

Do cells have a sweet tooth?

March 27 2018, by Lydia Goff



Prevalence of Self-Reported Obesity Among U.S. Adults by State, 2016. Credit: Duke Research Blog

Obesity is a global public health crisis that has doubled since 1980. That is why Damaris N. Lorenzo, a professor of Cell Biology and Physiology at UNC-Chapel Hill, has devoted her research to this topic.

Specifically, she examines the role of ankyrin-B variants in metabolism. Ankyrins play a role in the movement of substances such as ions into and out of the cell. One of the ways that ankyrins affect this movement is through the [glucose](#) transporter protein GLUT4 which is present in the heart, skeletal muscles, and insulin-responsive tissues. GLUT4 plays a large role in [glucose levels](#) throughout the entire body.

Through her research, Lorenzo discovered that with modern life spans and high calorie diets, ankyrin-B variants can be a risk factor for

metabolic disease. She presented her work for the Duke Developmental & Stem Cell Biology department on March 7th.

GLUT4 helps remove glucose from the body's circulation by moving it into [cells](#). The more GLUT4, the more sugar cells absorb.

Ankyrin-B's role in regulating GLUT4 therefore proves really important for overall health. Through experiments on [mice](#), Lorenzo discovered that mice manipulated to have ankyrin-B mutations also had high levels of cell surface GLUT4. This led to increased uptake of glucose into cells. Ankyrin-B therefore regulates how quickly glucose enters adipocytes, cells that store fat. These ankyrin-B deficient mice end up with adipocytes that have larger lipid droplets, which are fatty acids.



Obese mouse versus a regular mouse. Credit: Duke Research Blog

Lorenzo was able to conclude that ankyrin-B deficiency leads to age-dependent obesity in mutant mice. Age-dependent because young ankyrin-B mutant mice with high fat diets are actually more likely to be affected by this change.

Ankyrin-B has only recently been recognized as part of GLUT4

movement into the cell. As cell sizes grow through increased [glucose uptake](#), not only does the risk of obesity rise but also inflammation is triggered and metabolism becomes impaired, leading to overall poor health.

With obesity becoming a greater problem due to increased calorie consumption, poor dietary habits, physical inactivity, environmental and life stressors, medical conditions, and drug treatments, understanding factors inside of the body can help. Lorenzo seeks to discover how ankyrin-B protein might play a role in the amount of sugar our cells internalize.

Provided by Duke University

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