The brain is much more sensitive to reduced food intake than increased food intake, because the systems that regulate appetite developed in a state of starvation was much more of a threat to human survival and having too much food wasn’t a problem.

Dieting tricks the brain into thinking there is a food shortage.

When the brain has faced a food shortage (such as a diet once) the body will be more efficient at storing fat than it was before – this is why crash diets rarely work in the long run.

Scientists have already tried to develop drugs which switch off appetite but, and while these drugs often work for a while, the brain is very good at adapting so that appetite returns.

As always, prevention is better than cure; so combining a sensible diet with an active lifestyle throughout your lifetime is likely to be the best solution.

Dr Bev Muhlhausler is a research fellow with the FOODXtreme Research Centre, School of Agriculture, Food and Wine, University of Adelaide. To find out more about the 10 Big Questions, go to http://ua.edu.au/sciences/10big.

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Q HOW do we unravel the cause of disease?

A If you have ever been late for or skipped a meal you probably remember that unpleasant hungry feeling you experienced.

On the other hand, most of us will have at times eaten a lot more than we actually needed to, but without feeling any ill effects – at least not until we reach extremes. It turns out that there is a scientific reason for this, and that the systems in our brain which regulate appetite are much more sensitive to a reduced intake of nutrients than to increases in the nutrient supply.

This makes sense when you remember that these systems developed at a time when humans were living in a hunter-gatherer society, where there would be plentiful food during certain months but very little food during others. In this hunter-gatherer world, the people who were most likely to survive particularly harsh times were those who had laid down more fat stores to sustain them.

On the other hand, starvation is a different issue and this is why dieting is so difficult.

When we eat less, the brain responds as if we are entering a famine – by switching on hunger pathways so we go in search of food.

The brain also slows down our metabolism to conserve energy, which means that as we lose weight our metabolic rate decreases further so it becomes even harder to burn more calories.

This is the cause of the plateau in weight loss which many people experience.

On top of this, once we have been through one famine (or diet) our body becomes even more protective of fat stores, which explains the well-described rebound effect, where people end up putting on more weight than they lost once a diet is over.

In effect, our own physiology, which evolved to help protect us from starvation, is thwarting our efforts at weight loss.

How do we get around this?

Well, unfortunately there probably is not going to be a magic bullet when it comes to weight loss.

Informed citizens our challenge

HEATHER KENNETT

THE future of society depends on the ability of educators to create “informed and productive citizens”, says secondary teacher Len Altmann.

The 69-year-old who has taught science subjects including geology, mathematics and physics at Marden Senior College for the past 13 years is a regional winner in the The Advertiser-State Government SA Public Teaching Awards.

“The future of our society depends to a large extent on the ability of our teachers to develop in our next generation the skills and attitudes that will help them become informed and productive citizens,” he said.

“It will to enable them to meet the challenges of our constantly changing world.”

Mr Altmann said he was “very honoured” to be nominated in the category of Inspirational Secondary School Teacher.

The former exploration geophysicist fell into teaching when the now booming mining industry experienced a decline 20 years ago.

“It was really by accident but looking back I feel lucky that it happened. Knowing that quite a few of my students have gone on to careers in geology, mathematics and physics, I find that inspiring and makes it worthwhile.”

He enjoyed teaching within an adult learning environment, where less than half the students were aged under 18, he said. “I’m teaching students from all sorts of backgrounds and from different careers and people looking for a second chance. It rubs off on the younger ones as they are able to see what others have done in.”

Mr Altmann, who has also won the 2009 Prime Minister’s Prize for Science Teaching in Secondary Schools, said a hands-on, varied and flexible approach to learning and getting outside the classroom helped motivated students to learn. “I’d rather teach outside in the natural environment (and they like it) – it’s the best way to learn.”

State winners will be announced on World Teachers’ Day, October 5.