

THE NEW ERA OF HEALTHCARE

For thousands of years, humans have known that the food we consume can impact our health. And traditionally, throughout millennia, plants and food have been used as medicine. So is it little wonder that modern-day technology is catching up to ancient thinking? TARA THORNE investigates the world of nutrigenomics, the study of how our nutrition interacts with our genes.

We have officially entered a new era of healthcare. In this era, we're able – and even encouraged – to be proactive about our own health. Scientific research has shown that the diet we eat and the lifestyle we lead greatly impacts our health, to the point of literally turning on or turning off specific genes in our body, for better or for worse.

In fact, one study, published in the journal *Nature*, found that 70 to 90 per cent of all cancers are caused by lifestyle and environmental factors. This is seen clearly when we look at smoking, which has been shown to be the number one risk factor for developing lung cancer. And we also know that drinking alcohol is strongly associated with various different cancers, in particular breast cancer. This is exactly what nutrigenomics is all about: optimising our diet to reduce our chances of getting disease.

Since the human genome was mapped in 2003, we've become better able to understand how our personal genetics interact with the diet we consume. The human genome consists of about 30,000 genes and almost all of these genes can exist in varying different forms. The variations in our genes make us unique from one another; they determine everything from the colour of our eyes to our blood type, the colour of our hair and how we metabolise and

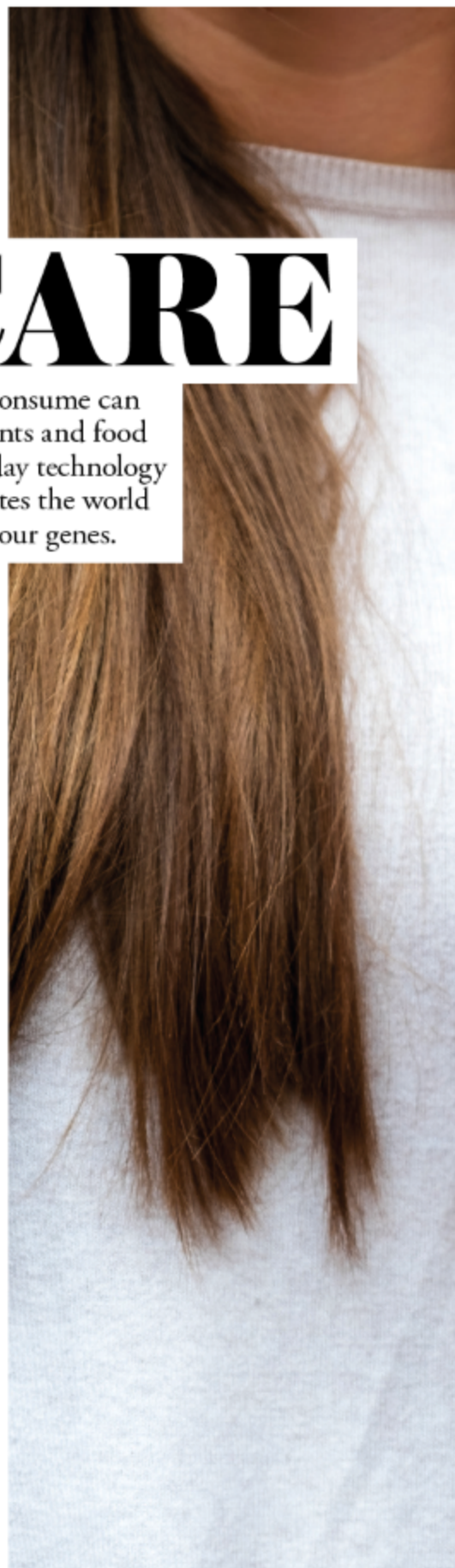
utilise the various nutrients we consume. These findings have been profound and have confirmed that our diet can either enhance or damage our overall state of health.

THE SCIENCE, DE-CODED

Nutrigenomics is the scientific study of the interaction of nutrition and genes, which relates to the prevention or treatment of disease. The term nutrigenomics refers to two main factors. The first is the study of how the food, beverages and supplements we consume affects our genes. The second is how our genes can influence our bodies' response to what we consume. Essentially, this science helps to explain why one man's meat is another man's poison. And thus, nutrigenomics is slowly changing the future of healthcare as we know it.

We now know that our genes only account for about 10 per cent of all human disease. And in fact, estimates suggest that about 50 per cent of early death worldwide is attributable to only a few factors such as diet, indoor and outdoor air pollution, along with active and passive smoking.

So, if our genes aren't completely to blame for driving disease, what is? Well, there's a saying in the world of functional medicine: 'Genetics load the gun, but diet and lifestyle pull the trigger'. This means that our health





is somewhat within our own control. It also means that the diet we choose to eat and the lifestyle we choose to lead can profoundly influence many different disease states. It holds us accountable and empowers us to take control of our health in the hope that we can prevent many diseases. Nutrigenomics is at the forefront of this exciting and pioneering movement in healthcare, proving once and for all that food really is medicine.

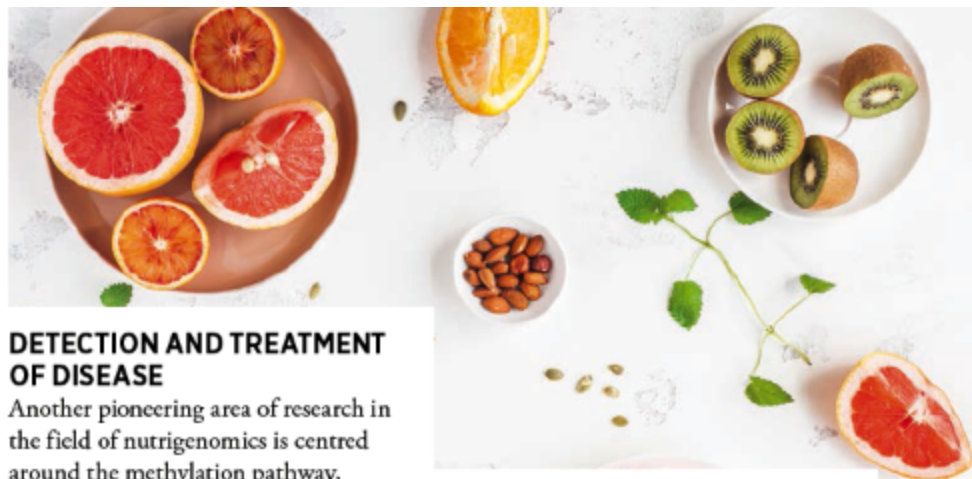
HOW IT WORKS

Nutrigenomics also allows us to study how compounds in food can turn on or off specific genes in the body, which also greatly influences the state of our health. To better understand the process, let's take a look at some common minerals that are consumed in a balanced diet.

Sulforaphane is a compound that is found in cruciferous vegetables such as broccoli. When consumed, this compound has been shown to switch on a specific gene that increases our ability to detoxify. Similarly, when omega-3 fatty acids – which are commonly found in oily fish such as salmon, sardines and anchovies – are consumed, the genetic mutation PPAR α comes into play. This mutation has been shown to influence how various people absorb and utilise omega-3s.

If you have the PPAR γ genetic mutation, it reduces your ability to absorb omega-3s, meaning that it might be prudent to consume these fatty acids in higher amounts or take omega-3 supplements. Omega-3s are crucial for optimal health and play a role in reducing inflammation, reducing the risk for cardiovascular disease as well as cancer, arthritis and other chronic disease. They're also important for optimal cognitive function. So you can see why finding out whether or not you have this specific genetic mutation might come in handy.

Other ways in which scientists are studying nutrigenomics includes an old morning favourite: the veritable liquid gold, coffee. A study published in *The Journal of the American Medical Association* demonstrated that in some individuals, caffeinated coffee intake lowered the risk of heart attacks, while in others, the same dose of caffeine increased the risk of heart attack. Researchers attribute this phenomenon to a gene called CYP1A2, which breaks down caffeine in the liver. The study showed that those who have a slower version of this gene have an increased risk of heart attack when consuming caffeine, whereas those who have the fast version of this gene have a lower risk of heart attack when consuming the same amount. All these bits of information, when pieced together, could make a very real difference to your health and to your chances of developing disease.



DETECTION AND TREATMENT OF DISEASE

Another pioneering area of research in the field of nutrigenomics is centred around the methylation pathway, which contributes to a range of bodily functions such as immunity, energy, mood balancing, managing inflammation and detoxification.

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In her book *Feel Good Nutrigenomics*, Dr. Amy Yasko writes that genetic weaknesses in the methylation pathway can put you more at risk for conditions including diabetes, cardiovascular disease, thyroid dysfunction, neurological inflammation, chronic viral infections, cancer, Alzheimer's disease, autism and more.

Dr. Yasko goes on to explain how various nutrients and supplements can essentially bypass these mutations to seriously reduce your risk of developing these aforementioned health conditions. "By identifying the precise areas of genetic fragility, it is then possible to target appropriate nutritional supplementation of these pathways to optimise the functioning of these crucial biochemical processes," she writes.

DETERMINE YOUR UNIQUE GENES

There's no doubt this is an exciting time to be alive, and nutrigenomics is paving the way of personalised medicine, but is it accessible for you? The answer is yes. There are a couple of tests you can do in order to assess which genes might be working for you or against you. Some genetic tests assess between 43 to 45 genetic markers and provide

you with personalised nutrition advice and physical activity recommendations, tailored to your very own DNA.

The tests data will give you information about multiple different genetic variants you may have. For example, you can be tested for the CYP2R1 genetic variant, which can tell you if you have trouble converting vitamin D into the active form of vitamin D. A mutation in this gene has been associated with selective 25-hydroxyvitamin D (the active form of vitamin D), deficiency. This would therefore suggest it might be wise to take a vitamin D supplement as an important consideration in order to avoid a deficiency in this crucial nutrient.

Similar information can be seen on tests for vitamin A, vitamin B12, vitamin C, folate, iron, calcium and more. The tests even give you clues as to whether or not you might be gluten or lactose intolerant, how well you metabolise coffee and how your body metabolises various different fats. They can even provide information related to the relationship between your genes and athletic performance as well as injury risk.

The era of prescription customised diets according to each individual's genotype is here, and we are lucky to be living in a time when nutrigenomics is allowing us to create target treatment plans and tailored diet recommendations in order to promote health and enable us to thrive. It is science-backed preventative medicine at its best, and there's no doubt it will change the face of medicine as we know it today, allowing more people to experience not just longer lives, but more full and healthier lives, too. ■