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This Time It's PERSONAL(ISED) NUTRITION

Vitafoods™ INSIGHTS

CONTENT

January 2018

As Individual as You Are

Imagine a world where anybody can take control of their own health; where health is assessed early on and people are supported in making the right lifestyle choices; where diet has the potential to reprogram genetic destiny.

In this industry, we're fortunate to be at the cutting edge of the next health and wellness revolutions, spoilt by advances in probiotics and continuous research in established natural ingredients. But how often do we actually stand at the starting line of something as revolutionary as personalised nutrition promises to be?

As Jennifer Cooper explains in her article on page 9, just as no two people are identical in appearance, neither are they precisely alike on a molecular level. Personalising nutrition has the potential to revolutionise healthcare, with nutrigenetics and nutrigenomics revealing how dietary choices could be the primary environmental influencer on human health over the lifespan.

But with the very definition of personalised nutrition focusing on the importance of meeting individual requirements, the question remains how much of the innovation and new technology is available and affordable to the mass market—in other words, can the industry deliver? Join me on page 5, as I examine the opportunities at every level and the business challenges presented by the breakthrough concept for the global industry.

In his piece on page 13, Wolfgang Roehr contends while personalised nutrition may be the industry darling of the moment, it has been practiced for thousands of years already. Modern medicine, technological advances and data processing are modernising personalised nutrition, keeping the traditional healing systems from 4,000 years ago relevant today.

And finally, for any business considering entering this space, there are various questions that must be addressed, with Peter De-Meester tackling the big ones in his article on page 17. Crucially, for enduring success, the solution must start with the consumer.

Personalised nutrition enables individuals to adopt a healthier lifestyle and take control of their nutrition and health. More importantly, though, it celebrates the differences between people amid the standardisation of disease treatments and broad population-based standards of care. Consumers want tailored nutritional plans as individual as they are, and the industry is stepping up—it's an exciting time to be involved.

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Where's the Business?

by Jade Mitchell-Ross

Personalised nutrition is unquestionably the breakthrough concept for the global health and wellness industry. Consumers are recognising the one-size-fits-all approach is no longer ideal and businesses are beginning to dip their toes into the space. But with the very definition of personalised nutrition focusing on the importance of meeting individual requirements, the question remains how much of the innovation and new technology is available and affordable to the mass market? And is it commercially possible for the industry to deliver?

Few companies understand how to market genetically customised nutrition to consumers or how to successfully patent a diet consisting of foods already widely available. Researchers face the challenge of identifying and measuring a much subtler state than disease—health. Optimal health is more than the absence of disease; the industry needs to develop an entirely new set of biomarkers. Even then, translating understanding of health and disease—as influenced by genetics, metabolism, lifestyle and environment—into personalised, science-based nutrition is another matter entirely.

To bring personalised nutrition to the market, a company must: establish regenerative, genomic and metabolic platforms to model cellular function in health and disease; develop cellular models to simulate genetic, metabolic and physiologic characteristics of common chronic diseases; and identify and discover nutritional interventions to modify these molecular, cellular and physiologic disease mechanisms. These are the traditional remit of the pharmaceutical product development process, but personalised nutrition sits in between food and pharma—in an area that isn't dietary supplements or functional foods, but isn't a pharmaceutical intervention either. Personalised nutrition is not about developing synthetic molecules or drugs to treat a specific disease—this sector works with natural products with a much higher burden of scientific proof, concept of nutritional medicine and very extensive clinical studies. There's a lower safety barrier than seen in pharma, but this does not diminish the amount of science required.

Despite the difficulty, 20 percent of exhibitors at Vitafoods Europe 2017 identified personalised nutrition as the most important trend for the nutraceutical and functional food industry in the short term, while 28 percent of those surveyed see it as a long-term concern. This matches with the 21 percent of visitors to Vitafoods Europe 2017 who named

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personalised nutrition for the short term, and the 22 percent identifying its importance long term. Technology around personalised nutrition—testing and profiling—saw similar results, as 21 percent of exhibitors and 28 percent of visitors named technology the most important development for the future of the industry.

Consumers are interested too. They're used to measuring their health using tools like body mass index (BMI) and resting heart rate; advances in wearable technology have made trackers more accessible and appealing to consumers interested in measuring more variables. The next logical step for health-conscious consumers is to examine their diets—and many consumers are already aware of calculating their macronutrient requirements. The advent of personalised nutrition shows researchers are moving in the same direction.

The big science approach has changed nutrition research in the past decade. This field, once confined to small groups of researchers studying the effects of single nutrients—such as particular vitamins or proteins—on a few dozen volunteers, is now adopting the heavy-lifting tools developed for genetics and pharmaceutical research. It also has a catchy name: nutrigenomics. The more researchers learn how our genes interact with our diet, the more they appreciate the deeper insight gained by an interdisciplinary approach. Such knowledge could lead to breakthroughs in our understanding of risk factors for diabetes and cardiovascular disease, or improve the design of weight loss diets.[1]

There is opportunity at every level—from healthy people wanting to stay healthy, to chronic lifestyle disease-sufferers and those genetically predisposed. An ageing global population requires healthcare systems better adapted to the needs of the elderly; 60 million Alzheimer's patients and the 7 percent of the world population living with diabetes need a system with greater emphasis on the prevention and treatment of chronic diseases; the 120 million overweight and obese people in the United States, and the 20 percent of people under 18 in China living with obesity need treatments focusing on their increasing comorbidities such as cardiovascular diseases and diabetes. There is huge potential for personalised nutrition solutions offering customer-centricity and patient empowerment.

The difference between selling a food product or dietary supplement and selling a personalised solution is the diagnosis involved—something must be measured and advice must be transmitted to the consumer. The product requires services—and businesses could even just sell the service. Personalised nutrition products need to integrate different elements, such as personal coaching, new technological diagnostics, wearables and mobile applications. Consumers want information integration—they don't want to fill in multiple questionnaires every day, or calibrate various software systems, or use individual apps measuring specific biomarkers. Big science is coming to the table and technological advances are expected to fill this gap within the next ten years. Genetic testing kits are available at lower prices each year, major wearable technology companies are beginning to integrate with our measurable devices, and personalised diets are more widely available based on assessed dietary intake.

Dr Ben van Ommen, principal scientist at the Dutch organisation, Applied Scientific Research, made the following predictions in a presentation at University College Dublin's Institute of Food and Health:

In three years' time:

- Consumers will have access to all their relevant genetic variations for less than €100
- Consumers will have access to a series of home-based diagnostics connected to the internet

In ten years' time:

- Consumers will have access to their complete genome
- Personal diagnostics will be integrated with online monitoring and primary medical advice
- Nutrition science will have tackled the complexity of gene-diet interactions

Personalised nutrition concepts have the potential to substantially improve the perceived value of food and its role in health.[2] The discovery and mapping of the complete human genome in 2003 introduced the possibility of individualised medicine and personalised nutrition to tailor dietary advice to an individual's physical and genetic make-up. Direct-to-consumer genome-wide profiling to assess disease risk can provide information about a person's genetic risk for up to 40 common polygenic diseases.[3] Proponents state providing this information may result in healthier lifestyle choices while sceptics believe such testing has the potential to cause harm, including anxiety and increased use of unnecessary and expensive screening and procedures. As the clinical validity and utility of these tests had not been demonstrated, many observers argue their sale raises consumer protection issues.[3] Dr Cinnamon Bloss et al studied a selected group of subjects who underwent direct-to-consumer genome-wide risk profiling with a commercially available test to assess its impact in the short term. Assessment of those who completed follow-up did not show measurable changes in anxiety level, dietary fat intake, or exercise behaviour after genetic testing. The researchers concluded the findings support the null hypothesis that providing the results of a genetic test does not affect health-related behaviour. However, information is only as good as the ability to use it—the promise of personalised nutrition has so far failed to develop as a commercial service, and matching dietary advice to genetic profiles has proven difficult.[4]

> **Personalised nutrition** has the potential to substantially improve the perceived value of food and its role in health.

The business challenge is the provision of personalised medical or nutritional advice—and this needs science, regulation and entrepreneurs. Personalised nutrition services are unlikely to follow a conventional business model, but will instead require developments in society and technology to occur simultaneously—public-private partnerships are likely to be the best vehicle for developing personalised nutrition services. Open innovation agreements, standards

and formats are needed to deliver consumer convenience, while a proper regulatory climate is necessary to empower and protect the individual. Given the important ethical issues that may arise from companies holding genetic information, policy makers will need to ensure regulatory frameworks guarantee data protection and privacy, while an enforcement environment should ensure reliable information is disseminated to consumers. This includes an unbiased scientific knowledge base, optimal integration of medical records with personalised health monitoring, and science-based algorithms to translate phenotypes to dietary requirements. Different scientific interpretations of the data will be counterproductive to the development of personalised nutrition, in the same way contradictory food and dietary advice has caused confusion in the past.[2] Any new scientific discipline needs a way to share data. Through a collaboration called the European Nutrigenomics Organisation NuGO), contributors are recruited to the Nutritional Phenotype Database (dbNP). Its goal is to combine data from many different areas of biology, including genetics, transcription, protein production, metabolism and behavioural data. It has great potential for use in the development and validation of biomarkers, and in bringing personalised nutrition to the mass market.

Personalised nutrition is emerging as a novel concept offering exciting approaches to improving health and wellbeing. But successful implementation is not without its challenges. Delivering a full personalised nutrition service will require integration of a wide range of elements and earning consumer trust will be crucial in its success.

The human genome can currently be sequenced for as little as €850 in around a week, and Dr van Ommen expects consumers will soon be able to have their whole genome mapped in a day. Personalised nutrition concepts are developing rapidly and consumer genomic analysis is beginning to understand how a genetic snip impacts health. Importantly, researchers are discovering how to influence, affect and even counteract these health impacts with nutritional interventions. Personalised nutrition is the breakthrough concept for the 21st century and we are at the starting line. ●

References:

1. Laursen L. Interdisciplinary research: Big science at the table. Nature. 2010

2. http://fstjournal.org/features/31-2/personalised-nutrition

3. Bloss C et al. Effect of Direct-to-Consumer Genomewide Profiling to Assess Disease Risk. N Engl J Med. 2011; 364: 524-534

4. http://www.food4me.org/images/downloads/updatedfood4me_leaflet_2012_def%202.pdf

The Science Behind Personalised Nutrition

by Jennifer Cooper

In human beings, as in nature, there is a beautiful and complex array of diversity. Just like no two people are identical in physical appearance, neither are they precisely alike on a molecular level. Even the most mundane and essential processes are subject to slight individualised nuances. The suspicion you have that somehow every carb you eat goes to your hips, while your friend seemingly indulges with impunity, is not your imagination. We now know some people process carbohydrates differently than others and these differences can be both advantageous or deleterious.

A single nucleotide polymorphism (SNP) or change occurs in nearly 1 in 1,000 base pairs and accounts for much of an individual's uniqueness.[1] Research on SNPs and other genetic variations like deletions, inversions, duplications and copy number variations (CNV)—which represent up to 9.5 percent of the human genome—have changed the face of human nutrition and validated the concept that nutrition could and should be personalised.[2] It is now well established that our diet and genes interact. Our genes are not as intransigent, nor our diet as inert as we once believed. It is a radical concept that a lifestyle factor like nutrition may be the primary environmental influencer on human health over a lifespan.[3]

Nutrigenetics—or personalised nutrition—delineates how the metabolic outcome of what we put in our mouth may be different for each person. These variations elucidate how one person might be impacted by a particular dietary intervention, while another is not.[1] Polymorphisms explain why monitoring carbohydrates is the critical factor for some, and fat for others. It also offers an explanation for confounding data in large cohorts and other studies on vitamin use, weight loss, lipid metabolism, chronic disease development and longevity. Polymorphic populations—those with high genetic or epigenetic variability—in clinical trials may generate mixed data, which doesn't necessary mean an intervention wouldn't work in a more targeted group. Future population selection for these studies will be based upon the nutrient-gene paradigm of each subject, helping to standardise results with a higher level of reproducibility.[4]

Nutrigenomics is the umbrella encompassing epigenetics, proteomics and metabolomics.[5] It explains how dietary factors can reprogram our genetic activity—by changing which genes get turned on and off, their frequency, productivity, and efficiency of expression. New science is revealing how these changes can be imprinted over a lifetime, and even passed to future generations.[6] Besides ameliorating gene expression, the eventual outcome of a gene can be mediated by how the resulting proteins are folded, where they are delivered, the timing of production, and with what corroborating elements they are complexed or metabolised into.[4]

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Nutrient availability can modulate all of these factors and altering how our genes are expressed can override our original genetic code. The potential exists to devise nutritional interventions for 'bad' genes, but it is equally possible our lifestyle choices may ruin 'good' genes. The implication is that nutritional choices alone can make sick people well, and healthy people sick.[7] Certainly, prenatal and early childhood nutrition can exert a fundamental and long-lasting positive or negative impact. The development of many chronic diseases can be traced back to early epigenetic modifications in response to environmental stimuli during these formative life stages.[6,8]

Most of us make our dietary choices using less scientific rigor. Food is a sensory and cultural experience which is also significantly impacted by our genes. We are motivated to choose our food by taste, sight, smell, expense, emotion, and expediency, as well as by the delicate signalling of our body denoting hunger and satiety.[9] We eat when we are not hungry, not knowing that routinely ignoring our body's cues can cause long term alterations in genetic expression in these metabolic pathways and modify the ability to provide 'normal' signals in the future. The propensity to neglect important feedback from our body can be programmed—for better or worse—back into our genetic make-up through epigenetic adaptations and possibly even passed to our children.[6] Dietary choices are not the only exogenous factors that may impact genetic integrity and expression. Our genes are exposed to both deliberate and random concomitant factors, like UV light exposure, pollution, smoking, stress, infection, drugs, exercise, etc.[10, 11]

> **"It is a radical concept**
> that nutrition may be the primary environmental influencer on human health over a lifespan.

The science of nutrigenetics and nutrigenomics is evolving. While initially very promising—even exciting—more randomised clinical trials are needed to demonstrate a health outcome for nutritional interventions based on addressing a single genetic variation. The majority of SNPs and CNVs have not yet crossed the clinical standard demonstrating the link between better nutritional advice specific to genetic aberrations and mitigating disease.[2,12] A major impediment for advancing this kind of nutritional research has been the limitations inherent in accurately assessing dietary intake.[13] For studies monitoring what might be small but meaningful changes, nutrigenomics needs to cultivate correspondingly sensitive biomarkers for validating food intake.[14]

Dietary intake has been shown on a molecular level to mitigate inflammation, promote healthy aging, reduce the risk of cardiovascular disease, support bone maintenance, modulate lipid metabolism, change insulin sensitivity and influence the microbiome. Many promising phytonutrients, vitamins and minerals have already demonstrated potential benefits beyond their well-known, functional contribution to metabolic processes. For polyphenols like resveratrol, their renowned antioxidant activity may just be the tip of proverbial iceberg. It has long been recognised the benefits of resveratrol cannot be explained by its antioxidant value alone, and emerging research suggests resveratrol may also exert epigenetic influence by blocking or inducing specific transcriptional effects.[15]

The convergence of nutrigenetics, nutrigenomics, metabolomics and epigenetics holds the promise of meaningful interventions that will personalise nutritional recommendations based on genetic predispositions, gene expression reprogramming and imprinting, inherited diseases or disadvantages, lifestyle choices, lifestyle diseases, stages of life, behavioural challenges, environmental exposure and organoleptic preferences.[16-18]

Today, the science may seem complex and even esoteric to the consumer—yet consumers are easily able to understand and even embrace the truth that we are each different. It is human nature to want to be recognised and treated as special for those differences. The European Union Food4Me project validated this idea. Regardless of whether a personalised dietary regime was accompanied by specific genetic counselling, subjects were simply more likely to comply with and stay on a dietary recommendation over six months if they believed it had been designed specifically for them.[17] Compliance to any regimen is more likely to be successful if the benefits are noticeable.

Personalised nutrition has the potential to revolutionize health care. It is an opportunity to intercede in disease before diagnosis; reprogram genetic destiny; and shift focus from broad based population 'standards of care' to tailored, nutritional modalities for the individual.

Jennifer Cooper is chief scientific officer at Savant Science.

References:

1. *Gaboon, N EA (2011) Nutritional genomics and personalized diet. The Egyptian Journal of Medical Human Genetics 12, 1-7.*
2. *Mullaly A & Ritz J (2007) Beyond HLA: the significance of genomic variation for allogeneic hematopoietic stem cell transplantation. Blood 109, 1355-1362.*
3. *Virgili F, Perozzi G (2008) How does nutrigenomics impact human health? IUBMB Life 60, 341-344*
4. *Kussmann M, Fay LB (2008) Nutrigenomics and personalized nutrition: science and concept. Personalized Medicine 5, 447-455*
5. *Ozdemir V & Kolker E (2016) Precision nutrition 4.0: a big data and ethics foresight analysis—convergence of agrigenomics, nutrigenomics, nutriproteomics, and nutrimetabolomics. A Journal of Integrative Biology 20, 1-7*
6. *Godfrey KM, Gluckman PD, Hanson MA, et all. (2010) Developmental origins of metabolic disease: life course and intergenerational perspectives. Trends Endocrinol Metab 4, 199-205*
7. *Waterland RA, Jirtle RL (2003) Transposable elements: targets for early nutritional effects on epigenetic gene regulation. Mol Cell Biol 23,5293-5300*
8. *Weaver, IC (2009) shaping adult phenotypes through early life environments. Birth Defects Res C Embryo Today 4, 314-326.*
9. *Le Coutre J (2003) Taste: the metabolic sense. Food Technol 57, 34-37.*
10. *Kalow W (2001). Pharmacogenetics in perspective. Drug Metab Dispos 4, 468-470.*
11. *Ozdemir V, Endrenyi L, Aynacioglu S, et al. (2014) Bernard Lerer: recipient of the 2014 inaugural Werner Kalow responsible innovation prize in global omics and personalized medicine (pacific rim association for clinical pharmacogenetics). OMICS 13, 43-61*
12. *Zarrei M, MacDonald JR, Merico D et al. (2015) A copy number variation map of the human genome. Nat Rev Genet 16, 172-183.*
13. *Penn L, Boeing H, Boushey CJ et al. (2010) Assessment of dietary intake: NuGo symposium report. Genes Nutr 5, 205-213.*
14. *Favé G, Beckmann ME, Draper JK et al. (2009) Measurement of dietary exposrure: a challenging problem which may be overcome thanks to metabolics? Genes Nutr 4, 135-141.*
15. *Joven J, Rull A, Rodriguez-Gallego E, Camps J, Riera-Borrull M, Hernandez-Aguilera A, et al. (2013) Multifunctional targets of dietary polyphenols in disease, a case for the chemokine network and energy metabolism. Food Chem Toxicol 51, 267-279.*
16. *Ozdemir V, Motlsky AG, Kolker E, Godard B, et al. (2009) Genome-environment interactions and prospective technology assessment: evolution from pharmacogenomics to nutrigenomics and ecogenomics. A Journal of Integrate Biology 13, 1-3.*
17. *Celis-Morales C, Livingstone KM, Marsaux CF, et al. (2015) Design and baseline characteristics of the Food4Me study: a web-based randomized controlled trial of personalized nutrition in seven European countries. Genes Nutr 10, 450.*
18. *Szic KS, Declerck K, Vidakovic M, Berghe WV et al. (2015) From inflammaging to healthy aging by dietary lifestyle choices: is epigenetics the key to personalized nutrition? Clinical Epigenetics 1-18*

    https://en.wikipedia.org/wiki/Methylenetetrahydrofolate_reductase

    http://pharma.bayer.com/en/innovation-partnering/technologies-and-trends/personalized-medicine/

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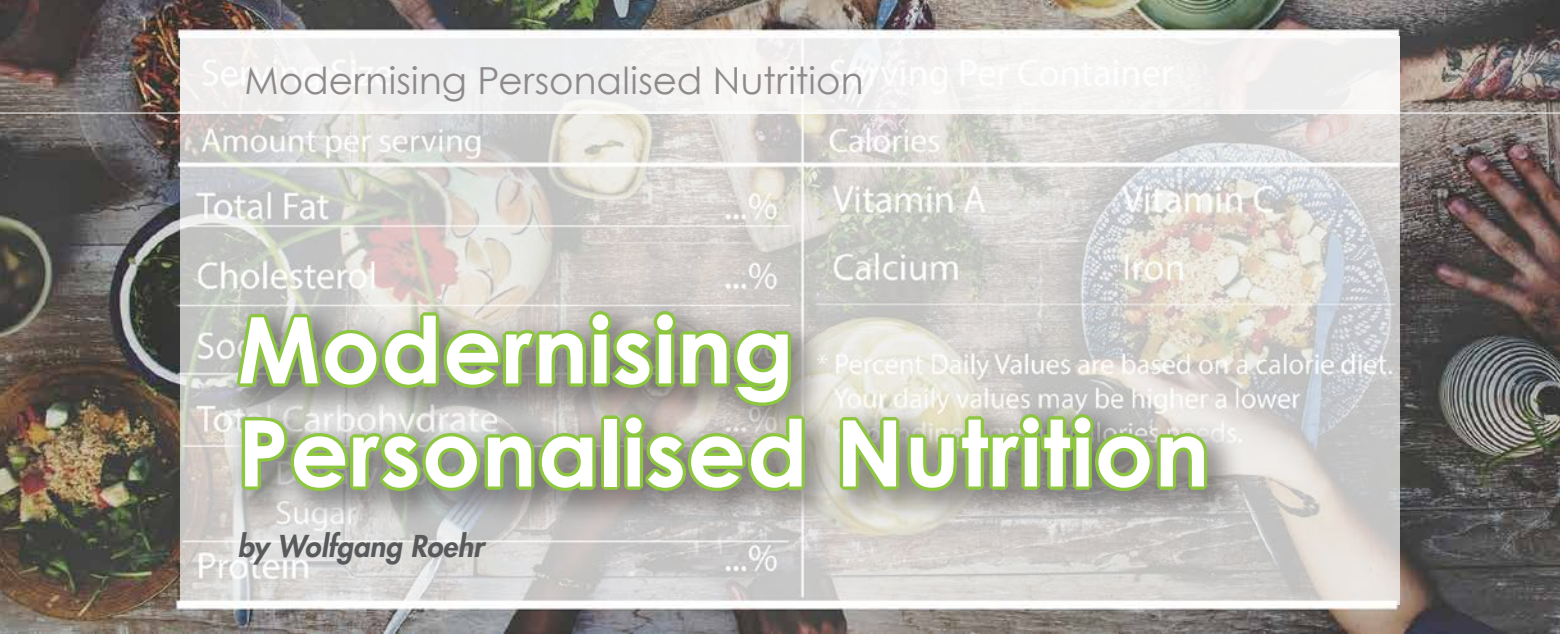


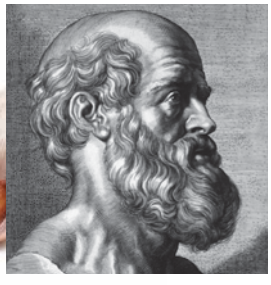
Modernising Personalised Nutrition

by Wolfgang Roehr

Having been practiced for thousands of years, the idea of personalised medicine and nutrition is nothing new. In traditional healing systems, including Ayurveda and Traditional Chinese Medicine (TCM), the concept of prevention and complimentary disease treatment requires a holistic approach, taking the individual into consideration. The clear differentiation between medicines and food—as is practiced in the Western world today, and regulated by health authorities—was not as well-defined.

Food has always been an integral part of living and keeping healthy, and people have always known they fall into different categories. In Ayurveda, the three doshas—Vata, Pitta and Kapha—determine a person's mind-body classification. These doshas are present in all people to various degrees of dominance. The Ayurvedic classification system distinguishes people into different Prakriti types, based on the relative proportions of each dosha. Prakriti comprises the bodily constitution, temperament and fundamental form specific to the individual. It is considered fixed during the lifetime, having been determined at conception with contributions from environmental factors, including maternal diet and lifestyle. The specific treatments—including medicines, diet and lifestyle—for Prakriti are a distinctive feature of Ayurveda. In TCM, there are several similarities, including the holistic and individual classification systems.

Modern medicine has led to the standardisation of disease treatments, often with very effective medicines. This was, and is, important for treating infectious diseases. However, the world today is experiencing challenges from chronic and degenerative diseases, driving consumers to explore a more holistic and personalised approach.



Hippocrates 460 to 370 BC

'If we could give every individual the right amount of nourishment and exercise, not too little and not too much, we would have found the **safest way to health**.'

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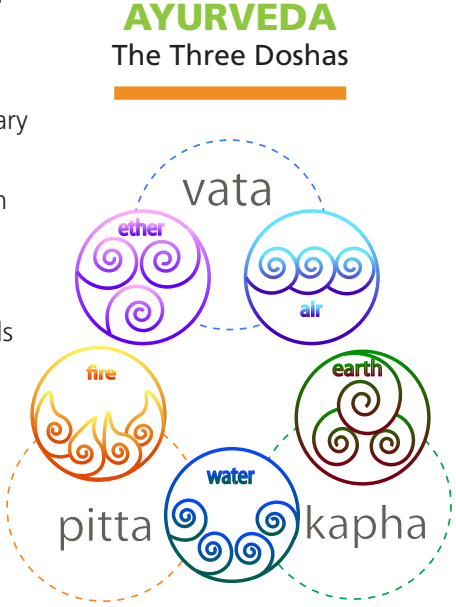
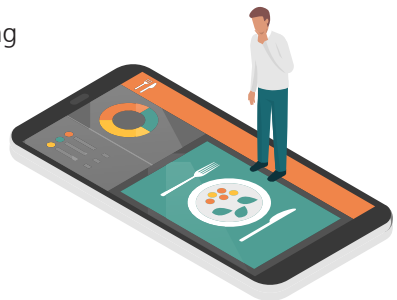
Consumers realise a healthy lifestyle and good nutrition—including dietary supplements—are important for them, but the sheer number of products and theories about what they should do to stay healthy confuses them. New diets are promoted constantly, with contrasting—and confounding—regimes promising weight loss. Dietary supplements are touted on their merits, with many consumers believing the higher the dose, the better. Even the most educated health food shopper stands to be overwhelmed by the number of products on offer; the internet provides a wealth of information, but this volume can be exhausting; and every company claims its products are the 'best' for different health conditions. With all this, consumers are demanding individualisation; they want to oversee their own health.

Personalisation is a huge trend in many industries; but, in comparison to having your trainers emblazoned with your name, personalising your health is a much more complicated process. Without proper assessment and scientifically proven diagnostics, industry will not provide a personalised approach to determining the requirements of an individual. There are also different degrees of personalisation needed: disease prevention requires a broader testing regimen, taking the underlying causal factors into consideration; disease management needs a more targeted approach.

The draft sequence of the human genome by the Human Genome Project was unquestionably a great scientific achievement, and the starting point for human genomics. This led to the development of nutrigenetics—the science of the effect of genetic variations on dietary response—and nutrigenomics—the role of nutrients and bioactive food compounds in epigenetic or gene expression modification. Both are crucial to a better understanding of nutrient-gene interactions in different genotypes and the development of personalised nutrition.

There is great diversity in the inherited genome between individuals and ethnic groups, affecting nutrient bioavailability and metabolism. In an article published in the *Journal of Ayurvedic and Integrative Medicines* in 2010, the authors hypothesised Prakriti assessment has a strong genetic component: 'Subtle combinations of the three doshas—Vata, Pitta and Kappa—are as specific and individualised as the DNA sequence-based genetic makeup.'[1] Ayurveda has been investigated for this, based on the hypothesis Prakriti types may offer phenotypic datasets for analysing underlying genetic variations. Further studies have been conducted using the principles of Korean Sasang constitution medicine, TCM and Traditional Japanese Medicine. More research is required, but





it appears the traditional systems of medicine—dating as far back as 4,000 years ago—identified the unique qualities of the individual and state the necessity of a personalised approach for optimal response. However, genetics are only one factor of the overall assessment. There are still some critical voices believing our knowledge of genes is not scientifically proven nor sufficiently validated to draw specific conclusions for personalised dietary recommendations.

Nutrition is important, but is only part of the overall health concept of personalised nutrition.

Personalised nutrition is difficult to bring to the mass market for various reasons and will always involve diagnostics and monitoring, but it is encouraging to see the market evolution. Myriad gadgets tracking health or performance exist and many genetic testing labs are receiving capital from industry or venture capital companies. These labs and gadget companies recognise diagnostics alone will not make them successful; consumers need to be offered a ready solution. One genetic test offers insight to a predisposition to a disease—a statistical risk—and is an important starting point, but it is essential consumers have follow-up tests; blood biomarker tests can reveal whether diseases are already in progress. Other factors, such as metabolism and gut health, are equally important and must be considered.

Nutrition is important, but is only part of the overall health concept of personalised nutrition. This movement is about balancing and optimising the different elements needed for healthy longevity and will require a platform offering a full service, including educating consumers. Companies that realise this and participate fully will be able to generate a powerful brand with loyal customers. ●

Wolfgang Roehr is founder and CEO of Roehr Pharma.

References:

1 *Joshi K et al. Traditional medicine and genomics. J Ayurveda Integr Med. 2010 Jan-March; 1: 26-32*

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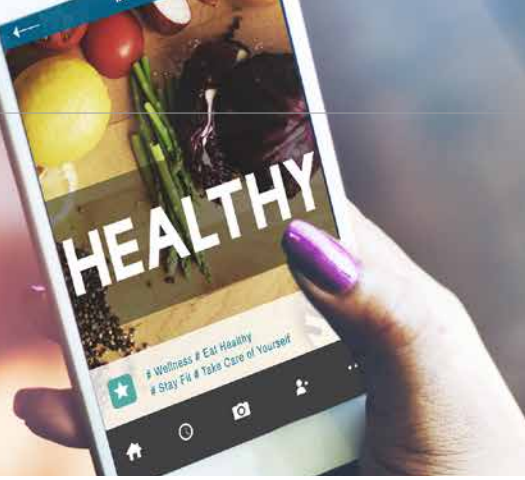

Positive attitudes toward health and wellness have increased globally in recent years and with the wealth of knowledge now available at people's fingertips online, consumers have more awareness of the importance of their health and the solutions available to them than ever before.

This heightened focus on health can be attributed to a range of factors. For example, nearly 17 percent of the world's population is expected to be aged over 65 years by 2050.[1] With an ageing demographic comes a potential range of related medical issues, which can often encourage the early adoption of a healthier way of living to prolong quality of life into later years. Similarly, healthcare costs are rising, growing by 4.3 percent in 2016 to reach $10,348 per person per annum in the United States.[2] Research has shown increased nutrient intake for those aged 55 and over through supplementation can offer significant public health cost savings by helping to prevent or manage certain conditions, such as cardiovascular disease and osteoporosis, again encouraging a higher focus on preventive approaches.[3,4]

In addition to becoming more aware of their health, consumers are also increasingly digitally-led. This has resulted in a range of developments in healthcare, such as the IBM® Watson® Care Manager—a management system with the functionality to consolidate data to develop and manage individual care plans.[5] Technological advancements offer a wide-range of personalisation opportunities across a variety of industries, and nutrition is no exception. It is widely accepted a one-size-fits-all approach to health is a challenge, with genetic, lifestyle and environmental factors all having an influence on an individual's nutritional needs. In recent years, however, personalised nutrition has gained traction as a possible solution. For example, in the United States, the National Nutrition Research Roadmap—outlined by the Interagency Committee on Human Nutrition Research—includes a focus on increasing the understanding of individual differences in nutritional status, as well as enhancing the ability to evaluate change.[6]

As personalised nutrition becomes a more important topic across the industry, there are various questions that must be addressed by anyone considering projects in the area.

How do we define personalised nutrition?

Personalised nutrition enables individuals to adopt a healthier lifestyle by delivering the right nutrients at the right time. Based on their individual situation and through accurate and fast nutritional measurements, nutrition is customized for them to optimize health outcomes.

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The first step when approaching personalised nutrition activities must be to understand the parameters of personalisation and the definition of 'individual', whether that be a particular group or a singular person. There are a variety of different ways to cluster people to cater to their specific needs. For example, research has shown that those with type 1 diabetes may benefit from a higher intake of vitamin D during childhood.[7] Alternatively, people who live in countries with limited sunlight or those who spend most of the daylight hours inside may struggle to get enough vitamin D. So, whether it is geographically, by genotype, by lifestyle or on a truly individual basis – this must be outlined early on.

What do consumers need from personalised nutrition?

A survey by DSM has shown people are aware, in general, of the need to stay healthy.[8] The survey, which included 7,000 participants from across the Europe, Middle East and Asia region, looked at the areas of health concerning consumers the most and how they were addressing these worries. The results found the top health concerns differed by age and region, and showed a clear opportunity for a more targeted approach to nutrition. For example, nutrients linked with eye health, such as lutein and zeaxanthin, may have more appeal in countries like Russia, which demonstrated a larger interest in vision. Additional research has also shown consumers are willing to use supplements to address concerns and improve their wellbeing, under recommendations from health practitioners, but supplement usage differs from country to country—indicating geography can alter an individual's preferences and needs.[9]

Understanding what people need and how they can potentially benefit from personalised nutrition is key to developing successful new solutions. Using insights into current consumer behaviour, as well as conducting further research on the topic can help ensure new developments are effective in addressing these specific needs, whether it is via different dosage forms or nutrients that address particular concerns.

How do we engage consumers?

With any new initiative, consumer engagement is vital. Currently, there are a range of different ways consumers are engaging with their health. With a variety of calorie tracking apps, such as MyFitnessPal, and exercise tracking apps, including the United Kingdom's National Health Service Couch to 5k program, and even games designed to encourage a healthier lifestyle

(such as Zombies Run), the market is saturated with technology looking to improve people's health.[10-12] Yet research has shown a large number of these apps are downloaded and then not used, despite consumer faith in the effectiveness of the apps themselves.[13]

Understanding how to keep people engaged beyond an initial interaction is important to ensure the longevity of an initiative. If data is collected not only on a person's health and nutritional status, but also on how they interact with programs, then continuous measurement and feedback can be used to keep consumers motivated for longer periods in the future.

No matter how data is collected, it will always require an element of engagement from individuals, so finding a way to encourage initial uptake, and then incite commitment, is important for long-term change. While feedback can help extend commitment, working with organisations that have a thorough understanding of consumer behaviour is particularly important for smaller organisations that do not have the capacity to facilitate their own research but need to develop the initial engagement trigger. Additionally, pairing with companies that can also offer scientific expertise can facilitate partnerships to effectively translate data into meaningful recommendations for both technology and individuals.

How should data be collected?

Currently, most health-related data is self-reported with individuals filling in lifestyle questionnaires. While this is a simple method, accuracy cannot be guaranteed with the danger of people under or over-reporting their intake of foods and supplements, as well as potential miscalculations in the nutritional content of diets. For example, a survey stating an intake of 100g of carrots would suggest high levels of vitamin A, but the way in which the carrot was cooked may negatively affect these levels and cause a discrepancy in the reporting. The most effective technique to monitor individual nutrient levels is through blood sample analysis, but this is often unappealing for many. Faster, less invasive methods are therefore needed to encourage more widespread adoption.

In response to this, measuring devices should be easily integrated into both the home and local healthcare facilities, such as pharmacies. With the wearable technology market expected to be worth €28.2 billion by 2020 and the World Health Organization recognising health technologies as a key focus area, there is a clear opportunity for partnerships between healthcare and technology companies to meet this need.[14,15] Health apps, such as Google Fit and Apple Health are currently available to track a user's weight and exercise, as well as calorie and macro-nutrient intake through self-reporting, but there are clear gaps in the market for technologies that can provide a detailed analysis of a person's nutrient status. Here companies with strong science-based backgrounds can offer vital insights,

experience and knowledge as a partner in the development of new, innovative solutions to meet both consumer and global health needs.

Turning data into insight

Once an effective measurement method has been established, the large volume of data collected must be efficiently processed to offer valuable insights and turned into action. This is likely to initially be overwhelming for an industry that has not traditionally handled big data, which is another area where strong partnerships are critical. Artificial intelligence (AI) has proven to be invaluable in managing big data for large organisations. Coca-Cola, for example, recently launched a new flavour of one its beverages following analysis of data collected from self-service drink machines that allow consumers to mix their own flavours.[16] While many ingredient manufacturers may not be able to develop their own AI, working with companies with the technology already available can allow a similar level of data analysis.

> **Understanding what** people need and how they can potentially benefit is crucial to developing successful personalised nutrition solutions.

To turn data into actions, nutritional information may be passed to individuals to inform them of recommended changes to their diet, integrated into preventive approaches and advice for certain at-risk groups, or even passed directly to physicians. In some cases, this data may also be used for product development—depending on the capabilities of the organisations involved. Understanding the benefits of each option, and the most effective method, should be outlined early in the development of new solutions. For example, if providing consumers with the data is unlikely to lead to behaviour change it would perhaps be more effective to find a direct link to an individual's doctor. Again, continuous measurement is essential to gauge the effectiveness of actions and can be used to define and influence consumer behaviours.

How will personalised nutrition change the industry?

In the era of instant gratification, people can often lose interest when the benefit to them is not clear and immediately available. This is certainly the case in supplement usage, where a lack of both understanding of benefits and instant results are clear barriers. Personalised nutrition offers the opportunity to revolutionise how people engage with their health, giving individuals the ability to monitor their progress towards a given health outcome regularly and make tailored supplement usage a habit. This behaviour change will not only improve human health across the globe, but could also be good news for manufacturers—allowing them to more accurately meet consumer needs with future product and service developments.

Personalised nutrition also paves the way for the establishment of new online retail channels, a potentially huge opportunity for new, start-up businesses with the agility and flexibility to respond quickly to consumer demands. For example, the future could see machines able to dispense specific supplement combinations to match a person's profile. This would require collaboration between supplement brand owners and ingredient suppliers with a thorough

understanding of the science behind drug-nutrient interactions and dosage levels, as well as the ability to individualise delivery forms in a cost-efficient way while guaranteeing a safe, high-quality supply.

While it is likely personalised nutrition developments will be most noticeable in the dietary supplements market, due to the level of concentrations and range of formats available to meet a range of needs, there are also opportunities in both the food and beverage and medical nutrition industry. Some food manufacturers are already capitalising on the trend, with companies such as Campbell Soup investing in the personalised nutrition app, Habit.[17]

Securing sustained success

For personalised nutrition to be sustainable, a new value chain must be established with an effective feedback loop. Accurate and reliable measuring devices, as well as consumer feedback, provide data which must be developed into valuable insights. These insights into individuals or specified groups are then matched to the appropriate nutritional solution which is passed onto the consumer. If consumers then feedback into the measuring device, the continuous loop of information can be used to inform new developments and ensure ongoing improvements to both product delivery and service, as well as address changing nutritional requirements for individuals.

Personalised nutrition is currently in its early stages as a defined field but there are clear opportunities. To achieve future success, it is important to ask the right questions from the very beginning of the process. ●

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References:

1. *W. He et al 'An Aging World: 2015', International Population Reports, 2016.*
2. *National Health Expenditure Accounts, 'National Health Expenditures 2016 Highlights', 2017.*
3. *Food supplements Europe, 'Healthcare cost savings of calcium and vitamin D food supplements in the European Union', 2016. Available at: http://www.foodsupplementseurope.org/value-of-supplementation*
4. *Food supplements Europe, 'Healthcare cost savings of omega 3 food supplements in the European Union', 2016. Available at: http://www.foodsupplementseurope.org/value-of-supplementation*
5. *IBM, 'IBM Watson Health'. Available at: https://www.ibm.com/watson/health/*
6. *Interagency Committee on Human Nutrition Research. 'National nutrition research roadmap', 2016. Available at: https://www.nal.usda.gov/sites/default/files/fnic_uploads/2016-03-30-%20ICHNR%20NNRR%20%282%29.pdf*
7. *J. Norris et al., 'Plasma 25-Hydroxyvitamin D Concentration and Risk of Islet Autoimmunity', Diabetes, Vol 66, Issue 11.*
8. *DSM, 'EMEA health concerns', 2016.*
9. *DSM, 'Perception of nutritional supplements', 2017.*
10. *MyFitnessPal, 'Lose weight with MyFitnessPal'. Available at: https://www.myfitnesspal.com/*
11. *NHS 'Couch to 5k'. Available at: https://www.nhs.uk/LiveWell/c25k/Pages/couch-to-5k.aspx*
12. *Zombies Run, 'Zombies, Run!'. Available at: https://zombiesrungame.com/*
13. *NYU Langone Medical Center, 'National Survey of Americans' Health App Use Shows Technology's Promise & Weaknesses', 2015. Available at: https://nyulangone.org/press-releases/national-survey-of-americans-health-app-use-shows-technologys-promise-weaknesses*
14. *CSS Insight, 'Wearables Momentum Continues', 2016. Available at: https://www.forbes.com/sites/paullamkin/2016/02/17/wearable-tech-market-to-be-worth-34-billion-by-2020/#22d283073cb5*
15. *World Health Organisation, 'Resolution on health technologies', 2006, Available at: http://www.who.int/health-technology-assessment/about/healthtechnology/en/*
16. *Coca Cola, 'Fountain Favorite: Sprite Cherry is First National Brand Inspired by Coca-Cola Freestyle', 2017. Available at: http://www.coca-colacompany.com/stories/fountain-favorites-sprite-cherry-and-sprite-cherry-zero-become-first-national-brands-inspired-by-coca-cola-freestyle*
17. *Fortune, 'Campbell Soup invests in nutrition tech startup', 2016. Available at: http://fortune.com/2016/10/26/campbell-soup-invests-habit/*

Takeaways for Your Business

Positive attitudes toward health and wellness have increased globally in recent years with consumers more aware of the importance of their health and the solutions available to them. At the same time, the world is experiencing challenges from chronic and degenerative diseases and consumers are demanding individualisation.

Personalised nutrition is unquestionably the breakthrough concept for the global health and wellness industry with consumers recognising the one-size-fits-all approach is no longer ideal and businesses beginning to dip their toes into the space. But few companies understand how to market genetically customised nutrition to consumers or how to successfully patent a diet consisting of foods already widely available. And researchers face the challenge of identifying and measuring a much subtler state than disease—health. Even then, translating understanding of health and disease—as influenced by genetics, metabolism, lifestyle and environment—into personalised, science-based nutrition is another matter entirely.

The first step when approaching personalised nutrition activities must be to understand the parameters of personalisation and the definition of 'individual', whether that be a particular group or a singular person. Understanding what people need and how they can potentially benefit from personalised nutrition is key to developing successful new solutions. Using insights into current consumer behaviour, as well as conducting further research on the topic, can help ensure new developments are effective in addressing these specific needs, whether it is via different dosage forms or nutrients that address particular concerns. There is opportunity at every level—from healthy people wanting to stay healthy, to chronic lifestyle disease-sufferers and those genetically predisposed.

But the difference between selling a food product or dietary supplement and selling a personalised solution is the diagnosis involved—something must be measured and advice must be transmitted to the consumer. The business challenge is the provision of personalised medical or nutritional advice—and this needs science, regulation and entrepreneurs. Personalised nutrition services are unlikely to follow a conventional business model, but will instead require developments in society and technology to occur simultaneously—public-private partnerships are likely to be the best vehicle for developing personalised nutrition services. Open innovation agreements, standards and formats are needed to deliver consumer convenience, while a proper regulatory climate is necessary to empower and protect the individual.

Personalised nutrition offers the opportunity to revolutionise how people engage with their health: this behaviour change will not only improve human health across the globe, but could also be good news for manufacturers—allowing them to more accurately meet consumer needs with future product and service developments.

Personalised nutrition is emerging as a novel concept offering exciting approaches to improving health and wellbeing. But successful implementation is not without its challenges. Delivering a full personalised nutrition service will require integration of a wide range of elements and earning consumer trust will be crucial in its success. ●

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