

 ADIPOSE TISSUE

Sex differences in adipogenesis

The mechanisms underlying the different distribution of adipose tissue in men and women are unclear. New research in mice sheds some light on this issue.

Men are more likely to accumulate visceral white adipose tissue (VWAT), which has negative consequences for metabolic health, whereas women are more likely to accumulate subcutaneous white adipose tissue (SWAT), which is thought to be protective. To investigate the mechanisms underlying this difference, a team of researchers led by Matthew Rodeheffer developed an *in vivo* adipogenesis assay to study how fat mass expands in mice. “Focusing on *in vivo* assays is critical for the study of adipose given the responsiveness of adipose tissue to nutritional and

hormonal cues and its integration into whole-body physiology,” explains Rodeheffer.

The investigators found that obesity as a result of a high-fat diet induces adipocyte hyperplasia in just the VWAT of male mice. By contrast, the same conditions resulted in adipocyte hyperplasia in both VWAT and SWAT in female mice. “These depot-dependent differences in adipogenesis are influenced by the tissue microenvironment in the different depots, not by cell-intrinsic differences in adipocyte precursors,” says Rodeheffer.

Ovariectomized female mice had a male-like response to a high-fat diet, which suggests that sex hormones might be involved in the differences in adipogenesis between the sexes. To test this idea, the researchers

administered oestrogen to male mice. When these mice were fed a high-fat diet, adipocyte hyperplasia was increased in the SWAT, which indicates that oestrogen influences the response of SWAT to a high-fat diet. “Now that we have characterized adipocyte hyperplasia in obesity at the cellular level, we are focusing on how dietary changes drive obesogenic adipogenesis and what components of the adipose tissue microenvironment influence adipocyte hyperplasia in obesity,” concludes Rodeheffer.

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ORIGINAL ARTICLE Jeffery, E. *et al.* The adipose tissue microenvironment regulates depot-specific adipogenesis in obesity. *Cell Metab.* <http://dx.doi.org/10.1016/j.cmet.2016.05.012> (2016)

FURTHER READING Karpe, F. & Pinnick, K. E. Biology of upper-body and lower-body adipose tissue—link to whole-body phenotypes. *Nat. Rev. Endocrinol.* **11**, 90–100 (2015)