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Title of project: Gender-specific signalling networks in human adipocytes

ABSTRACT
Obesity, characterized by massive accumulation of adipose tissue after prolonged nutritional overload, is associated with an increased risk of developing cardiovascular diseases and type II diabetes. The parenchymal cells of adipose tissue, the adipocytes, play a crucial role in the maintenance of energy homeostasis by means of storing and releasing lipids, as well as by their role in hormone production. It is well recognized that women and men distribute their adipose tissue differently and thereby possess a divergent risk for the development of metabolic diseases. Studies indicate that adipocytes display gender specific differences; however, so far very little is known about the intrinsic functional differences between male and female adipocytes and the mechanisms driving these differences.
In the proposed project, I will determine the intrinsic differences in gene expression and epigenomic profiles between lean and obese men and women and use this to infer functional consequences as well as the molecular mechanisms driving these gender- and depot differences in the lean and the obese state. These unbiased studies will be combined with targeted metabolic analyses to validate predictions and to determine key functional parameters such as insulin sensitivity, lipolysis, and secretion of adipokines. This work will provide novel systemswide insights into the molecular mechanisms underlying these differences between adipocytes from men and women, which can lead to the development of gender-tailored approaches for the prevention of obesity comorbidities.