

Study sheds light on differences between male and female fat tissue, and health

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New research from York University on fat tissue is providing an important clue as to how females stay healthier than males, even as their body fat increases.

Published today in *Frontiers in Physiology—Vascular Physiology*, [the research](#) focusses on the differences between abdominal fat in obese male and female mice. A team of researchers under the direction of Professor Tara Haas found that the abdominal fat on female mice had more blood vessels than the fat on male mice, and that this protected the health of the female mice as they gained fat from eating a high-fat diet.

Males and [females](#) develop fat [tissue](#) differently and also differ in susceptibility to cardiovascular disease, insulin resistance and diabetes. However, the underlying biology behind why fat tissue in females is more protective against these conditions was not well understood, says Haas, a professor in the School of Kinesiology and Health Science, Faculty of Health.

Blood vessels are critical for maintaining healthy fat tissue by ensuring that the expanding fat cells are supplied with enough oxygen and nutrients, so the researchers looked at whether the abilities of the fat tissue to grow blood vessels and maintain healthy fat tissue would be different between males and females.

"We found that [female mice](#) have a higher number of blood vessels in their fat than males, and that females increase the number of blood

vessels as they are fed a high fat diet, while males do not. We concluded that this response enabled females to maintain healthier fat and better insulin sensitivity," says Haas.

Martina Rudnicki, a York post-doctoral associate and first author of the study, pointed out that the study was unique because it focused on the differences in male and female [fat tissue](#) in the abdominal area.

Although fat accumulates in different regions of the body, it is abdominal fat that is closely linked with increased risk of developing diabetes, particularly in males. So, the fact that females grow new blood vessels in this [abdominal fat](#) during weight gain may exert a health advantage for females.

The sex differences in the fundamental cellular processes that regulate the growth of [blood vessels](#) were unappreciated in the past, said Haas. It is important to understand them because they may contribute to an individual's susceptibility to develop serious obesity-related health complications such as diabetes, heart disease and cancer, ultimately impacting the health of more than 5.3 million Canadian adults.

The research team plans to confirm these findings in human samples. While it is clear that females also develop [health](#) problems with obesity, the fact that there was such a difference in the vascularization in male and female fat may mean it would be more effective to have different treatments for males and females.

Provided by York University

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