

Life Stages, Part 3: Healthy ageing



Introduction

The concept of healthy ageing is undergoing a shift, moving from curing disease and reversing the ageing process to delaying the onset of age-related decline. Consumers and industry alike are changing their outlook as younger people increasingly consider how their current lifestyle choices might affect their long-term health. As a result, products for healthy ageing are no longer limited to older consumers.

The Vitafoods Insights Life Stages report is written in three parts, published throughout 2023. You are reading part three.



**'A change in
mindset':**
The market for
healthy ageing

Consumers over the age of 65 had an estimated spending power of \$8.4 trillion in 2020, according to World Data Lab, and products targeting healthy ageing traditionally have targeted this very attractive market.¹ However, the Covid-19 pandemic has driven a shift in awareness, and younger consumers are more concerned than ever about preserving their wellness for a healthier future.² This presents a new and different opportunity for food and supplement companies, as well as technology providers.

Governments are also aware of the need to incentivise healthy lifestyles in light of ageing – and more overweight – populations. A growing number of public-private partnerships around the world is helping align consumers' diets with national nutritional guidelines, including as part of the United Nations Decade of Healthy Ageing (2021-2030).

"Longevity is about remaining well and



healthy across the life course," said Dr Richard Siow, director of Ageing Research at King's (ARK), King's College London, adding that this concept should inform better innovation in the healthy ageing space.³

"It's not about curing diseases," he said. "It's not about reversing ageing, but it's

delaying the onset of age-related decline, reducing the severity. I think there has been now a change in the mindset of both industry and also the consumer."⁴

The life expectancy-healthspan gap

Meanwhile, the world's population is getting older, making proactive health care an increasingly urgent issue for

governments as well as individual consumers.⁵ Despite a global trend of increasing lifespans, a gap remains between life expectancy and years spent in good health.⁶ In the European Union, that gap is about 11 years on average.⁷

For many governments, changing demographics could exacerbate the problem. Philipp Gut, head of data sciences and precision nutrition at Nestlé, points out that countries like Japan and China are on track to have one person over the age of 60 for every two under-60s by 2050.⁸

At the same time, obesity prevalence is on track to be over 60% in many countries by 2030, and is the main driver of cardiovascular disease, diabetes, osteoarthritis, and certain obesity-related cancers.⁹

“You can get an idea of what’s coming to us,” Gut said. “It’s almost a tsunami of metabolic conditions that the aged



population cannot easily absorb, including the public health systems.”

However, attitudes toward ageing are changing, and better technologies and data are emerging to help consumers manage their health.

“What we see is a huge shift in consumer

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I think there has been now a change in the mindset of both industry and also the consumer.”

Dr Richard Siow, director of ARK,
King’s College London

interest in the topic of proactive nutritional health management,” he said.¹⁰ “[...] This gives a great opportunity, when you think of the global challenge, if we can change the conversation from old age and frailty.”

Alongside changing consumer and industry approaches, scientists’ understanding of the ageing process is improving rapidly, helping to inform new product development to address these molecular changes.¹¹

In addition, increasingly precise testing protocols are able to provide a snapshot of an individual’s health and ageing profile, allowing for more personalised, targeted health and nutrition interventions.¹²

How to measure ageing



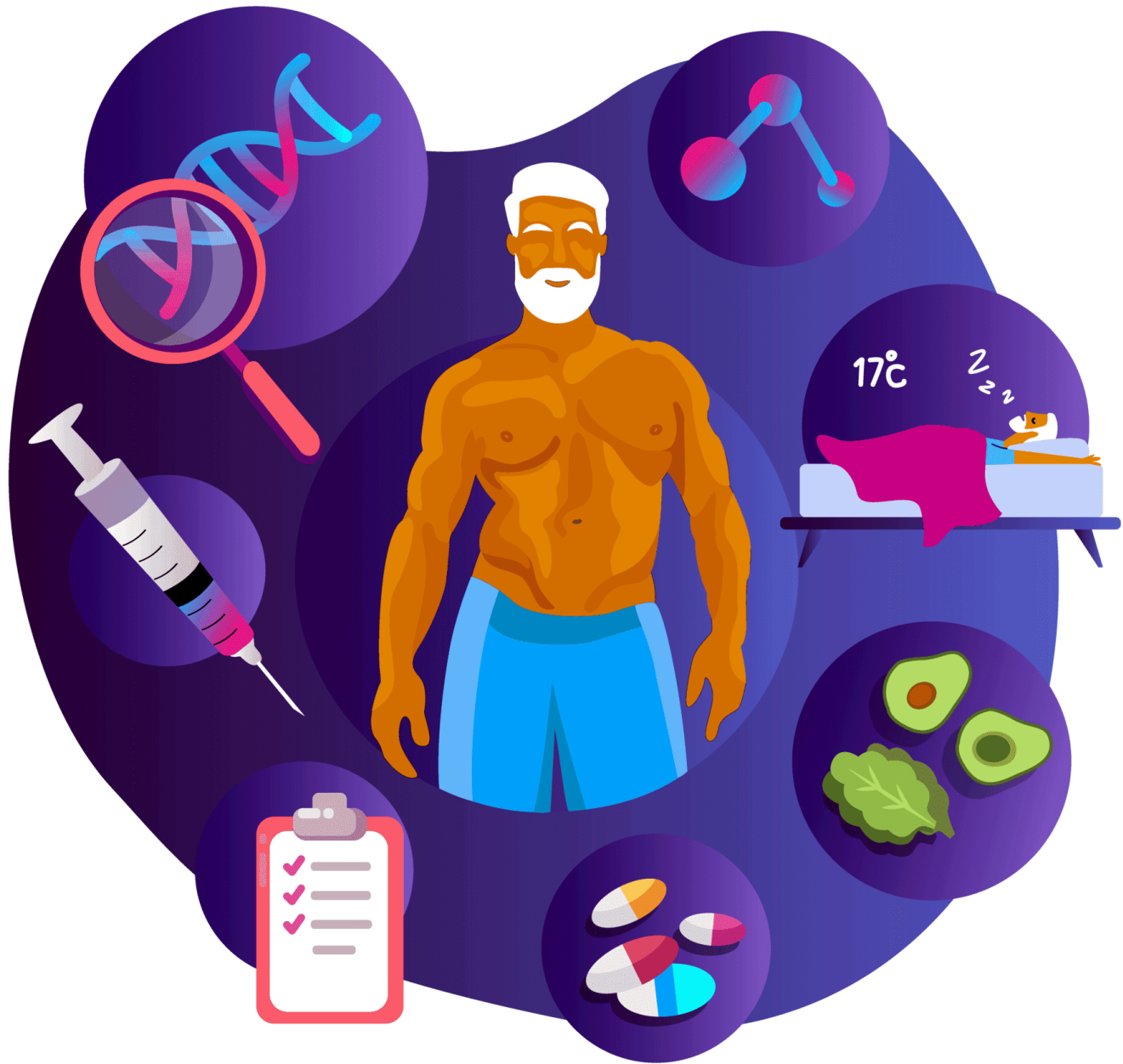


On a biological level, ageing can be measured in many different ways, including identifying certain biomarkers, DNA methylation, and microbiome changes.¹³

According to the Chinese team of researchers behind a recent review, using ageing biomarkers to construct biological age is the most popularly used model to date, which includes using data from DNA methylation, metabolomics, and clinical biomarkers obtained from blood tests and organ function tests, among others.¹⁴

Another approach is defining a “biological ageing clock” from genomics data, using biomarkers from multiple organs and systems alongside genetic indicators and physical activity data, for example.

Until now, this approach was deemed too expensive and complex to apply on a population level, but that is exactly what Richard Siow and his team at King’s College London hope to achieve.¹⁵



The aim is to collect consumer data over several decades to produce the most detailed picture yet of how our genetic makeup and nutritional choices interact (ie nutrigenomics), and to overlay that with the effects of everything in our environment.¹⁶

That covers lifestyle and diet as well as our parents' lifestyles and diets before conception, and what Siow calls the "exposome", which includes factors like cultural context, workplace environment, medical care, environmental contaminants, heat stress, global warming, sunshine, and access to green space.¹⁷



Ultimately, integrating data from the societal to the cellular level could help us better understand all age-related conditions, including heart disease, joint disease, obesity, cancers, and cognitive decline. Siow suggests this also could lead to the discovery of new protective interventions.¹⁸

"I think it's really important for us to understand how our diet, microbiome, and metabolism impact on epigenetics," he said. "I think that's the next level of research we need to work on together, both academia and industry."

The Ageing Research at King's (ARK) project is working with the consumer testing company MuhDo Health to use saliva samples and tracking devices to find patterns in this.¹⁹ And with another company, the researchers are examining how the workplace environment impacts DNA methylation patterns, whether through stress, management style, shift working, and so on.



It may depend on where a person lives, but Siow added: "There are these baseline clocks that can be accelerated or delayed. One of the key factors is a healthy diet."²⁰

As well as this population-wide approach, collecting data on our own personal ageing profile is becoming increasingly accessible.

“The pandemic accelerated innovation in technologies, in tracking, and also in education,” Siow said. “We are more aware of our own health.”²¹



Nestlé also is doing research in this space, including looking into ageing at the cellular level.²²

Phillip Gut suggests there are already a lot of personalised insights available via phone apps, and these can be particularly effective when combined with wearables, such as a watch that measures blood pressure, for example.²³

“Also there are more and more companies that develop at-home nutrient testing,” he said, adding that finger-prick tests could help personalise how a person could reach recommended blood levels of specific nutrients.²⁴

“We are trying to embed now nutritional recommendations also in the context of diet, making use of digital services, making use of the fact that we have I think about six to seven billion cell phones in the world,” he said.²⁵ “The question is, how can the cell phone become the nutritionist for everyone?”



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BioCell Collagen delivers skin and joint health benefits

Interview with Douglas Jones
global sales and marketing manager
BioCell Technology



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Interview with Douglas Jones, global sales and marketing manager at BioCell Technology.



BioCell Collagen is a clinically studied, bioavailable ingredient for healthy joints and skin. We spoke with Douglas Jones, global sales and marketing manager at BioCell Technology, about how this ingredient could help consumer goods companies make products that meet consumer demand for effective healthy ageing products.

Consumers are reconsidering their lifestyle habits in order to keep good health throughout their lives. This has led to an increase in demand for natural, functional ingredients that offer a range of benefits, such as improved joint and skin health. "Fast-paced, high-stress lifestyles has led people to look for functional, healthy ingredients," notes Jones.

There is also a growing interest in lifetime wellness, and in products that can help maintain levels of health and fitness, at any stage of life. Collagen supplements for example are often taken for skin health, joint health, and general health. For most consumers regardless of age, replenishing collagen levels has become a part of maintaining a healthy lifestyle.

Maintaining lifelong wellness

As a result, demand for collagen-based products is growing across a range of sectors, including healthcare, cosmetics, and food and beverages. In fact, the global collagen market is projected to reach \$7.2

billion by 2030, growing at a compound annual growth rate (CAGR) of 5.3% from 2022 to 2030. The market was valued at \$4.7 billion in 2022, according to Markets and Markets.



For consumers however, a key challenge is finding science-backed dietary supplements that specifically address certain healthy ageing issues. In particular, the collagen market also varies greatly in terms of product type, end use and overall quality.

"Collagen is used as a generic term for far-ranging ingredients that come from different sources and contain different amounts of bioactives," says Jones. "Collagen products are often lumped together, while we firmly believe that not all

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collagens are alike. This is definitely the case for BioCell Collagen.”

Not all collagens are alike

BioCell Collagen is not an isolated or purified collagen protein, it is a naturally occurring matrix of hydrolysed collagen type 2 peptides, chondroitin sulphate, and hyaluronic acid. This unique matrix is not a blend of individual ingredients.

Another key difference is that most collagen on the market is type 1 – the type most often found in products such as powdered drink mixes. A challenge for formulators and consumers alike is that the low bioavailability of type 1 collagen means high doses are required in order to achieve a degree of functionality.

This, says Jones, is not the case with BioCell’s collagen. This is primarily type 2 collagen, and the complex molecule

matrix that goes into BioCell Collagen is sourced only from chicken sternal cartilage.



“This is our source material,” he says. “There is no adding or manipulating the collagen. It is just as nature intended. This is an

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Collagen molecules in their native state are large and not easily absorbed. We put them through a hydrolysis process, to achieve molecules that can be more easily absorbed into the body.”

Douglas Jones, global sales and marketing manager, BioCell Technology

important distinction, as other collagen products are often not made up of the natural, complex matrix of molecules found in our product.”

Using patented manufacturing methods, BioCell is able to extract a bioactive powder that can be used as a healthy ageing dietary supplement. “Collagen molecules in their native state are large and not easily absorbed,” says Jones. “We put them through a hydrolysis process, to achieve molecules that can be more easily absorbed into the body.”

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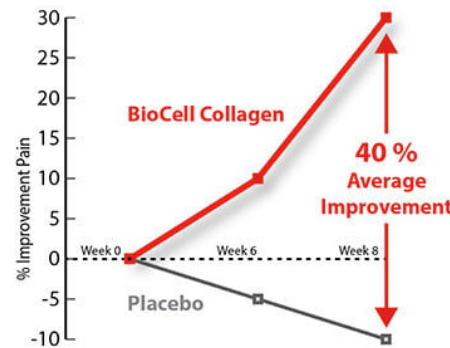
Collagen backed by science

Biocell Collagen is marketed as a standalone product or can also be used in numerous multi-ingredient formulations across the world. Clinical studies have been carried out on joint health and skin health. Evidence showing multiple positive effects on the body point to BioCell Collagen having a systemic effect.

The largest study to date was a recent clinical trial that evaluated the use of BioCell Collagen [among 128 women aged 39-59](#). The results corroborated the results of an earlier study that found ingestion of

BioCell Collagen [enhanced blood microcirculation and reduced facial ageing signs](#).

In a randomised, double-blind, placebo-controlled human clinical trial, subjects experienced statistically [significant improvement in their joint comfort and ability to engage in physical activities](#).



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There is no adding or manipulating the collagen. It is just as nature intended. This is an important distinction, as other collagen products are often not made up of the natural, complex matrix of molecules found in our product.”

Douglas Jones, global sales and marketing manager, BioCell Technology

“Multiple end points have been examined,” says Jones. “Another study that focused on facial lines and wrinkles revealed improvements in appearance, with before and after photos.”

Another clinical trial that focused on upper-body muscle-damaging resistance found that participants experienced favourable [improvements in stress resilience and recovery after bouts of intense resistance exercise](#), without any reported side effects.



Ingredients for specific health conditions

H ealthy ageing refers to avoiding age-related health conditions, as well as marketing specific ingredients to those who already have such diagnoses. An increasing number of ingredients companies – particularly in the digestive health and cognition spaces – target those who aim to stay well for as long as possible.

Here are some ingredients to watch.

Digestive health

The gut microbiome has been linked to a wide range of health states related to the immune system, cardiovascular disease, skin, mental health, and even certain cancers.²⁶ Now, it appears the bacteria in the gut may have a key role in how the body responds to all external factors linked to ageing, from bacteria and viruses to pollution and sun exposure, as well as overall diet quality.²⁷

Fibre is the most well-established dietary component for digestive health, and food

companies continue to incorporate fibre ingredients into their products, especially as good gut health has been linked to multiple health benefits, including protecting against bowel cancer and

obesity-related diseases such as type 2 diabetes.²⁸

Soluble fibre in particular has been shown to reduce blood cholesterol levels and help



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regulate blood sugar,²⁹ while insoluble fibre helps to increase the regularity of bowel movements, which may help pathogens move through the body more effectively, among other benefits.³⁰

Probiotics and prebiotics have entered the mainstream as a growing number of consumers understand that they may have health impacts beyond digestion itself, and are a widely available and cost-effective way to address age-related changes in the gut microbiome.³¹



So much so, that researchers from the National Yang-Ming University of Taipei in Taiwan have proposed the term “gerobiotics”, referring to biotic ingredients that could slow down or reduce the physiological ageing process.³² These include pre- and probiotics as well as postbiotics – beneficial waste products left in body after it digests pre- and probiotics.³³

According to a review published in *Biosci Microbiota Food Health*: “Use of gerobiotics could be a promising intervention strategy to improve healthspan and longevity of humans in the future.”³⁴

Cognitive health

With an ageing population comes a growing burden of dementia and other cognition-related problems.³⁵ Researchers already have established that eating a healthy diet plays an important role in slowing the rate of cognitive decline, and emerging research now aims to pinpoint specific ingredients that may be

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Use of gerobiotics could be a promising intervention strategy to improve healthspan and longevity of humans in the future.”

Ying-Chieh Tsai *et al*, National Yang-Ming University, Taipei

particularly useful.³⁶ Top supplements for brain health include omega-3 fatty acids, L-theanine, caffeine, vitamin D, choline, B vitamins, and pre- and probiotics.³⁷

Research is still emerging, and there are often gaps in knowledge regarding mechanisms of action or why certain people might benefit from a specific ingredient while others may not.³⁸ Randomised controlled trials looking at omega-3, for instance, have had mixed results when looking at cognitively healthy adults, but in those with coronary artery disease, omega-3 supplementation has been shown to slow cognitive decline by an average of 2.5 years.³⁹

B vitamins, on the other hand, have well-established neurological and physiological benefits related to brain health, and have even met the European Food Safety Authority's (EFSA's) notoriously challenging criteria to allow brain-related health claims.^{40,41} They are known to boost production of neurotransmitters, and researchers suggest they could boost cognitive function – even in those with cognitive decline.⁴²

Low vitamin D levels are correlated with increased risk of cognitive decline,⁴³ and researchers have suggested a strong correlation between increased choline intake and improved cognitive function in the elderly.⁴⁴ L-theanine and caffeine – an amino acid found in tea and a stimulant in coffee, respectively – also have shown promise both separately and in combination for their potential to improve cognitive performance.⁴⁵

Antioxidants are another mainstay of brain health foods and drinks, the theory being

that they could protect against neurodegeneration, thereby delaying cognitive decline.⁴⁶

Market research organisation Mintel highlighted ingredients for improved brain function as one of its top trends for 2023, but stressed the need for better evidence to win consumer trust.⁴⁷



“Consumers will look for food and drink that influence cognitive capacity, manage stress levels, and optimise brain function,” it said. “[...] But research will be needed to prove to consumers that the range of natural and functional ingredients from B vitamins to nootropics deliver on their cognitive health promises.

“New research and patents related to the gut-brain axis will create opportunities to highlight how the digestive health benefits of pro-, pre-, and postbiotics support cognitive health. These science-backed advancements will enable fibre-rich foods such as produce to shine.”⁴⁸

Joint health

Osteoarthritis is the most common joint health problem and affects about 7% of the global population, with 73% of sufferers aged over 55, according to the World Health Organization (WHO).⁴⁹ For those looking for natural relief, glucosamine and chondroitin – usually made from shellfish and bovine sources – have dominated the

space for decades, but research into their efficacy has been inconclusive.^{50,51} Studies looking at whether they can prevent arthritis from worsening have been similarly weak.⁵²

Consumers are becoming more aware of the need to take preventative action to prevent joint problems before they develop, including by maintaining a healthy weight and controlling blood sugar, as recommended by the WHO.⁵³

But while many consumers seek out supplements to help reduce pain and severity of joint problems after they appear, supplementation may also be part of a preventative approach.

Glucosamine may need further research, but has shown promise in conjunction with omega-3 fatty acids. German contract research organisation Analyze & Realize found that when taken with glucosamine, omega-3-rich extracts from New Zealand green lipped mussels helped reduce joint

pain associated with osteoarthritis more than glucosamine alone.⁵⁴

Collagen is among the most popular ingredients making inroads in the sector, and although research quality varies, most findings have been positive.⁵⁵ Researchers have suggested that collagen broken

down into peptides could help stimulate collagen production, but data proving this theory is scarce.⁵⁶ Nevertheless, it remains a hugely popular ingredient, with a compound annual growth rate (CAGR) of 8%, driven primarily by the joint health sector, according to Ken Research Analysis.⁵⁷

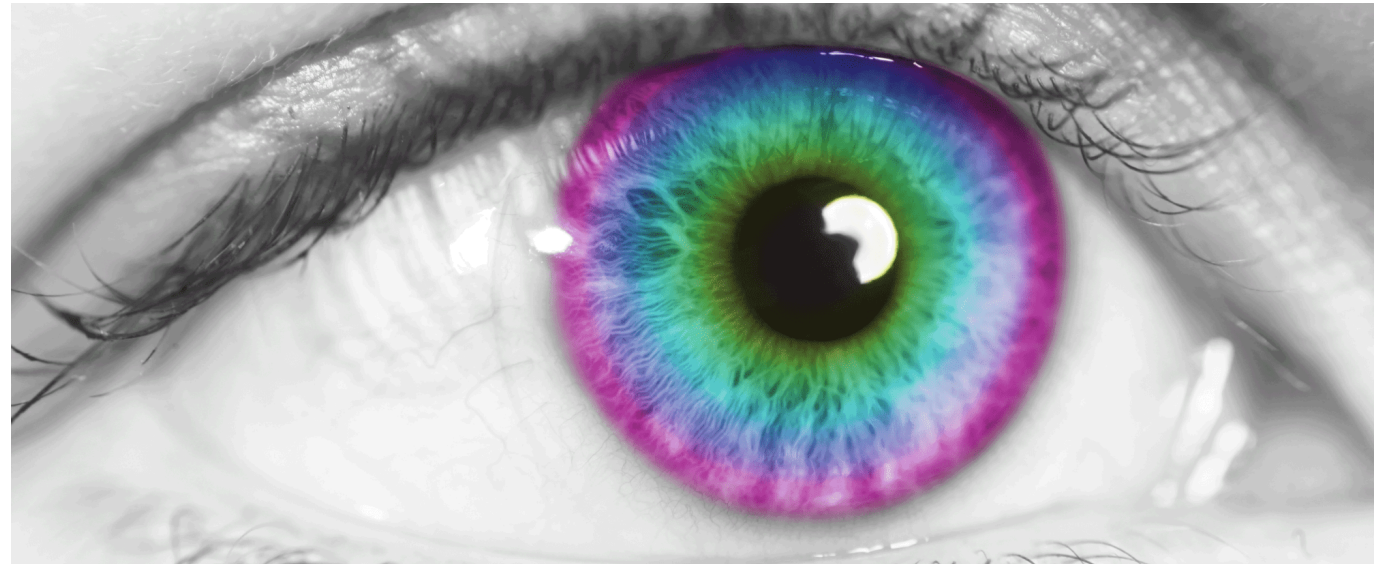
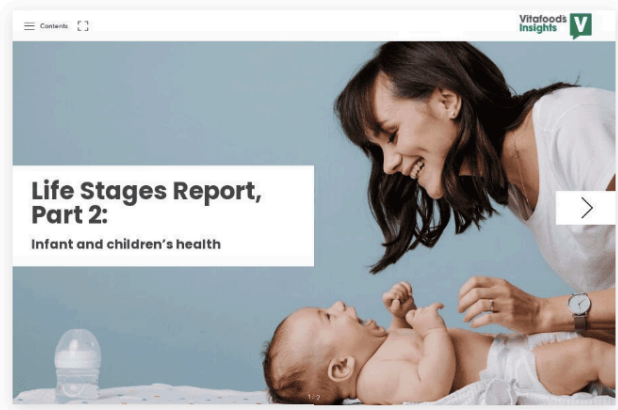


Another important segment for joint health includes traditional ingredients with a long history of use, including those used in Ayurvedic medicine, such as boswellia and turmeric (or curcumin), for their purported anti-inflammatory effects.⁵⁸

Eye health

Age-related macular degeneration (AMD) affects one in eight people aged 60-plus and is the leading cause of irreversible blindness in developed countries.⁵⁹ The carotenoids lutein and zeaxanthin are among the most well-known supplements

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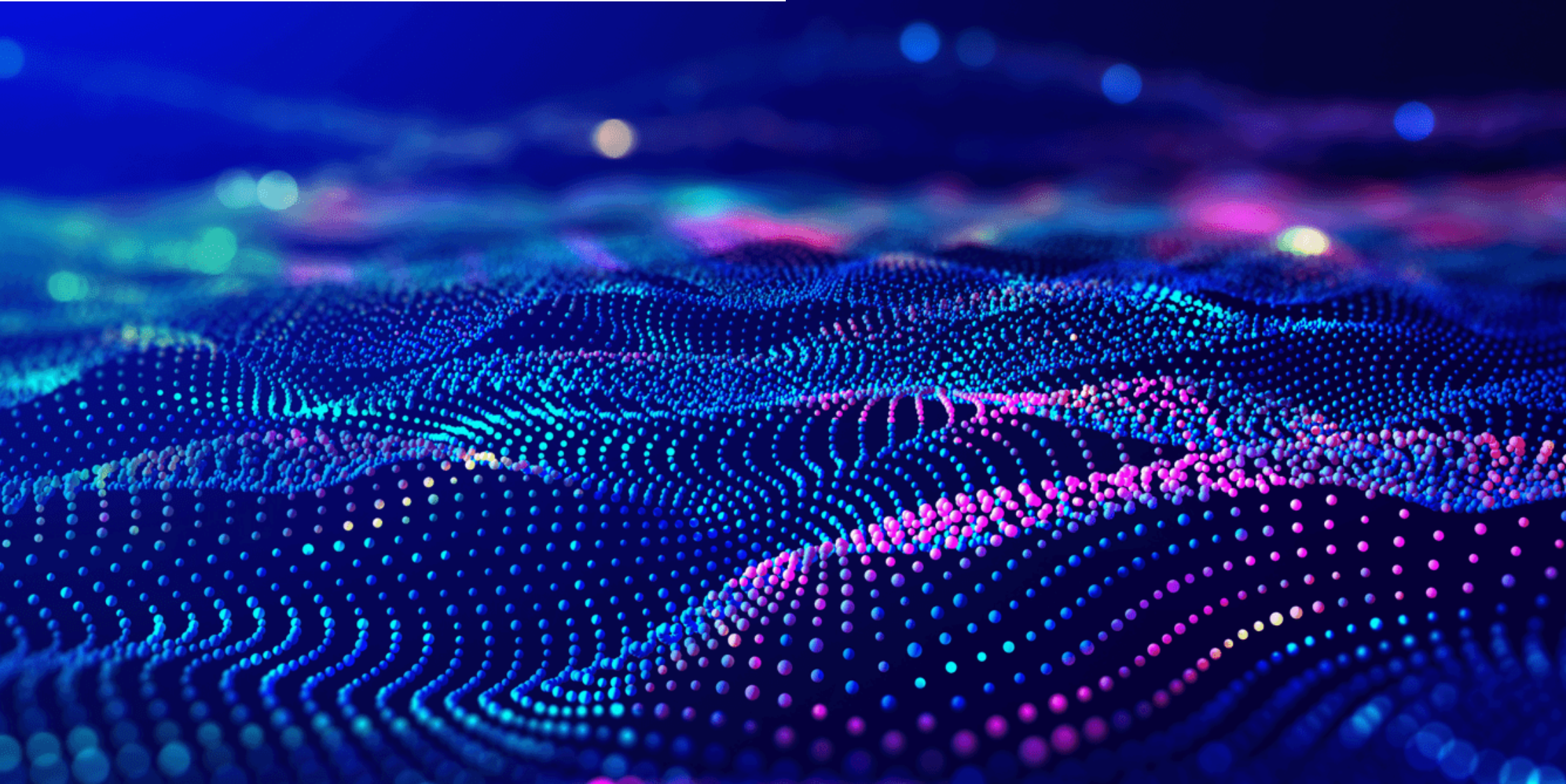
used to prevent AMD,⁶⁰ along with zinc and antioxidant vitamins such as A and D, but researchers suggest eating dark green, leafy vegetables should provide enough carotenoids to reduce AMD risk.⁶¹

Other age-related conditions that affect the eyes include dry eyes and cataracts. Research suggests omega-3 and omega-6 fatty acids could help improve dry eye symptoms,⁶² while antioxidants, including vitamins A, C, and E, carotenoids

lutein and zeaxanthin, and selenium could all help protect eye cells from damage that precedes cataracts.⁶³

That said, the American Academy of Ophthalmology advises against taking these ingredients in supplement form and instead to seek out antioxidant-rich foods and beverages. "Studies show that antioxidant supplements do not help prevent cataracts," it says. "Supplements may even be harmful."⁶⁴

Startups in the sector



Many of the startups targeting the healthy ageing sector are focused on rapid identification of age-related conditions. Artificial intelligence (AI) is proving to be a useful tool in the sector, allowing researchers to sift through thousands of data points and find important connections very rapidly.



Read more Tick tock: AI-powered ageing clocks to inform nutritional interventions

Spanish startup Exheus analyses gene expression to identify potential areas for improvement, looking at 22,000 genes through RNA sequencing and AI,⁶⁵ while Italian company Lightscience is developing a portable blood analysis system using AI as well as cloud computing.⁶⁶

Hong Kong-based Deep Longevity is using AI-powered ageing clocks to inform nutritional interventions. These use blood tests, epigenetic tests based on DNA methylation, and cognitive tests to help determine a person's biological age and detect age-related disease.⁶⁷

Romanian company Smart EpiGenetX has developed Nutricare, a digital nutrition platform based on nutrigenetic, microbiome, and screening tests to enable personalised prevention and treatment.⁶⁸

However, as revolutionary as many of these technologies may be, it is their application that holds the greatest potential for improving health as the

global population ages. Partnerships with established food and beverage companies are one way to bring such technologies to the broadest possible audience, especially as multinationals like Nestlé⁶⁹ and Unilever⁷⁰ have started to explore the potential of personalised nutrition.

Startups in the food sector are also targeting the healthy ageing market, from products specifically intended for menopausal women, such as MenoWell protein and energy bars,⁷¹ through to the Cambodian cereal company Bayon Cereal, which introduced three varieties of low-glycaemic rice specifically intended to address problems linked to diabetes prevalence in ageing populations.⁷²

In addition, a wide range of supplements targets the healthy ageing category, from those that address specific age-related health concerns, to those that aim to slow the biological ageing process itself, such as the DoNotAge supplement brand.⁷³



National strategies for healthy ageing

More than 100 countries across the globe have issued nutritional guidelines to help their populations better understand how and what to eat in order to remain healthy.⁷⁴

Usually, the emphasis is on health throughout the lifespan, but clearly they also are intended as navigational tools for consumers to reach their later years in the best possible health.

They vary according to cultural values, such as when and how people tend to eat, which foods are typical of that country, and those that are most likely to be over- or under-consumed.

On a national level, a handful of countries offer programmes specifically to help older consumers meet their nutritional needs. In the United States, the Older Americans Act (OAA) Nutrition Services⁷⁵ include several programmes, such as Congregate Nutrition Services, which provide meals for those aged 60 and over and their spouses



in senior centres, schools, and churches.⁷⁶ Its Home-Delivered Nutrition Services provide meal deliveries for older adults who have trouble leaving home or have certain health conditions, and the Child and Adult Care Food Program provides reimbursements for nutritious meals and snacks to older adults enrolled in daycare facilities.⁷⁷

Research has found that such services help boost energy as well as protein and

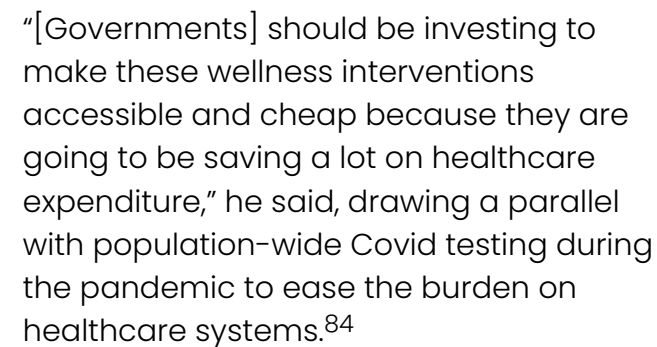
“[Governments] should be investing to make these wellness interventions accessible and cheap because they are going to be saving a lot on healthcare expenditure.”

Richard Siow, director of ARK,
King's College London

calcium intakes, and this improved nutrition leads to faster recovery from illness and helps maintain functionality in older adults.⁷⁸

Another notable example is South Korea, which recently amended its Food Code so foods manufactured to address certain nutritional concerns could be classified as “senior-friendly food” under a voluntary labelling scheme.⁷⁹

That might mean being easier to eat or digest, or having a nutritional profile specifically designed for this demographic.



Key takeaways



- **Younger consumers also are interested in ways to reach old age in the best possible health.**
- **There remains a large gap between longevity and healthy life expectancy.**
- **Understanding the ageing process requires data from the cellular to the societal level.**



- **Combining digital services, wearables, and at-home nutrient testing could give consumers personalised control of their health as they age.**
- **Gerobiotics – combinations of pre-, pro-, and post-biotics – are emerging as a tool to slow down the ageing process via digestive health.**
- **More research is needed to back ingredients' brain health benefits, as consumers increasingly look to nutrition for cognitive health.**
- **In the joint health space, emerging ingredients include omega-3 fatty acids, collagen, and those with a long history of use in traditional medicine.**
- **Carotenoids, healthy fats, and antioxidants are among the best ingredients for age-related eye conditions.**
- **Numerous startups are using cutting-edge technologies to provide personalised indicators of the ageing process.**
- **Government interventions to improve nutrition among the elderly have been shown to reduce malnutrition and improve functionality in older adults.**

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