

Tailormade diets

Why is one man's meat another man's poison? Nutrigenomics – the science of matching your diet to your genes – might have the answer, says Tara Thorne.



Take the test

Here is a selection of Australian DNA profiling labs:

- Remède Wellness Medicine, www.remede.com.au
- Easy DNA, www.easydna.com.au
- Nutrigenomix, www.nutrigenomix.com/clinic-locator
- Natural Body Lab, www.naturalbodylab.com.au
- Smart DNA, www.smartdna.com.au
- CuraMedicine, www.curamedicine.com.au
- Bodhi Wellness, www.bodhiwellness.com.au
- Melbourne Natural Medicine, www.melbournenaturalmedicine.com.au

CANCER and heart disease are responsible for most deaths in Australia, while debilitating conditions like obesity, arthritis, and diabetes also pose significant threats. With disease rates soaring, the need for a new way forward in healthcare is pressing. Enter nutrigenomics, an emerging science that matches food to your personal genetic make-up in order to prevent disease. It's the study of how food affects genes and how individual genetics affect our response to different nutrients. Nutrigenomics therefore has the ability to prevent and treat chronic disease, via small but effective dietary changes.

According to the Center of Excellence for Nutritional Genomics (CENG) at the University of California, Davis, the five tenets of nutrigenomics are:

- Under certain circumstances and in some individuals, diet can be a serious risk factor for disease.
- Common dietary chemicals can act on the human genome, directly or indirectly, to alter gene expression or structure.
- The degree to which diet influences the

balance between healthy and disease states may depend on an individual's genetic make-up.

- Some diet-regulated genes (and their normal, common variants) can play a role in the onset, incidence, progression, and/or severity of chronic diseases.
- Dietary intervention based on knowledge of nutritional requirement, nutritional status, and genotype (i.e., 'personalised nutrition') can help prevent, mitigate or cure chronic disease.

Changing gene expression

We've all heard about someone who defies conventional nutritional logic by eating heaps of red meat or denouncing green vegetables, yet their health never seems to take a beating. So how come a filet mignon can be harmless to one person but become a coronary assailant for another? By looking at the effects of different foods and their various constituents on gene expression, nutrigenomics can help prevent disease, and can potentially play a key role in personalised treatment plans, because by treating the patient as an individual and



“The idea behind nutrigenomics is to trigger gene activity in the right direction: downplay the bad and play up the good.”

tailoring their diet accordingly, nutrigenomics can eliminate guesswork and experimentation and bypass unhelpful (at best) or dangerous (at worst) nutritional protocols.

Only quite recently has science confirmed that genes are affected by the environment, and that diet and lifestyle choices like exercise as well as environmental toxins significantly impact the way our genes are expressed. We now know that our genes have epigenomes which interact with our environment, triggering them into action one way or another, good or bad. For example, let's say you're missing a part of the gene that helps to fight a specific cancer. Nutrigenomics can tailor a diet for you containing certain nutrients and supplements which significantly decrease your chance of ever developing that particular cancer. The same principle underlies why someone might respond well to a certain drug for a disease while someone else doesn't. At play here is the 0.1 percentage variance in our genetic make-up that makes each and every one of us unique.

So how do you find out which nutrients are important for your personalised healthcare plan?

In Australia there are many DNA profiling labs that you can send a simple saliva sample to, and in return they'll send you your DNA blueprint. From this your health practitioner can help determine how your current lifestyle and diet are affecting your personal genetic make-up and risk for certain diseases. There is still a lot to uncover in nutrigenomics, but it's paving the way for science-backed preventive medicine that is a potential game changer in healthcare. As a common nutrigenomics expression goes: "Your genes may load the gun – but it is your diet, lifestyle, stress and other environmental exposures that pull the trigger which causes disease".



MEET THE EXPERT

Tara Thorne is a professional freelance writer who's currently studying to become a registered holistic nutritionist. She's fascinated by how what we eat and the lifestyle we lead can have such a huge impact on our health. www.sheknowsnutrition.com

Nutritional insurance

Folate is an example of how the food we eat can affect our genes. Folate is required by the body in order to make DNA. Found in significant amounts in lentils, pinto beans, chickpeas, asparagus, spinach, navy beans and black beans, a folate deficiency is associated with a higher risk of developing cancer.

Genes can also tell us which foods we should not eat. Take phenylketonuria (PKU), for example. This is a genetic disorder in which people who have it don't have the enzyme required to break down phenylalanine – an amino acid found in dairy products, meat, fish, chicken, eggs, beans and nuts - into tyrosine, another amino acid. Instead, they break down phenylalanine into phenylpyruvic acid. If too much phenylpyruvic acid accumulates in the system it can lead to brain disorders, mental retardation, and seizures. So people with PKU should avoid foods high in phenylalanine.

Then there's methylation, a term likely to become a lot better known in the not-too-distant future. Methylation is important in gene expression and repair as it can turn a gene on or off, or activate or deactivate an enzyme. Certain nutrients impact the methylation pathway, such as methionine, folate, B6 and B12. If there's a hiccup in the methylation process then nutrigenomic testing offers insight and, therefore, a nutritional workaround. The way this pathway functions in our body is associated with a plethora of different diseases, particularly mental illness, so making sure it's functioning optimally is imperative in preventive medicine.