

Obesity and Bariatric Surgery Drive Epigenetic Variation of Spermatozoa in Humans - DTU Orbit (08/11/2017)

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Obesity is a heritable disorder, with children of obese fathers at higher risk of developing obesity. Environmental factors epigenetically influence somatic tissues, but the contribution of these factors to the establishment of epigenetic patterns in human gametes is unknown. Here, we hypothesized that weight loss remodels the epigenetic signature of spermatozoa in human obesity. Comprehensive profiling of the epigenome of sperm from lean and obese men showed similar histone positioning, but small non-coding RNA expression and DNA methylation patterns were markedly different. In a separate cohort of morbidly obese men, surgery-induced weight loss was associated with a dramatic remodeling of sperm DNA methylation, notably at genetic locations implicated in the central control of appetite. Our data provide evidence that the epigenome of human spermatozoa dynamically changes under environmental pressure and offers insight into how obesity may propagate metabolic dysfunction to the next generation.

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