

Why smokers gain weight when they quit smoking

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Most smokers put on a couple of kilos when they quit smoking. This is not due to an increased calorie intake, but to a change in the composition of the intestinal flora after quitting smoking, as a study supported by the Swiss National Science Foundation (SNSF) suggests.

When smokers wave goodbye to their cigarettes, eighty per cent of them put on seven kilos on average. Their weight increases even if their calorie intake remains the same or even falls compared to the level before quitting smoking. What is the reason for this weight gain?

Researchers working with Gerhard Rogler of Zurich University Hospital attribute the cause to a changed composition of the [bacterial diversity](#) in the intestine. As they recently showed in *PLoS One*, the [bacterial strains](#)

that also prevail in the [intestinal flora](#) of [obese persons](#) take the upper hand in people giving up smoking.

Comparison of stool samples

Rogler and his colleagues of the Swiss IBD cohort study examined the genetic material of [intestinal bacteria](#) found in the [faeces](#) and studied [stool samples](#) which they had received from twenty different persons over a period of nine weeks – four samples per person. The test persons included five non-smokers, five smokers and ten persons who had quit smoking one week after the start of the study.

While the bacterial diversity in the faeces of smokers and non-smokers changed only little over time, giving up smoking resulted in the biggest shift in the composition of the microbial inhabitants of the intestines. The Proteobacteria and Bacteroidetes fractions increased at the expense of representatives of the Firmicutes and Actinobacteria phyla. At the same time, the test subjects who had quit smoking gained an average of 2.2 kilos in weight although their eating and drinking habits remained the same (with the exception that, towards the end of the study, they drank on average a little more alcohol than before quitting smoking).

More efficient utilisation

Their results reflected those seen in previous studies conducted with mice, says Rogler. When other scientists transplanted the faeces of obese mice into the intestines of normal-weight mice some years ago, they saw that both the fractions of the Proteobacteria and Bacteroidetes in the gut flora as well as the weight of the mice treated increased. The new gut flora apparently used the energy contained in the nutrition more efficiently.

Rogler and his colleagues assume that the same effect also manifests itself in their test subjects. The composition of the diverse bacteria in the intestinal flora, which changes after giving up smoking, probably provides the body with more energy, resulting in new non-smokers gaining weight.

Swiss IBD cohort study

With the aim of gaining a better understanding of inflammatory bow-el diseases or IBD, specialist hospitals, private practice physicians and university institutions have come together to pool their knowledge. They are collecting the medical data of now nearly 2,000 affected persons who are participating in this long-term study. The study has been supported by the Swiss National Science Foundation since 2005.

More information: Biedermann, L. et al. Smoking cessation induces profound changes in the composition of the intestinal microbiota in humans, *PLoS One*, 2013. online. [DOI: 10.1371/journal.pone.0059260](https://doi.org/10.1371/journal.pone.0059260)

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