

Researchers develop cell line to study obesity, other diseases

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A Kansas State University research team has created a cell line that can be used in studies aimed at understanding obesity and other disease in humans, a discovery that has caught the attention of a Canadian company that markets innovative work in the life sciences.

Stephen Chapes, professor of biology at Kansas State University, said the researchers have studied a protein that regulates body weight, called the leptin receptor, and its impact on large [white blood cells](#) called macrophages.

"Macrophages are located throughout your body, protecting you from infection," Chapes said. "Macrophages are important in [obesity](#) because if you become obese, your immune function is disrupted."

The U.S. Centers for Disease Control estimates that more than one-third of adult Americans, or 78.6 million people, are obese. Obesity is associated with an increased incidence of stroke, diabetes, cardiovascular disease and some types of cancer.

In a healthy organism, the leptin hormone works to regulate hunger and energy use, thus serving as an ally against obesity. Chapes and colleagues in Kansas State University's [human nutrition](#) department studied lab mice that lacked the leptin receptor.

"They are always hungry," Chapes said of the leptin receptor-deficient [lab mice](#). "They cannot reach a point where they are satisfied, so they eat

and eat and get fat. When that happens, it changes the macrophages that are in the adipose tissue—or body fat."

He said that scientists have many questions about how this new population—called inflammatory macrophages—affects obesity as well as immune responses to other diseases.

Normally, macrophages in the body—whether in tissues, blood, organs or elsewhere—serve as a patrol against disease.

"If something bad comes in, they can take care of it," Chapes said. "We were interested in whether the lack of this receptor also affects the ability of these cells to function."

The cell line developed at Kansas State University, called DB-1, was derived from bone marrow cells taken from the leptin receptor-deficient mice. The line provides an in vitro tool for scientists to further investigate the link between leptin and innate—or nonspecific—immunity in humans and other organisms.

A Canadian company, Applied Biological Materials Inc., has signed a licensing agreement with Kansas State University to provide the cell line to scientists worldwide, according to Angela Trinh, who works in the company's technology transfer office.

The Kansas State University Research Foundation and the university's Institute for Commercialization, or KSU-IC, worked to form the licensing agreement.

The research study, "Establishment and characterization of DB-1: a [leptin receptor](#)-deficient murine macrophage cell line," was published in the online journal Cytotechnology. The article is co-authored by Kansas State University's Lea Dib, a 2011 doctoral graduate in human nutrition,

and Tonatiuh Melgarejo, associate professor of human nutrition.

More information: Lea H. Dib et al. Establishment and characterization of DB-1: a leptin receptor-deficient murine macrophage cell line, *Cytotechnology* (2015). [DOI: 10.1007/s10616-015-9843-3](https://doi.org/10.1007/s10616-015-9843-3)

Provided by Kansas State University

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