Low birth weight can increase hunger in adulthood

Foetuses that receive insufficient nutrition risk ending up as adults who overeat without satisfying their hunger. This is due to a faulty central mechanism in their fat stem cells.

If you can keep eating without feeling full, you may not have received sufficient nutrition when you were swimming around in your mother’s amniotic fluid.

New Danish research shows that babies who did not grow enough inside their mother’s womb, and were consequently born with a low birth weight (LBW), have a faulty central mechanism that regulates their hunger. This means that they can eat more than others for the rest of their lives.

“They become programmed to seek food because they have had insufficient nutrition at the embryonic stage. To survive in spite of their low birth weight, they can consume more when the mother starts breastfeeding them,” says Allan Vaag, a clinical professor at the Copenhagen University Hospital, Department of Clinical Medicine.

"Early on, the babies with a low birth weight survive because their hunger is greater than in babies with normal birth weight. But when they grow older, and if the food supply is large, as it is in Denmark, their increased appetite becomes a disadvantage because they end up eating too much and may become overweight.”

Low-weight babies have less leptin

Vaag heads a research team which has discovered that infants who weigh too little produce lower levels of the appetite hormone leptin than those with a normal birth weight. This is a result of their fat cells not maturing properly, the new study reveals.

It is therefore likely that people with LBW have a greater risk of becoming overweight and suffer type 2 diabetes than others, conclude the researchers, whose study is published in the journal *Diabetes*.

By comparing biopsies from 14 adult men who had LBW with biopsies from 13 men with normal birth weight, Vaag’s team has discovered that the stem cells in the fat tissue of those with LBW do not develop into functional cells, because they do not mature in the same way as in other people.

Immature cells lead to type 2 diabetes

Faulty maturation of the stem cells can be fatal, partly because leptin, which regulates our hunger, is produced during cell maturation.

"We’re very excited about our findings because they bring us closer to an answer to why LBW increases the risk of diabetes. Specifically, our study shows that the fat stem cells in low-weight babies lack the ability to mature in the right way. It is plausible that this also applies to the cells in other organs and tissues in the
body,” says Vaag.

“Type 2 diabetes is a disease caused by impaired functions in many of the body’s organs. If there is a general reduction in cell maturation in the body, this could provide a unifying explanation to why significant changes in energy metabolism occur in more than one organ in type 2 diabetes patients.”

**Feeling of satiety starts at the embryonic stage**

The body’s cells continue to mature throughout life until they perish and are replaced by the new stem cells, which in turn develop into mature cells that make up the body’s tissues.

Fat tissue has a short life span and its cells are constantly being replaced by new stem cells. When the fat stem cells become mature cells, they store the energy and the fat that enters the body through food. In this process they release a variety of hormones, including leptin, which regulates how much food we can stuff into our stomachs without becoming too fat.

"Our study shows that the body’s ability to transform stem cells into mature and leptin-producing fat cells is likely to start at the embryonic stage,” says the professor.

**The fat is stored in the organs**

If a foetus receives insufficient nutrition, this will not only result in a lack of leptin and thus a decreased ability to feel satiated. The cells in the fat tissue do not mature either, which means they cannot store fat. Instead, the fat is stored elsewhere in the body:

"Fat is usually stored in the fatty tissue under the skin, but people with a low birth weight store it in the liver, the heart, the brain and in other organs. This makes them more vulnerable not only to type 2 diabetes, but also to heart problems and a number of other diseases. Research suggests that these people also have an increased risk of suffering neurological disorders such as depression,” says Vaag, who believes there may be an evolutionary reason to why fat stem cells in low-weight babies do not mature properly and thus fail to produce leptin:

“In the early stages of life it is good that infants who weight too little can eat a lot just after birth, because here they need a lot of energy in order to gain weight and survive. The problems start to arise later in life, however, when they no longer need to eat as much to survive.”

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*If you can eat a lot more food than your friends, it may be because you received insufficient nutrition when you were in your mother’s womb. (Photo: [Shutterstock](http://www.shutterstock.com/)) [10]*

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Anne Ringgaard [17]

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