

Type 2 diabetes gene predisposes children to obesity

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Pediatric researchers have found that a gene already implicated in the development of type 2 diabetes in adults also raises the risk of being overweight during childhood. The finding sheds light on the genetic origins of diabetes and may present an avenue for developing drugs to counteract the disease, which has been on the upswing in childhood and adolescence.

Researchers from The Children's Hospital of Philadelphia and the University of Pennsylvania School of Medicine published the study Nov. 23 in the online version of the journal *Diabetes*.

"It has been a bit of a mystery to scientists how or even if these adult diabetes [genes](#) function during childhood," said study leader Struan F.A. Grant, Ph.D., a researcher and associate director of the Center for Applied Genomics of The Children's Hospital of Philadelphia. "This finding suggests that there may be [genetic activity](#) during childhood that lays the foundation for the later development of type 2 diabetes."

Type 2 diabetes occurs either when the pancreas produces too little insulin, or when the body cannot efficiently use the insulin that is produced because the cells have become resistant. Formerly called adult-onset diabetes and still most common in adults, type 2 diabetes has been increasing sharply among children and teenagers.

Grant and study co-leader Hakon Hakonarson, M.D., Ph.D., director of the Center for Applied Genomics at Children's Hospital, investigated 20

gene variants, known as single [nucleotide polymorphisms](#) (SNPs), previously reported to be associated with type 2 diabetes. The researchers drew on a cohort of nearly 7,200 Caucasian children, aged 2 to 18 years, in an ongoing genome-wide association study of [childhood obesity](#) at Children's Hospital. Dividing the cohort randomly in half allowed the team to follow their discovery study with a replication study.

Researchers continue to unravel the complicated role of different diabetes-related genes in influencing body weight toward both lower and higher ends of the scale. The risk of developing type 2 diabetes in adulthood is often influenced by factors in the first year of life, including lower birth weight, as well as by higher body mass index (BMI) during childhood. Obesity is a well-known risk factor for type 2 diabetes.

A previous study earlier this year by the same study team found that another type 2 diabetes gene, CDKAL1, affects fetal growth and increases the likelihood that a baby will be underweight at birth.

The current study found that the gene HHEX-IDE does not affect birth weight, but makes it more likely that a child will become obese during childhood. The gene does not appear to predispose to obesity in adults, although by contributing to childhood obesity, it may set the stage for type 2 diabetes in adulthood.

Grant cautioned that HHEX-IDE accounts for only a small proportion of the genetic contribution to the risk of [type 2 diabetes](#), so many other gene variants remain to be discovered. However, he adds, HHEX-IDE may represent an important underpinning of the disease. "Previously we thought that this gene affects insulin production during adulthood, but we now see that it may play an early role in influencing insulin resistance through its impact on body size during childhood," said Grant. "One implication is that if we can develop medicines to target specific

biological pathways in childhood, we may be able to prevent [diabetes](#) from developing later in life."

Source: Children's Hospital of Philadelphia ([news](#) : [web](#))

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