Gorillas, unlike humans, gorge protein yet stay slim

June 23 2011

(PhysOrg.com) -- A Massey University scientist's study on how wild gorillas in Uganda stay healthy by gorging on protein has highlighted fundamental differences in the way eating habits of various species evolve.

Nutritional ecologist Professor David Raubenheimer says his research also provides clues as to why humans are increasingly obese.

The gorillas he studied in remote Bwindi Impenetrable National Park seasonally overeat protein to meet their needs for carbohydrates and fats. But the results of the study, published in British journal *Biology Letters*, surprised the researcher because they are opposite to what humans do these days, which is overeat carbohydrates and fats to get enough

protein.

In the four months of the year when fruits are freely available, the rare apes eat a diet that provides 19 per cent of energy from protein. This, the study shows, is close to a balanced diet for gorillas, and is similar to the protein requirements of humans.

But in the eight months of the year when fruits are scarce in their high-altitude forest habitats, the gorillas eat a diet containing a whopping 30 per cent protein.

“This provided us with a natural experiment in which we could test whether the appetite of mountain gorillas is more tightly linked to protein or non-protein energy [carbohyrdrates and fats],” Professor Raubenheimer says. “If protein is more important, then gorillas stuck on the high protein diet will eat enough food to satisfy their need for protein, but in the process eat less than the required amount of fats and carbs.”

He and colleagues had previously found that spider monkeys in the wild, and humans in experiments, also behave in this way. “This pattern of nutrient regulation, which we call ‘protein leverage’, explains a lot about the nutritional biology of our own species,” he says. “It means that our intake of fats and carbs, and hence of energy, is lower when we eat a diet high in protein – which is how high protein weight loss diets, like the Atkins diet, work.

“But there is a flipside – when we eat a diet low in protein, we over-eat fats and carbs to satisfy our appetite for protein.”

This, says Professor Raubenheimer, can explain the rise over the past few decades in human obesity.

“For a number of reasons, including the relatively high price of protein, the protein content of our diets has over the past 50 years become diluted with fats and carbs. Our craving for protein causes us to over-eat the low-protein foods, in the same way that an alcoholic would drink more low-alcohol larger to satisfy his addiction”.

The findings are both surprising and interesting, he says. “It suggests that an Atkins-type diet would not work on gorillas, and provides some potentially important information for conserving the species. But our immediate interest is to find out why gorillas differ in this way from spider monkeys and humans.”

He and his colleagues are expanding the study to include several other species of primates, with the aim of learning more about how different evolutionary environments can lead to fundamental differences in nutritional biology.

Provided by Massey University