Rewarding fat rats

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We all remember a time when we were paralyzed in the face of a tough decision. For animals in the natural world, making the right choice can mean the difference between life and death.

When rats and other animals choose the thing that leads to a "reward," such as food, changes happen in the body and the brain. Describing and understanding those changes has been the focus of Natural Sciences and Engineering Research Council grantee Peter Shizgal for most of his career.

Shizgal was recently recognized for his contributions by the American Association for the Advancement of Science. He will be inducted as a fellow during its annual conference in San Francisco.

"It's an honour to receive this sort of recognition from one's peers, and I do feel proud," says Shizgal, a Concordia University professor of psychology. "That pride should be shared. Achievements like this in the natural sciences often reflect the work of a team, and that is certainly true in my case. I have been privileged to have terrific trainees and faculty colleagues as research collaborators, many of whom have been supported by NSERC scholarships and grants."

In their studies of food reward, Shizgal's team investigated the role of leptin, a hormone that the body produces in proportion to the amount of stored fat. A person who eats a lot during holidays, for example, will make more leptin than a person who sticks to a stricter diet.

In work carried out by Shizgal's team, chubby lab rats were put on a diet to reduce their fat mass and, hence, their leptin levels. They found that restricting the rats' diet to one meal per day not only made them lose weight, but also made reward sensations stronger. Conversely, increasing the level of leptin in the brain weakened the reward sensation. Their work has appeared in notable journals such as Science and Behavioral Neuroscience.

"Trying to understand the brain mechanisms of motivation in animals – and also in humans – is not only fascinating for me, but also highly rewarding. More broadly, there is an exciting confluence of work emerging from both major branches of NSERC-supported research: natural science and engineering," says Shizgal.

"While natural scientists use concepts and technologies developed by engineers to try to understand what makes animals tick, certain computer scientists and engineers look to the natural world for inspiration and guidance as they build intelligent machines. Ongoing research has already produced some computer programs and robots that can learn from experience and adapt their behaviour to a complex, constantly changing environment. We can expect that this technology will be greatly improved in the near future."

Source: Natural Sciences and Engineering Research Council

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