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Peanut Allergy

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Calories and Lifespan

Although a restricted-calorie diet slows metabolism in both lean and obese mice, only mice prone to obesity receive the life-prolonging benefit of such diets, according to the results of a recent study by researchers from the University of Southern California, Los Angeles, and the University of North Texas Health Science Center in Fort Worth (Sohal RS et al. *J Nutr*. 10.3945/jn.108.100313 [published online ahead of print January 13, 2009]).

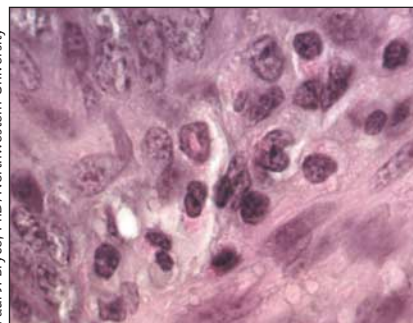
The authors studied the C57BL/6 strain of mice, which have a longer life when fed a calorie-restricted diet, and the DBA/2 strain of mice, which do not live longer on a restricted diet. The mice were fed two different diets and were tested for their rate of resting oxygen consumption at 6 and 23 months of age. When mice from both strains were allowed to eat as much as they wanted, they ate about the same amount. However, the C57BL/6 mice became obese, while the DBA/2 mice, which had a higher rate of oxygen consumption, maintained their weight. When the two strains were fed a diet containing 40% less energy, mice of both strains initially lost weight before leveling off at equivalent weights for a few months, and their oxygen consumption was reduced.

The authors hypothesize that caloric restriction is beneficial only when an organism has an energy use imbalance that causes weight gain and related health problems.

Peanut Allergy

Food allergies have become more prevalent in recent years and now affect more than 11 million US individuals. Study of how such allergies develop has been hindered by the lack of an animal model with many of the key features of human food allergies. Now, scientists from Northwestern University in Evanston, Ill, have developed a promising mouse

model for peanut allergies, and studies in this mouse model suggest that exposure to certain bacteria may make individuals more prone to developing allergic reactions to food (Ganeshan K et al. *J Allergy Clin Immunol*. 2009; 123[1]:231-238).



An eosinophil (distinguished by its characteristic doughnut-shaped nucleus) in the jejunum of a new mouse model for peanut allergy signals an allergic reaction.

The researchers found that mice given staphylococcal enterotoxin B along with peanut extract became sensitized to peanut allergens. This dual exposure, the authors hypothesized, triggers changes in the immune system, resulting in a loss of immune suppression. This model also suggests exposure to staphylococcal enterotoxin B through contaminated food or other routes might promote food allergies, the researchers said.

Timing Chemotherapy

Scientists have found a biological mechanism that may explain why chemotherapy is more effective when given at certain times of the day.

Previous evidence had suggested the circadian clock plays a role. In the current study, researchers from the University of North Carolina in Chapel Hill demonstrated how a specific DNA-repair mechanism regulated by the clock may explain the phenomenon (Kang T et al. *Proc Natl Acad Sci U S A*. 10.1073/pnas.0812638106 [published online ahead of print January 21, 2009]).

The researchers measured the activity at various times of day of the nucleotide excision repair system in tissue from the mouse cortex. They found the system is most active in the afternoon and evening hours and least active in the morning. This may explain why chemotherapy is more effective in the morning because this system is less able to repair DNA damage in cancer cells.

Because it is possible this system also helps repair DNA damage caused by UV radiation, the findings may have implications for preventing skin cancer. If this discovery is supported by human studies, it might suggest that sun exposure is less damaging during the afternoon hours when this repair system is most active.

Picturing Poxvirus

Scientists at Oklahoma State University in Stillwater and the University of Texas Health Science Center in San Antonio have revealed new details about how poxviruses disable the human immune system (Krumm B et al. *Proc Natl Acad Sci U S A*. 2008;105[2]:20711-20715).

Orthopoxviruses, such as the virus that causes smallpox, trick the human immune system by creating their own version of human interleukin 18 binding proteins (IL-18BP). These virus proteins bind to human interleukin 18 (hIL-18), preventing the immune system from mounting an effective defense. But the precise details of how these molecules bind have been elusive. The researchers used an x-ray crystallography technique, the single-wave anomalous dispersion method, to elucidate the crystalline structure of an orthopoxvirus IL-18BP as it binds to IL-18.

Studying this structure may help in the development of drugs that target orthopoxvirus IL-18BP to treat individuals infected with poxviruses. It may also aid the development of treatments for autoimmune disorders, in which hIL-18 is overactive.—Bridget M. Kuehn