

Smoking changes our genes

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New findings show that smoking affects several genes which are related to common health issues in smokers.

(Medical Xpress)—The fact that smoking means a considerable health risk is nowadays commonly accepted. New research findings from Uppsala University and Uppsala Clinical Research Center show that smoking alters several genes that can be associated with health problems for smokers, such as increased risk for cancer and diabetes.

We inherit our [genes](#) from our parents at birth. Later in life the genetic material can be changed by epigenetic modifications, i.e. chemical alterations of the DNA that affect the activity of the genes. Such alterations are normally caused by ageing but can also result from

environmental factors and lifestyle.

In a study recently published in the journal *Human Molecular Genetics* the researchers have examined how the genes are changed in smokers and users of non-smoke tobacco. They could identify a large number of genes that were altered in smokers but found no such effect of non-smoke tobacco.

"This means that the [epigenetic modifications](#) are likely not caused by substance in the tobacco, but by the hundreds of different elements that are formed when the tobacco is burnt", says Åsa Johansson, researcher at IGP and Uppsala Clinical Research Center, who has led the study.

It has been previously known that [smokers](#) have an increased risk of developing diabetes and many types of cancer, and have a reduced immune defence and lower sperm quality. The results from the study also showed that genes that increase the risk for cancer and diabetes, or are important for the immune response or [sperm quality](#), are affected by smoking.

"Our results therefore indicate that the increased disease risk associated with smoking is partly a caused by [epigenetic changes](#). A better understanding of the molecular mechanism behind diseases and reduced body function might lead to improved drugs and therapies in the future", says Åsa Johansson.

More information: Welisane Besingi and Åsa Johansson (2013) Smoke related DNA methylation changes in the etiology of human disease, *Human Molecular Genetics*, Advance Access, Dec 11.

Provided by Uppsala University

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