

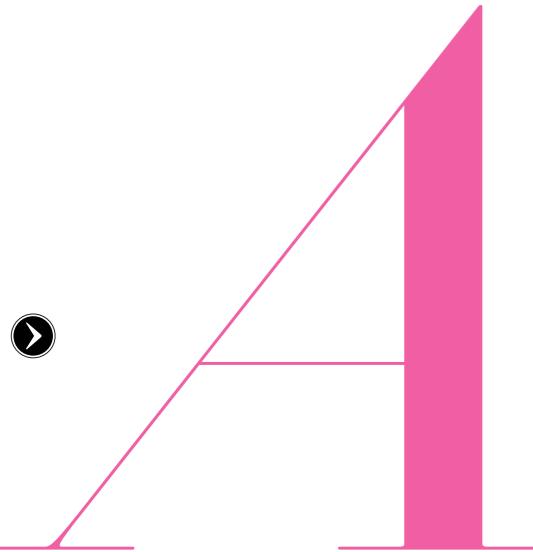
CAN YOU REALLY OUT-TRAIN YOUR DNA?



DNA testing companies are getting in on the wellness action, promising to build bespoke workouts and diet plans based on the data hiding in your genes. But are they selling the ultimate health boost or a high-tech placebo effect?

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few years ago, counting the number of steps you'd just taken to the supermarket would have been grounds for therapy. But that was before Fitbits, Apple Watches and health apps. Now, if you're not tracking something – steps, sleep, calories, sex – you're clearly not so savvy about your health goals. This is the era of self-optimisation, where we've bought wholesale into the idea that the more we can measure, the more we can improve. In the eye of that storm is an emerging personal genomics industry that's marketing ways to take self-analysis deeper still. Why leave it to wearable tech or common sense when a simple over-the-counter DNA test can analyse you gene by gene, resulting in a diet, exercise or skincare regime so bespoke, it's quite literally tailor-made for you?

And so it works thus: from around £99, you can submit a sample – usually a small pot of saliva or a swab from your inner cheek – and the company checks your DNA for gene variants associated with a whole range of traits, from whether you're extra-sensitive to coffee to your diabetes risk. Some companies, such as 23andMe – one of the largest, having this year celebrated its millionth customer – don't offer specific diet or fitness advice. Instead, the answers are there for you to extract from its report. How will you respond to a Mediterranean diet? Are your muscles suited to weight training? You'll be able to find out (alongside such helpful information as the consistency of your earwax). Other companies, such as DNAFit and My Gene Diet, use their narrower genetic tests to create bespoke recommendations. From around £200, they offer premium services with personalised meal plans and fitness regimes – or, in the case of GeneU, personalised anti-ageing serums based on analysis of genes related to collagen production and antioxidant protection.

Pay a visit to PT Leanne Spencer's South London studio and as part of your initial consultation you'll be offered the opportunity to purchase one such DNA test. Spencer believes that it takes the "educated guesswork" out of designing a bespoke fitness programme. In her words, the tests can be "game-changing". Discover you have a food intolerance, and a small tweak to your diet can end niggling digestive problems; learn you're sensitive to carbs, and a diet low in them suddenly shifts that stubborn bulge around the belly.

One of Spencer's clients is Sarah Wilkinson, 36, who works in PR and opted for DNAFit's Fitness Diet Pro package (£249), which includes fitness recommendations; guidelines on ideal daily intake of carbs, proteins and various vitamins and minerals; a four-week meal plan and a weekly shopping list. The advice wasn't exactly groundbreaking: with the exception of a note that she should limit her intake of grilled meat and fish due to her genetic sensitivity to some of the compounds in it, there was little in the test she didn't already know.

"It wasn't a shock to learn that I should be reducing unrefined carbs, sugar, salt and caffeine in my diet," she says. Her "personalised" exercise advice was to aim for an even split between power and endurance training – again, fairly standard. But what's interesting is the difference this seemingly obvious advice made to her health in less than two months. "I lost almost a stone and a half and have loads more energy," she says. Wilkinson feels that gaining a greater understanding of how different foods affect her body turned out to be a good motivator. But many researchers just aren't convinced that the science these companies are touting is sound.

THE GENE GENIE?

"Don't waste your money," Anneke Lucassen, professor of clinical genetics at the University of Southampton, says bluntly. "It's a nice idea, but there's not enough evidence to show that your DNA will accurately predict what diet you should go on, or what exercise you should do." The problem, Lucassen says, is that genomics companies overstate the role our genes play in our health and wellbeing. "To develop diabetes, there might be around 100 different factors at play, and those factors might be genetic, or they might be environmental, or they might be random. So if I just test for one factor and don't test for the other 99, my prediction will be pretty poor." That doesn't mean DNA tests will always be wrong, but at the moment, she says, they're "not much better than the kind of crystal ball you'd find at a seance".

A number of other geneticists echo her stance, and point out that we also have little evidence to suggest that DNA-tailored diets will work. "You'll lose weight if you exercise more and eat less, and that's pretty much true irrespective of your genetics," says Mark McCarthy, professor of diabetes at Oxford University. "It may be that those with a high risk of putting on weight are less likely to be successful, but the advice is still the same."

One experiment that seemingly legitimises personalised DNA testing was conducted last year by the University of Trieste, Italy, on 191 obese people. The majority (104) of them were asked to simply eat 600 fewer calories a day. The

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The team building was all too much for Susan

NICE GENES! WH's Beauty & Fitness Editor Amy Lawrenson tries a DNA test on for size

What did it tell me that I didn't already know? Well, happily, I can reap the antioxidant benefits from a daily glass of red (happy days) and I can drink as much coffee as I wish without becoming jittery or sleepless (thank the stars). It also revealed I'm definitely not gluten-intolerant, but suggested

my body does best on a low-carb diet, which mirrored my own experience – I've always felt leaner and more energised when going low-carb. The validation is a good reminder when I'm reaching for the bread basket. My exercise report was more interesting. On an injury-risk spectrum that runs from 'very

low' to 'very high', I'm 'high'. (They're not wrong – a tug-of-war at the office sports day resulted in weeks of physio.) The results suggest fast-tempo, high-intensity classes may not be a good fit for me, so I've stuck to a slower, strength-training style. So far – injury free. The big draw is the exactness

of the information. There's always conflicting advice, but knowing for certain what works for you and what doesn't means that you don't end up confused. And all the warnings about coffee? I know they don't apply to me any longer. There's something very freeing about that.

study found that those who had been placed on a DNA-matched diet lost, on average, 33% more weight than the basic calorie counters. But critics say the test sample is just too small.

Here in the UK, we're in the middle of a similar trial. In June, a £50,000 lottery-funded pilot project was launched by the Essex-based NHS group Enable East, which offered DNAFit diet and fitness testing to 56 overweight people. Susannah Howard, 45, the director of Enable East, believes testing can be a real help to people like her, who struggle with weight. "The overwhelming message in society is that managing your weight is very simple: eat less and exercise more, and if you don't lose weight, what's wrong with you? The actual evidence suggests it's not that easy," she says.

DIGGING DEEP

Howard is referencing personal experience as much as evidence. Her test results showed that among other things, she carries FTO, the so-called "fat-gene" associated with increased hunger and appetite. While there aren't any lifestyle changes that will affect the gene directly, simply knowing this has helped her become more mindful of her portion sizes, she says. Which is where the deeper complexities of DNA testing come into play. Howard has acted on her results, but despite the old adage of 'knowledge is power' there's little evidence to actually suggest that such in-depth information acts as any kind of motivator in general.

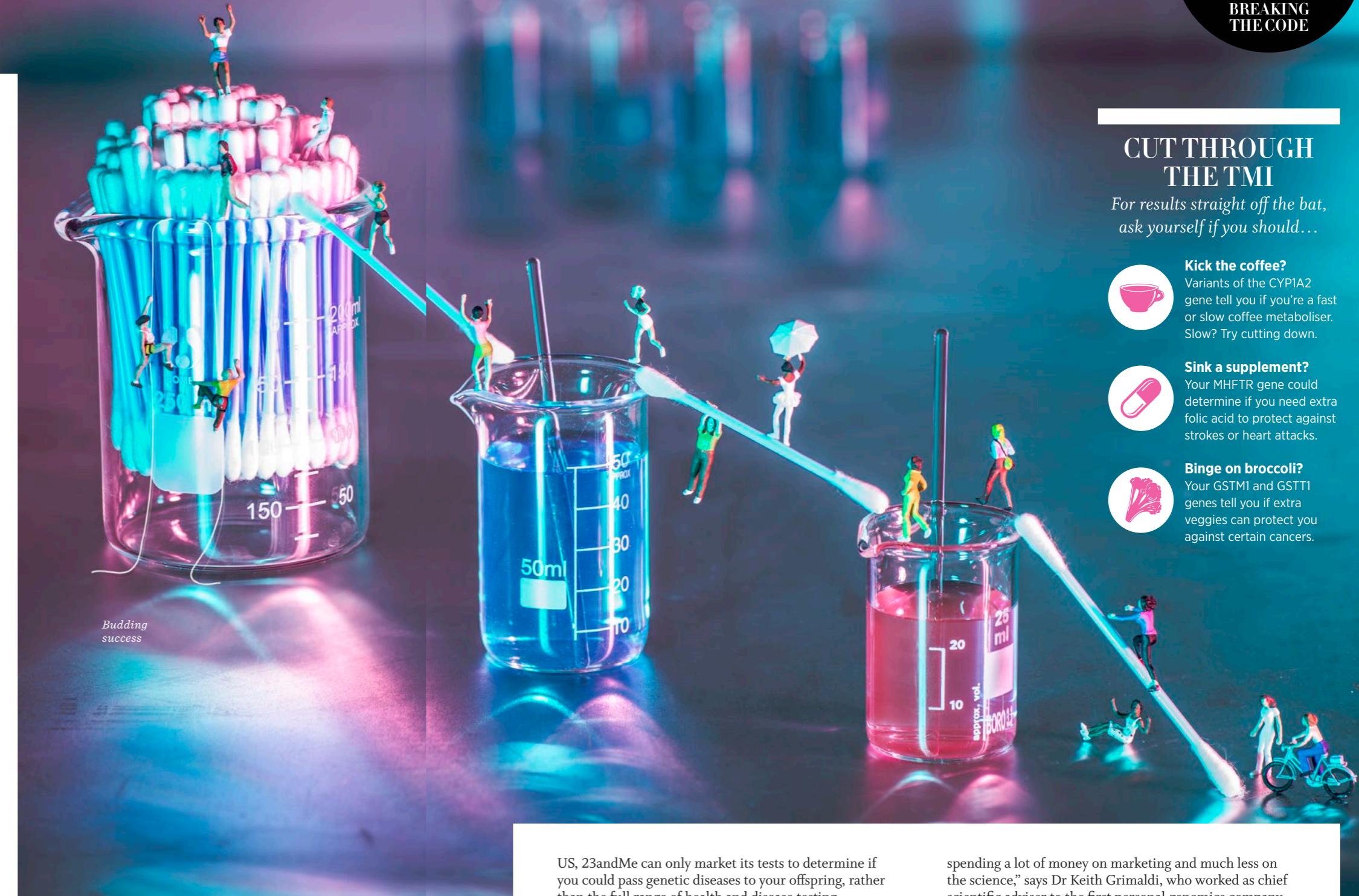
In fact, labelling and categorisation can sometimes be counterproductive. Take last year's study by the University of Richmond, US, that found while calling obesity a disease made 'sufferers' feel better about themselves, it didn't motivate them to make any changes to an unhealthy lifestyle. For every person who's determined to out-train their genetic disposition, there's another who'll feel fated by it – a life-long excuse wrapped up in the deepest part of themselves. And, even if you do come down on the more positive side of the motivation divide, perhaps there are ethical questions about delivering common sense advice encoded in blinding science and extraneous information.

At the time of print, it was too early to measure the results of Enable East's project, but at least one participant, Linda Green, 53, a company director, had already noticed big changes. Despite being overweight and having type 2 diabetes, her DNAFit result revealed that her body has high aerobic potential and recovers well from exercise. (To reach that conclusion, the company tests around 16 genes that at least three peer-reviewed human studies have linked to training performance and uses them to create a composite picture of where you fall on the power/endurance spectrum.)

"Most people settle for that collective mindset of, 'we start putting on weight in our fifties, we don't run marathons', but that's changed for me because now I realise that I do have it in me," Green says. She has rediscovered her old love of running, has lost 6kg in under three months, and feels healthier and younger.

Spencer agrees that the tests deliver a powerful, bespoke form of empowerment: "In most cases, successful and sustainable weight loss is about compliance, but to be compliant, there has to be a strong motivational factor. DNA testing helps with that because it's not one-size-fits-all. I find I get better compliance out of my clients because it's something tangible to hold on to when the training gets tough." But there's another catch. In 2013, the US Food and Drug Administration (FDA) banned the company 23andMe from marketing its services stateside, arguing that they weren't sufficiently "analytically or clinically validated" – in other words, they couldn't provide the evidence to back up their claims.

Several years before, a US government agency sent the same DNA sample to four companies and received four very different results – an experiment that several US journalists have since repeated, with similar conclusions. In February, the FDA relaxed its ruling slightly, but in the



THOSE ON A DNA-MATCHED DIET LOST 33% MORE WEIGHT THAN THOSE WHO JUST COUNTED CALORIES

US, 23andMe can only market its tests to determine if you could pass genetic diseases to your offspring, rather than the full range of health and disease testing.

Here in the UK, it faces no such restrictions, because our regulatory body, the Medicine and Healthcare Products Regulatory Authority, doesn't examine the scientific claims behind the DNA tests. (It only looks at the safety of the kits provided; things like whether you could injure yourself when collecting saliva.) "We've argued for years that the UK regulations are inadequate," Dr Helen Wallace, executive director of the campaign group GeneWatch, tells me. "Right now, we have no way of knowing that the company selling the test really knows what they're talking about, or is being honest about the scientific evidence."

Even the biggest cheerleaders for DNA testing acknowledge that there are some cowboy firms in the market who are making overblown claims as to what your DNA can reveal – and the tricky part is they're not necessarily that easy to distinguish from the more scrupulous firms. "It's very difficult for the consumer because a lot of companies are

spending a lot of money on marketing and much less on the science," says Dr Keith Grimaldi, who worked as chief scientific adviser to the first personal genomics company in the world, Sciona, and now advises several others.

There's a chance, though, that the DNA testing market might soon be more regulated. The EU has mooted plans for US-style supervision, but it's likely that lifestyle products (which could include diet and fitness tests) will be exempt. If you are considering doing a test, Grimaldi recommends you do your research first and dig into the claims companies are making and the scientific credentials of the people behind them. (Start by asking to see a sample report, he says, so you know what you'll actually get for your money, and find out which genes they're testing for – if it's all eye colour and ear wax-level stuff, you'll probably want to pass.)

Are the tests worth it? It depends on your expectations. If your curiosity has been piqued (Should you swap running for weights? Could you do with cutting caffeine?), then £99 may be worth a glimpse into your own inner workings. If you're looking for a miracle, best save your money. **WH**

CUT THROUGH THE TMI

For results straight off the bat, ask yourself if you should...



Kick the coffee?
Variants of the CYP1A2 gene tell you if you're a fast or slow coffee metaboliser. Slow? Try cutting down.



Sink a supplement?
Your MHTTR gene could determine if you need extra folic acid to protect against strokes or heart attacks.



Binge on broccoli?
Your GSTM1 and GSTT1 genes tell you if extra veggies can protect you against certain cancers.