Your eating habits may affect your grandchildren's metabolism

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Your eating habits and food preferences could and will affect your later generations. Also, your parents or grandparents indirectly decide what your favourite food will be and how you eat. If they loved over consuming hamburgers and happy soda drinks or left their vegetables on the plate after dinner, they indirectly made a choice of your destiny. An unbalanced diet with high amounts of fat could actually promote the risk of getting illnesses, especially type 2 diabetes. In fact, the risk they left you with is not just for yourself, it is actually spreading to your children or maybe even grandchildren. Type 2 diabetes is becoming a worldwide disease; it is a start of an epidemic. Today we are able to list some of the reasons for the rapid increase of global diabetes and not blaming the genetics as the main causing agent.

You are what your grandfather ate

You are a product of your mom and dad. A mix of their genes made you arise as your own individual. Heritage and environment are creating who you are, but new research indicate that you also pick up traces from your parent's habits in their young years. In fact, their parents (your grandparents) were affecting your parents who now indeed are indirectly affecting you. How can you inherit traces of habits?

DNA carries information of who you are

Your DNA looks like a double twisted ladder. It consists of genes that make up the recipe of your gene pool, for instance which hair-colour you have, the size of your thumbs or if you are a carrier of a heritable disease. The environment can have an influence on your genes. Exposing yourself to things like smoking or eating hamburgers every day can create a small mark on your gene pool, like etiquettes attached to your DNA. These marks can change how genes are being expressed. Environmentally induced changes on your DNA are reversible and can be affected by inherited habits. This mechanism of inheritable traits outside of your coded recipe in your DNA, is called epigenetics.

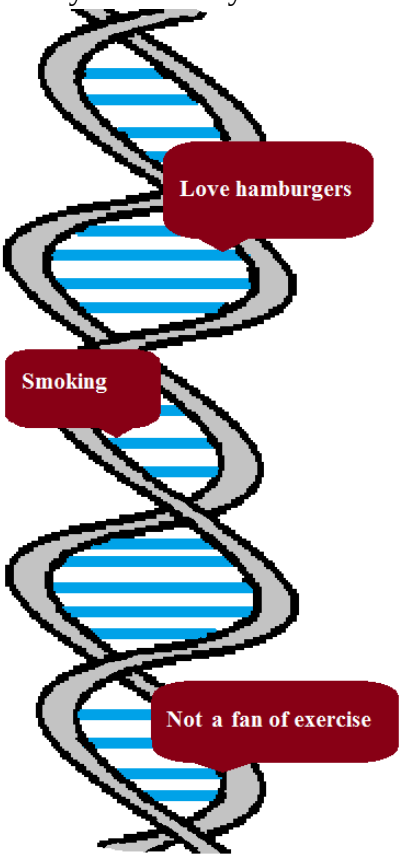

Figure 1. DNA with epigenetic etiquettes

What your mother ate vs. what your father ate

Both the mother's and the father's diet show significant relation to offspring. The maternal diet is important during her pregnancy period; she has a direct connection to the developing foetus. If the mother suffers from unbalanced diet or starvation throughout pregnancy or the prenatal

E-P-I-genetics

- "Epi" means over or above which explains the term "above genetics"
- Epigenetics does not change your DNA, but it decides how much some genes are expressed in different cells in your body
- Epigenetics look at what happens to your genes over the course of your life, whether those changes can be passed on to your children or even your grandchildren

period, the foetus gets undernourished which later will affect the growing child after birth. However, unhealthy changes in the paternal eating habits even before the fertile state has been shown to influence gene expression due to epigenetic mechanisms; it makes a change to how the offspring´s genome is utilized. Furthermore, these alterations affect his sperm-DNA, which may be passed on to the offspring.

This is how type 2 diabetes works

The balancing mechanism

After consuming a meal, the blood sugar (glucose) levels rise and needs to be restored again. Normally, a balancing system detects the change in the blood, and secretes a hormone called insulin from the so-called β-cells (beta cells) in the pancreas. Insulin flows into the blood stream and send signals to the body's storage cells (including the liver) for glucose uptake. When enough glucose has entered the storage cells, the blood glucose levels are stable again; insulin breaks down and is recycled. Diabetic patients with type 2 diabetes have problems with either producing insulin in the β-cells or that the recipient cells are resistant to glucose uptake. Diabetes type 2 is a condition where the blood sugar level is too high.

Is type 2 diabetes an epigenetic disease?

Recent studies show epigenetic patterns in sperm-DNA in correspondence with the status of the offspring's insulin producing cells in pancreas. These alterations are a concern for the progeny's risk to develop type 2 diabetes as an adult.

Health insurance

We assume that our DNA affects how our body responds, but in reality, you are able to do things to change the expression of the genes. How? By controlling your food intake and workout sessions.

Physical activity, food affection and addiction

Every animal depends on food as a nutritive source for survival. Wrong nourishment can also have a bit of a contrasting effect. Eating more than the recommended daily intake could in long terms lead to overweight or obesity. Obesity is shown to promote metabolic diseases such as type 2 diabetes. Scientific experiments have shown that a period of high-fat diet actually participate in forming an offspring's relationship to food, which in turn can accumulate in later generations. This also indicates that metabolic diseases could accumulate in your family. For individuals in the risk zone of developing type 2

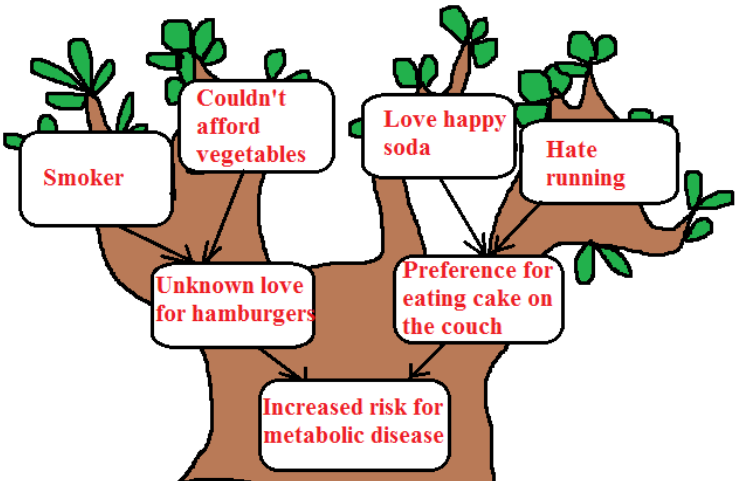

Figure 2. A fictive illustration of a happy family tree with explanations how type 2 diabetes can be inherited

diabetes, a healthy balanced diet could turn the tables. Weekly physical exercise of not less than 150 minutes is shown to decrease the risk of developing type 2 diabetes.

Therefore, if you feel that you are in danger of developing diabetes, you should remember that epigenetic changes to your DNA are characterized by being reversible mechanisms. That is, you are not doomed because your grandparents had a bad harvesting year; you are able to change your destiny, as well as influencing your descendant's' condition, by living a healthy happy active life.

More information

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