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## Brain Cells That May Play a Key Role in Appetite

Targeting cells ‘may prove useful’ in eating disorders, researcher says

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Scientists have discovered a cluster of cells in an unexpected area of the brain that could play a powerful role in regulating appetite and eating habits, says a report in the journal *Nature*.

In mouse experiments, destroying the cells caused the rodents to overeat and gain excessive weight. Activating the cells had the opposite effect: The mice lost their appetite and became almost anorexic.

The cells, called cholinergic neurons, were located in the basal forebrain at the front of the brain, in a region called the diagonal band of Broca. The neurons produce acetylcholine, a chemical that helps brain cells transmit information to one another, but its role in controlling appetite wasn't previously known, researchers said.

The neurons use the same pathways in the brain as nicotine, a chemical in tobacco and an appetite suppressant, they noted.

“Targeting cholinergic neurons for either electrical, genetic or pharmacological manipulation may prove useful in treating detrimental eating habits or eating disorders—or aspects of addiction,” lead researcher Dr. Benjamin R. Arenkiel, associate professor in the departments of molecular and human genetics and neuroscience at Baylor College of Medicine in Houston, said in an email.

To assess acetylcholine's effect on appetite, researchers used genetic-modification techniques to kill cholinergic neurons in mice without harming other brain cells. Mice without the neurons doubled in weight on an unrestricted diet and became increasingly inactive over two to three months. In contrast, control mice with intact neurons exhibited normal weight gain and activity levels.

Overeating and obesity occurred in both sexes, but females tended to gain more weight, the researchers said.

In separate experiments, mice were exposed to bright blue light to stimulate the neurons to produce more acetylcholine. The light-exposed mice consumed 25% less food on a daily basis, while non-exposed controls showed no significant changes in feeding habits.

Previous appetite-related research has mostly focused on a region of the forebrain called the hypothalamus, researchers said.

Caveat: Cells from other parts of the brain may play a role in appetite changes, researchers said. The effects of manipulating cholinergic neurons haven't been tested in human studies.

A cholinergic basal forebrain feeding circuit modulates appetite suppression