Study connects obesity with nervous system

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A discovery by Queen's biologists and their students sheds new light on the genetic roots of obesity – a condition that is increasing dramatically in North America and has been linked to heart disease, diabetes and some forms of cancer.

The new findings may also help to unlock the mystery of how our nervous systems control obesity.

Published on-line this week in the journal *Proceedings of the National Academy of Sciences*, the study was partially funded by the Natural Sciences and Engineering Research Council of Canada (NSERC).

Professors William Bendena and Ian Chin-Sang teamed up to work with tiny, transparent worms that have similar neurotransmitters (chemicals that transmit nerve impulses) as humans. They discovered that when a specific nerve receptor is deleted, the worms lose interest in foraging for food, become slow-moving and accumulate fat at a much higher rate than normal, non-modified, worms.

"Although there is a wealth of scientific data currently being collected regarding classic brain neurotransmitters, it's still uncertain how neuron connections may be either stimulatory or inhibitory in various organisms," notes Dr. Bendena. "Our breakthrough came when Dr. Chin-Sang localized the worm's receptor to one specific connecting nerve cell."

The worms that had their receptor deleted showed no difference in

behaviour from other, non-altered worms – until placed directly on food. Then they stopped their normal foraging behaviour, dramatically slowing their movements, and gained fat more quickly than worms with their receptors intact.

When extra copies of the receptor were added to the mutant worms, they became hyperactive and traveled large distances away from their food.

Drs. Bendena and Chin-Sang conclude that this type of receptor is an inhibitory switch within one connecting cell, and that worms defective in the receptor will gain fat. “Such clearly affected behaviour and physiological changes have never been seen nor understood until this discovery,” says Dr. Bendena. “We hope that this will provide a basis for further research to unlock the mystery of the long-awaited nervous system connection to obesity.”

Source: Queen's University