



Megan Tatum

This time, it's personal (nutrition)

The 'one size fits all' diet is no longer enough. Armed with data from Fitbits, DNA kits and stool samples, shoppers are now demanding nutrition tailored to their very specific needs. But what does that mean for a food and drink industry designed for the masses?

It took 13 years, \$2.7bn and a research effort spanning five countries, but by 2003 scientists had successfully built the first blueprint of human DNA. Nearly a century after researchers learned to map the genes of a fruit fly, the international members of the Human Genome Project had mapped all three billion base pairs in the human genome, each pair a rung in the twisted ladder of our DNA. It was a discovery that paved the way for huge breakthroughs in the prevention, treatment and prediction of disease. And it wasn't long before companies spotted its potential to provide a new level in personalised nutrition too.

Individual genes, they said, could predispose you to metabolise caffeine or booze terribly, bulge at the first sign of butter, or be sensitive to excess salt. Your genome, in other words, could provide a perfectly personalised nutrition plan, an antidote to the one-size-fits-all advice dished out by government and doctors.

At first it was an application of the science restricted to billionaires and business tycoons. The first commercial DNA sequencer, a machine capable of automating the gene mapping process, cost a cool \$300k per person. The late Steve Jobs reportedly forked out \$100k to get his own DNA mapped as recently as 2011.

But in the past couple of years that cost has begun to fall. Rapidly. In fact, only seven years after Jobs paid the sum of a small house for his individual genome, world-leading provider Illumina says it'll soon be able to offer the same service for only \$100, an astonishing 99.9% fall in price. It means that 16 years after scientists made it possible, access to personalised nutrition could soon be available to each and every one of us.

But with that opportunity comes questions. For one, is the demand for personalised nutrition really there?



MEET THE PIONEERS

What's all the hype about Habit?

In 2017, Californian startup Habit launched to much fanfare in the US. The platform tests users across a variety of metrics, including genetics, metabolic rate and body measurements. Combining this with detailed information on their lifestyle and specific health goals, it then provides bespoke meal plans and nutritional advice – the first platform to approach personalised nutrition in such a holistic way. In 2016, ahead of launch, Campbell's Soup Company confirmed it would be making a \$32m cash injection in the business. "The entire food industry is being transformed by the fusion of food, well-being and technology," said Denise Morrison, Campbell's president and CEO, of the move. "Habit is well positioned in this wired-for-wellbeing space and poised to lead the personalised nutrition category."

If it is, is genetics the best approach? How can it best be delivered to the mass market? And what is the role of retailers and suppliers in all of this?

The first question is easy, say experts: demand for personalised nutritional advice is undeniably on the rise. As Peter Jones, a nutritional scientist at the University of Manitoba in Canada, puts it, "we're getting consumer buy-in because we live in a hedonistic, me-first kind of world." As a result, "this is going to be the manifestation of the future. The one-size-fits-all platform is a thing of the past."

That's partly driven by the confusion and mistrust that swirls around traditional sources of information on health and nutrition. "It's a complete minefield, so people are trusting the old bastions of knowledge less," says Jared Williams, founder of personalised meal service Fresh Fitness Food. "They're turning to bikini models on Instagram instead, and we may laugh, but they have millions of followers and a more meaningful relationship with their followers than most people have with their GP. With this fragmentation and the growth of new nutritional knowledge providers, people are conscious they need to do a bit of research and are taking it upon themselves to be experts."

Which, thanks to technology, increasingly they can. Since 2010 Fitbit has sold about 76 million devices, allowing users to track everything from steps to sleep and heart rate. You don't even need to splash out much, with the same data available via free mobile apps if you have a smartphone. "This theme of the quantified self, the explosion of fitness trackers and customers getting much more used to understanding their own data on body and health – that's pretty mainstream now," says Dawn McKerracher, strategy director at design agency This Place. "Personalised nutrition is really the next evolution."

Anyone still sceptical should shadow nutritionist Daniel O'Shaughnessy for a day. He has worked with the likes of Panasonic and Deutsche Bank, and says that around 70% of people that now walk into his office are looking for some sort of test to personalise advice. It's a big change from five or six years ago and one that isn't limited to those trying to understand a specific health problem either, but rather part of what is considered general health maintenance.

Top of their testing hit list is invariably genetics. Because though we aren't quite at the stage where a full genome sequence is mere pocket change (Illumina says the \$100 price tag is a few years away), UK providers such as DNAFit do charge as little as £99 for a partial analysis. Users can send off swabs and receive detailed breakdowns of core genetics, and how that links with

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nutrition. On Black Friday alone, Amazon reportedly sold more than one million of these DNA testing kits to US consumers.

"Personalisation is more than a trend, it's working its way into our daily lives," insists DNAFit founder and CEO Avi Lasarow. "DNA genetic testing for the purposes of how your body metabolises medicine, cancer screenings and health screenings is a very robust science. But there's also fast acceleration and research on the other areas around nutrition and fitness." Its kits offer recommendations on optimal diet types, carbohydrate, fat, lactose and gluten responses and other nutritional pointers.

The science

There is plenty of scepticism about how accurate these recommendations really are though. Geneticist and obesity expert Dr Giles Yeo has repeatedly said the science cannot yet support complex nutritional advice based on cheek swabs alone, with much of the interpretation currently offered in the "embryonic stage".

Williams agrees there have "100%" been companies that overpromised on what they could deliver. "There was a very commercial need, to put it bluntly, to acquire clients. With any new business, you are simultaneously trying to boost your visibility, engagement, trust and establish what you do. Some businesses fell prey to the commercial needs of running their business rather than running a service that was 100% accurate, and did storm ahead."

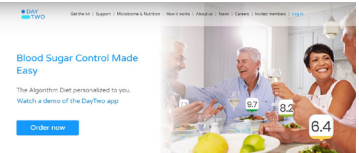
Lasarow doesn't accept this is the case for DNAFit though. "As a company we're very clear to not overcommunicate the science – in fact we state the limitations, which is very important."

"Has the science got to the place it's going to be? Definitely not. Are we as a company responsibly advocating where the science is and the best practical way to apply it? Absolutely. Are we getting results? Definitely. And are we validating results with clinical studies? Yes we are. We're very excited about the outcomes."

Still the "evidence is relatively modest," insists Professor John Mathers of Newcastle University, who worked on the major EU Food4Me study in 2011.

But how much does that matter? After all, as the study found, people adhere better to advice they're told is personalised, as opposed to generic information and, crucially, the content or accuracy of that personalisation doesn't seem to matter very much (see p33). Is it harmful then if DNA providers oversell a touch? "Of course, as a scientist it matters hugely to me that the

Other personalised partnerships to watch



Day Two and Johnson & Johnson

In June 2017, Day Two, an Israeli startup that uses information from the microbiome to help diabetics manage blood sugar, secured \$12m in funding. Among those investors was fmcg giant Johnson & Johnson. The cash injection followed an announcement four months earlier that J&J would collaborate with the platform, leveraging its experience in pharmaceuticals to access new markets for the startup.



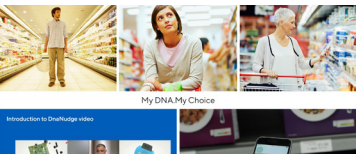
Genesis Healthcare and Nestlé

Launched in 2017, Nestlé's 'Wellness Ambassador Program' offers around 90,000 subscribers, paying around £500 per year, a variety of personalised support based on information gleaned from DNA kits, processed by Genesis Healthcare. Users are provided with tailored supplements and can even submit pictures of their food via the chat app Line to receive dietary advice. Currently it's only available in Japan.



Thryve and Unilever Ventures

Personalised gut health programme Thryve secured \$1.4m in funding in May last year, which included cash from the private equity arm of Unilever, Unilever Ventures. The startup says it utilises "next gen sequencing" to determine the balance of bacteria in your gut before creating personalised dietary advice and curated probiotic blends delivered to your door, on a subscription basis. The initial kit costs \$299.



DNA Nudge and Waitrose

In October last year, Waitrose announced it had collaborated with Imperial College London and DNA Nudge to launch an app for shoppers that would 'nudge' them toward healthier choices. The clinical trial will invite shoppers to take a saliva swab and have the DNA results synced with the app. The app can then be used to scan barcodes and determine whether the product is suitable for that person's genetics and metabolism.

“evidence is weak,” says Mathers. “But at a very practical level what we want is people eating healthier diets, so maybe it doesn’t matter too much, provided they’re not being conned out of spending lots of money.”

The danger arises though if changes are not in a “healthful direction” or companies “undermine the whole credibility of the field because people get disillusioned with its effectiveness. That’s always an issue with early adoption by commercial providers before the evidence is strong enough.”

It’s why O’Shaughnessy says he “never takes the DNA test as an absolute”, recognising there are some genes which must be taken with “a pinch of salt”. Instead, it’s a “nice to know” he uses alongside myriad other available tests, and his own experience.

After all DNA, despite being awarded the biggest hype, isn’t the only mechanism emerging as a means of providing this type of personalised nutritional advice.

Alternatives to genetics

For some providers, such as Fresh Fitness Food, the data collected is detailed, but hardly futuristic. Their bespoke meal plans are based on biometrics, lifestyle and religious preferences, before being tailored down to the last gram of carbs (“if a client needs 162g of carbohydrate rather than 164g, that’s what they get”) before being delivered to their home or work. A personalised service is as much about convenience as the nitty-gritty of the science, Williams believes. “I think a lot in the industry fool themselves into thinking mainstream consumers are driven by the science. We have to make this as convenient, affordable, flexible and understandable as possible.”

Then there is a growing field of research around the microbiome, and a subsequent surge in platforms that analyse users’ individual gut bacteria to determine their diet (see box, right). Always changing, the microbiome offers a “feedback loop” on the success of any changes to nutrition and lifestyle that gives it some advantages over genetics, points out Nard Clabbers, senior business developer at research organisation TNO. “Looking at DNA will never be enough,” he says. “If I had a twin brother with a completely different lifestyle, body type, job and social environment, the genes would still be the same. But it be would illogical to give him exactly the same dietary advice.” Conversely, the microbiome will “adapt quite quickly to a change in diet allowing feedback based on that change”.

It’s why, when delivering presentations on the microbiome, co-founder of the American Gut Project Dr Rob Knight shows slides depicting an individual



THE MICROBIOME

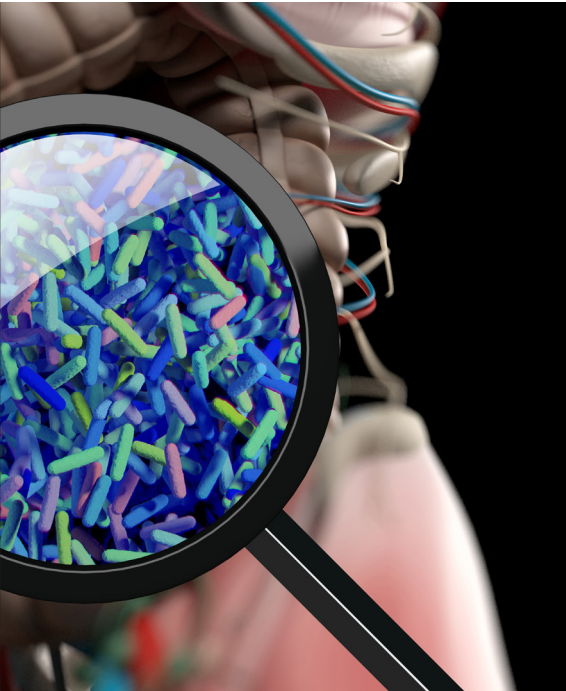
What is it? And why is everyone talking about it?

Recent years have seen a surge in efforts to unravel the genetic information hidden in our microbiome. Each of us houses anywhere between 10 trillion and 100 trillion microbial cells in our body – collectively referred to as the human microbiota. Our microbiome is the name given to all of the genes inside these microbial cells.

Until recently scientists largely neglected their significance in diet and health. But in the past decade that’s changed. In fact, from 2013 to 2017, the number of publications focusing on the gut microbiota was 12,900, according to the BMJ, which represents 80% of the total number over the past 40 years.

It’s one of the reasons the microbiome is fast becoming a mainstay of personalised nutrition, providers offering tailored advice on diets with only a sample sent through the post. Thryve, Viome and Map My Gut are only a few of those already on the market.

“The use of the microbiome is going to be very broad-reaching,” says Daniel McDonald of the American Gut Project. He cautions though that much of the science remains “in the basic research stage”. In other words, buyers beware.



breathing on to a mirror each morning to get a daily read out of their microbiome with dietary advice, says his colleague – and scientific director at the project – Dr Daniel McDonald. “That’s something within the realm of possibility but still five or 10 years out.

“Companies can make a lot of claims but from the peer-reviewed science there’s no data to suggest that from a microbiome sample alone you can advise someone what they should or shouldn’t eat,” he adds. Not yet anyway. And “you don’t want to provide advice that’s not rigorously supported by scientific data – there’s a lot of room for harm so you want to be very careful.”

“It’s in its infancy,” agrees Clabbers. But along with the leaps forward in genetics, all these emerging mechanisms of personalised nutrition mean that “data that was once hidden in your doctor’s cupboard is now available. And in the future you’ll hopefully be able to use that knowledge when you go and shop for food.”

And that is where the mainstream food and drink industry comes in. There are opportunities for suppliers to match this personalised advice with more tailored products, say experts, or ensure it is their SKU that ends up on a recommendation screen, while for the supermarkets there is the chance to offer personalisation apps or online shopping lists. Already there are some significant investments and collaborations taking place (see p31) that show mass market operators are taking note of the trend.

At the extreme end, you could imagine products tailored to personalised body types and genetics, suggests McKerracher, though “implications on legislation and manufacturing are too much to comprehend”.

“Kellogg’s is not going to start putting 50 different types of cornflakes on the shelf,” says Williams. But there will be “a growing level of technology that

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empowers the consumer to make better choices,” he believes. “For instance, you might be able to go up to a cereal bar on a supermarket shelf, scan the QR code and your app tells you, based on your DNA or ideal calorie intake, or what you’ve eaten that day, whether or not that’s the best thing on the shelf for you.”

For struggling bricks and mortar grocers trying to reposition themselves as holistic food and drink brands, it could be a godsend, adds McKerracher. “The business challenge of grocers particularly in the UK is, what is their relevance in the future? There’s a huge shift in the way consumers eat, so while the food market is growing overall, the grocery share is in decline. The concept of them being a health partner for consumers is a natural extension.”

For suppliers though “it’s a question of, how do you get your product to be recommended?” says Maartje van den Berg, senior analyst in consumer foods at Rabobank. “That’s going to be essential. It’s not going to be about being on the supermarket shelves but about popping up in those lists and apps.” Something that, once again, will be achieved by engaging in the science at this early stage and getting ahead of the curve.

Collaboration

Experts agree that getting personalised nutrition to the mass market in the next decade is less about science and far more about collaboration. That applies, on the one hand, to commercial providers of the data. Because “we are not going to make John Doe optimal, or extend his life expectancy, avoid various diseases, by a microbiome test, or a Fitbit or by Fresh Fitness Food alone,” says Williams. “It’s when those companies start talking to each other and John Doe can pick and choose what makes sense for him that it works.”

But it also applies to the tech giants, retailers, suppliers and foodservice providers, capable of delivering this data to the mainstream. At the moment “they’re still very much in silos,” believes Clabbers. “Everyone wants to invent their own personalised offer and business model. The real success though depends on the value chain that includes many more parties. It could be changed next week, but if they don’t it could still be niche in five years.”

“I don’t think it’s going to be easy,” adds Lasarow. “But eventually, in the same way supermarkets were taken by surprise with this whole vegan movement” if they don’t watch out they’ll be caught out by the rise of personalised nutrition too. And “if they’re not ready for it, consumers will go to someone who is.” ●



What was the Food4Me study? And what did we learn from it?

Launched in 2011, the Food4Me study remains one of the largest research projects into personalised nutrition to date. Set up by the EU to better understand how new tailored nutritional advice, made possible by the mapping of the human genome, could best be applied to populations at large, it spanned myriad investigations into business models, ethics and consumer acceptance. But at its centre was a mass public experiment that set out to understand whether personalised advice actually worked in the first place.

Led by Professor John Mathers of Newcastle University, the online trial recruited adults across seven European countries. Those taking part were split

into two groups, one group handed general recommendations as per European food guidelines, and the other given personalised advice. Those receiving personalised advice were then split into three groups: one receiving recommendations based on a simple analysis of their current diet, the second based on both that and their phenotype (height, weight, waist circumference and so forth) and the final group on both diet and phenotype, plus genetics. The central question was “would the change in diet be better, ie people eating healthier, when receiving personalised nutrition advice compared with the control?”

The answer was yes. Even though the control group made some

improvements, those given personalised advice did better, adhering more closely to the advice given out and making “bigger and more appropriate changes to their diet”. Significantly, though, the type of personalisation made no difference. “The nature of personalisation didn’t seem to matter – they were getting something that they felt mattered to them rather than generic information,” explains Mathers.

In other words “at this stage we don’t have evidence that one type of personalisation is better than the other, all we know is personalisation helps”. And so, for the consumer, “finding a personalisation that works for them without spending a lot of money would seem to be a good way forward.”