), the international team conducted a pilot study with 240 infants at high risk for developing type 1 diabetes, based on their family history and genetic profile.

The investigators randomly assigned the babies to receive one of two types of formula: a regular cow's milk-based formula or a special formula in which the proteins had been hydrolyzed, i.e. broken down into very small molecules unable to provoke an immune response. Parents were instructed to use the formula they had been assigned whenever breast milk was unavailable during the first six to eight months of the babies' lives. The children were

monitored to see whether they developed autoantibodies associated with diabetes, a sign they might later develop the disease.

These children are now about 10 years old, and remarkably, those who received the hydrolyzed formula were 46% less likely to develop one or more autoantibodies associated with diabetes development. *"No intervention or therapeutic effort, and there are many, has ever been able to touch these autoimmune signs,"* says Dr. Dosch.

CAUTIOUS OPTIMISM

Lowering rates of type 1 diabetes even a little would be an astounding achievement. Currently, over 300,000 Canadians live with the condition, and about 10,000 are newly diagnosed annually. Diabetes and complications from diabetes, which include damage to the kidneys, eyes, nerves, and blood vessels, cost the Canadian economy more than \$17.4 billion every year.

Dr. Huot says that while these findings are encouraging, *"we have to be cautious. Documenting that you have high levels of autoantibodies will not necessarily translate into diabetes."*

The much larger TRIGR trial, when completed, will provide a clearer picture of just how beneficial this special diet may be for high-risk infants. *"It would be a very easy ... way of preventing or postponing a condition,"* says Dr. Huot. *"But what is not available in regular practice is the genetic screening that these families have undergone to identify those babies at high risk for type 1 diabetes."* So to date, it remains unclear which babies might benefit from the special formula. 🐾

BY ALISON PALKHIVALA



"Type 1 diabetes changes the lives of children and their families dramatically."

Ref.: Knip M, Virtanen SM, Seppa K, Ilonen J, Savilahti E, Vaarala O, Reunanen A, Teramo K, Hamalainen A, Paronen J, Dosch H, Hakulinen T, Akerblom HK. Dietary intervention in infancy and later signs of beta-cell autoimmunity. *New England Journal of Medicine* 2010;363(20):1900-1908.