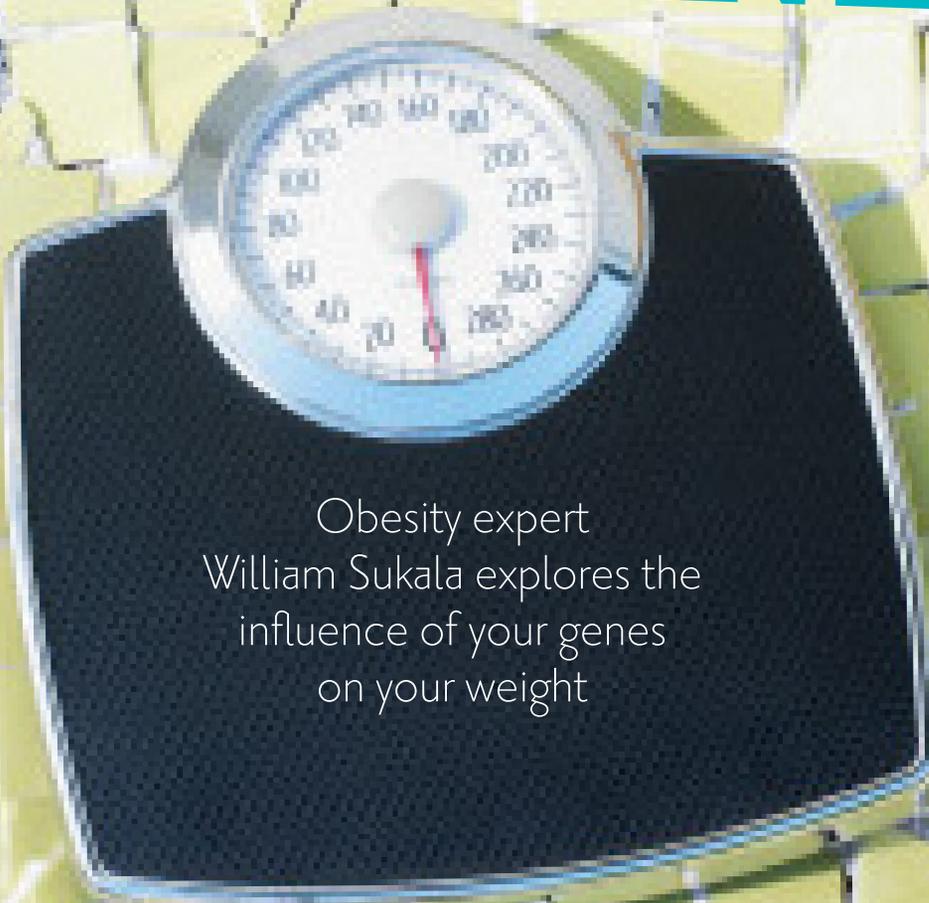


**FAST FACT**

do you hold the

# OBEESITY GENE?



Obesity expert  
William Sukala explores the  
influence of your genes  
on your weight

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**THE WORLD HEALTH ORGANISATION**

has indicated that across the world there are in excess of one billion adults who are overweight. At least 300 million of these are classified as clinically obese, to the extent that their condition may cause health problems, such as heart disease, diabetes or cancer. While these statistics are grim, they are not entirely surprising.

**SURVIVAL OF THE FATTEST**

Essentially, our Paleolithic genes are performing precisely as they were designed to. They are there to store fat and protect against famine at all costs. Back in the caveman days, those who could store fat most efficiently during times of food scarcity were the ones to survive the famine and continue to procreate. Fat genes were selected for and – in fact – favoured over the so-called skinny genes. Ironically, as much as we loathe fighting the battle of the bulge, it is body fat that contributed to our ancestors' survival, up to the point of producing us!

**SUICIDE BY DESK JOB**

Unfortunately, our ancient human genome could never have imagined the world in which we live today. Kilojoules (calories) previously burnt off through hunting, gathering and fleeing from predators, are now readily stored as excess body fat. And therein lies the irony: our formerly protective fat-storing biology has now become a health liability in times of physical inactivity and food over-abundance.

**WHERE TO FROM HERE?**

So, what's the solution to our expanding waistlines? For years, we've been told weight loss is simply a result of burning off more energy than you consume. All the experts preach the 'calories in versus calories out' gospel. That is, eat less and exercise more. However, is the issue really so black and white?

While the 'calories in versus calories out' mantra is technically true obesity is, unquestionably, a highly complex condition. Continuing advances in our understanding of energy balance and weight control suggest an intricate interrelationship between nature and nurture. Certain biological influences – such as genes, hormones and enzymes – may partially explain why some skinny people can eat to their heart's content and never gain a gram, while

## GENE, ENZYME, AND HORMONAL INFLUENCES OVER BODY WEIGHT REGULATION

**FTO GENE**

In a study of nearly 40,000 people, those with two copies of the FTO gene variant were likely to weigh approximately 3kg more than those without the gene, and 1.2kg more than those with just one copy of the gene.

**SCD-1 GENE**

The Steroyl CoA Desaturase-1 (SCD-1) gene encodes an enzyme that hinders fat burning and promotes fat storage in muscle. Obese people with the SCD1 gene have as much as three times the amount of this enzyme, compared to lean people. That is, obese muscle stores more fat and burns less fat. Interestingly, studies on isolated human stomach muscle tissue show that even outside the body, obese cells continue to express this enzyme, suggesting a mechanism for obesity independent of over-eating.

**TRAP**

Tartrate Resistant Acid Phosphatase (TRAP) is an enzyme secreted by immune cells in fat tissue, which plays a role in the formation of new fat cells. Obese individuals have been shown to have greater concentrations of this TRAP enzyme. Future therapies inhibiting TRAP formation may play a role in reducing obesity levels.

**OXYNTOMODULIN**

Oxyntomodulin is a hormone released by the small intestine. Topping up this hormone signals the brain to decrease appetite and increase activity levels. This is particularly relevant to dieters. The body instinctively tries to conserve energy during weight-loss attempts, but oxyntomodulin appears to counteract this effect.

others live on birdseed and tofu, and still manage to gain weight.

**IS WEIGHT LOSS AS SIMPLE AS EATING LESS AND EXERCISING MORE?**

There are a number of scientific developments that suggest perhaps there is more to weight control than just cutting back on the late-night snacks. The common denominator is the fact that some people are hard-wired to gain fat more easily than others. This may stem from the fact that obese people's ancestors may have lived in harsh, inhospitable climates and carried forward their fat-storing genes. Under that premise, skinny people's ancestors might have lived in a temperate, food-abundant region, where fat storage was not so important.

That said, while our genetic heritage does play a role in weight management, there is no doubt that these genes remain servants to the environment. It is widely understood that when people move from rural to industrialised, first-world regions, obesity and its related metabolic diseases follow. For instance, the Pima Indians – who are found on both the United States and Mexican side of the Mexico border – provide a clear example of the potent influence of environment over biology. Biologically, their gene pool is virtually identical, yet their diets and lifestyles are markedly different.

Pima Indians on the US side, who have adopted a modern, refined diet and woefully inadequate physical activity levels, show an astronomically high incidence of obesity-linked type 2 diabetes. However, Pima Indians on the Mexican side of the border still live in relative isolation, practice traditional farming methods involving regular activity, and eat an unprocessed diet. Not surprisingly, their incidences of obesity and diabetes are nearly non-existent.

**AND SO... ?**

Even if Mother Nature served you a heaping portion of fat-storing genes, enzymes and hormones, biology is not all-deterministic. We can still have a tremendous amount of control over the extent to which our genes exert their influence. That is, they must be 'activated' by overeating and prolonged physical inactivity. And so, the age-old recommendation simply to 'eat less and exercise more' is still sound advice when it comes to living well.