

Meet the Scientist

John-Olov Jansson is a well known expert on how the immune system can influence the parts of the brain that regulate hunger and fat mass. The major focus of Professor Jansson's laboratory in the Full4Health project is to investigate how these parts of the brain are influenced by gut bacteria.



Tell us about yourself and your lab

Our lab at the Sahlgrenska Academy in Gothenburg is mainly working on interactions between the immune system and regulation of fat mass. We are elucidating the mechanisms behind the surprising finding that the immune system regulators, interleukin-6 (IL-6) and IL-1 suppress body fat in healthy animals without infection or inflammation. We recently obtained evidence that the well-known body fat-suppressing effect of glucagon-like peptide-1 (GLP-1) is mediated by IL-6 and IL-1 in the brain (Shirazy R *et al* Proc Natl Acad Sci USA 110:16199-16204, 2013).

What is it in your research that particularly interests you?

The concept that the gut bacteria may communicate with the brain and thereby influence our behaviour, e.g. with respect to food intake, is fascinating. Interestingly, gut bacteria also have links to immunity. Until recently, it was assumed that gut bacteria only had a role in digesting food.



Do the bugs in your gut influence the hunger responses of your brain?

Prof. John-Olov Jansson

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What is the problem that this research is addressing?

Recent research suggests that the bacteria in our gut send signals to our body that influence the amount of weight we put on. Some of these effects are likely to be exerted on the parts of the brain regulating body fat and hunger, but little is known about this at present.

What is already known about the topic?

The number of gut bacteria is 10 times higher than the number of cells in the rest of our body. Despite this, until recently, very little was known about the function of the gut bacteria, except that they help us to digest food. A few years ago, a group in the USA reported that mice with no gut bacteria are leaner. In addition, studies have demonstrated that the composition of the bacteria and other microorganisms in the gut differs between obese and lean individuals. To a large extent, the mechanisms behind these observations are still unclear.

What research are you undertaking in Full4Health?

Although little is known about how the gut bacteria talk to the rest of body to influence body fat, it is likely that they affect the parts of the brain that control hunger and susceptibility to body fat accumulation and weight gain. We are now investigating how the hypothalamus and the brainstem, two parts of the brain regulating hunger and body fat, are influenced by the presence of the gut bacteria in experimental studies. The project is a collaborative study combining the expertise of Prof. Jansson's group regarding brain regulation of body fat, with that of a world leading expert on gut bacteria, Dr Fredrik Bäckhed. A first article presenting the results was recently published (Schéle E *et al* Endocrinology 154:3643-3651, 2013).

What do you hope will be the major outcomes?

We hope that we will discover important body fat regulators in the brain that are influenced by the gut bacteria, and that this will result in potential new targets for drugs to treat obesity. There is also a possibility that disturbances of gut bacteria could contribute to extensive loss of weight and appetite. New therapies for such diseases may also emerge from the present studies.