

# Nutrition I-Mag

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AUTUMN 2026

## Health and hormones

A comprehensive guide to balancing hormones for health and wellbeing

## THE STRESS EFFECT

The far-reaching impact of stress and anxiety, and the supportive role of nutrition and lifestyle

## Immune strength

Recommended protocols to help build immunity



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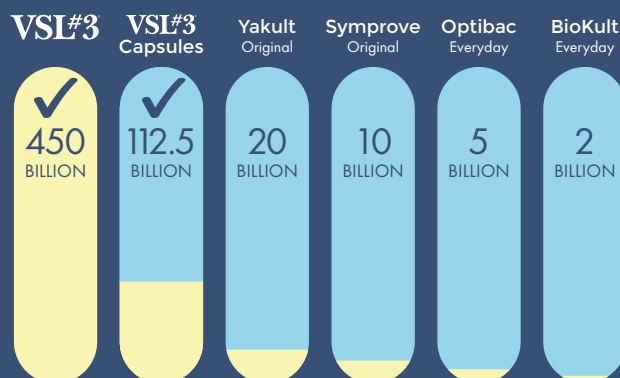


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UK-VSL3-2400033 | October 2025

1. DoxaPharma Research. Data on File, March 2022.

2. VSL#3 Clinical Summary, March 2023.

3. Vecchione A, et al. *Front Med.* 2018;5(59).

4. Based on companies websites accessed July 2024.

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# WELCOME



The statistics make for quite concerning reading when it comes to our stress levels in 2026; some nine in 10 adults report experiencing high or extreme levels of stress, with almost one in five facing it, worryingly, every single day. Furthermore, anxiety is now the most common mental health condition in the UK.

This makes for quite stark reading, especially when you consider the real and prolonged knock-on effect to so many areas of our health; indeed, this rise we have seen – which has certainly become more apparent in recent years, and particularly post-Covid – should be a collective cause for concern. Key to note is stress and anxiety management is an area of health in which nutrition can play a positive role, and the part of nutrition therapists, therefore, is hugely important.

And so in this issue of *Nutrition I-Mag*, we bring you a detailed guide to stress and anxiety, where a number of leading experts offer their insights into the modern-day factors that are making us more stressed, and the critical protocols that can support a client to manage the effects of stress and anxiety. [Click here](#) to read.

And don't forget that *Nutrition I-Mag* is certified by the British Association for Nutrition and Lifestyle Medicine (BANT) and the Naturopathic Nutrition Association (NNA) for self-directed CPD. All you need to do is read the magazine, and then head to our website, [www.nutritionimag.com](http://www.nutritionimag.com), where you will be directed to how to claim your points.

Finally, and remaining on the theme of education, you might be reading this while still on a summer break from your studies but that doesn't mean your learning has to stop. *Nutrition I-Mag's* sister magazine, *IHCAN*, hosts a regular educational podcast, featuring leading experts in the field on topics of relevance to today's practice. The podcast is free to listen to and can be found on all major platforms. If you want to learn more, [click here](#).



Rachel

RACHEL SYMONDS, EDITOR



## MEET THE TEAM

### EDITOR

Rachel Symonds  
[rachel.symonds@targetpublishing.com](mailto:rachel.symonds@targetpublishing.com)

### CONTRIBUTORS

Dr Miguel Toribio-Mateas, Maxime Maunand, Mike Wakeman, Will Jordan

### SALES & PUBLISHING DIRECTOR

Ruth Gilmour  
[ruth.gilmour@targetpublishing.com](mailto:ruth.gilmour@targetpublishing.com)

### KEY ACCOUNTS DIRECTOR

Abigail Hays  
[abigail.hays@targetpublishing.com](mailto:abigail.hays@targetpublishing.com)

### SALES MANAGER

Melissa Lamerton  
[melissa.lamerton@targetpublishing.com](mailto:melissa.lamerton@targetpublishing.com)

### DESIGN/PRODUCTION

Charlotte Weatherley  
[charlotte.weatherley@targetpublishing.com](mailto:charlotte.weatherley@targetpublishing.com)

### MARKETING DIRECTOR

James Rix  
[james.rix@targetpublishing.com](mailto:james.rix@targetpublishing.com)

### ACCOUNTS

Alison Barnes  
[alison.barnes@targetpublishing.com](mailto:alison.barnes@targetpublishing.com)

### MANAGING DIRECTOR

David Cann  
[info@targetpublishing.com](mailto:info@targetpublishing.com)

### NUTRITION I-MAG

Target Publishing Limited, The Old Dairy,  
Hudsons Farm, Fieldgate Lane, Ugley Green,  
Bishops Stortford CM22 6HJ

t: 01279 816300  
e: [info@targetpublishing.com](mailto:info@targetpublishing.com)  
[www.nutritionimag.com](http://www.nutritionimag.com)

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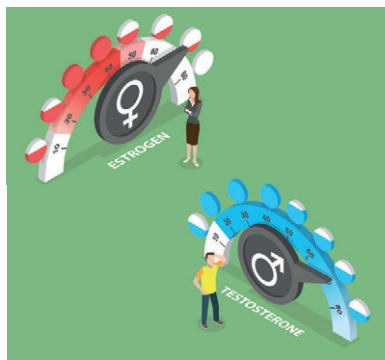
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# CONTENTS



## STRESS AND ANXIETY

Understand the wide-reaching effects of excess stress, and the nutritional support to offer clients



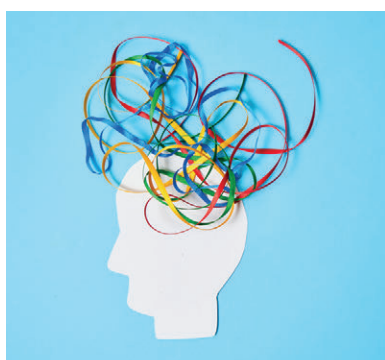
## HORMONE SUPPORT

An in-depth guide to managing hormone health, from a male and female perspective



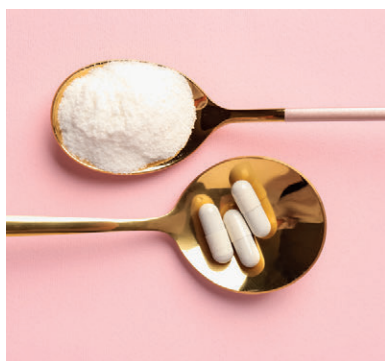
## THE ROLE OF THE IMMUNE SYSTEM

Experts discuss the impacts of a weak immune system on health, and the interventions to help strengthen it



## SPECIAL FEATURE

Dr Miguel Toribio-Mateos discusses ADHD and the critical role of nutrition



## INGREDIENT FOCUS

Detailed guidance around collagen and the correct recommendations to make in clinic

## REGULARS

### CONTRIBUTORS

The experts offering their insights this issue

### NEWS

The developments in the world of nutrition

### RESEARCH

We bring you up to date with the latest scientific news

### PRODUCT WATCH

What's new to market

### EDUCATION

Keep your education going with the *IHCAN* Podcast

### STUDENT PROFILE

We hear from a Nutritional Therapy student about their course experience and motivations

### ASK THE EXPERTS

Nutritional experts answer your questions

### COMPANY PROFILE

Invivo discusses its science-backed approach, and investment in sustainability

### RECIPES

Hugh Fearnley-Whittingstall shows us how to up our fibre

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|---------------------|------------|------------------------|
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| <b>22 September</b> | York       | York Medical Society   |
| <b>23 September</b> | Edinburgh  | Apex Grassmarket       |
| <b>6 October</b>    | Bristol    | Penny Brohn            |
| <b>20 October</b>   | Manchester | Manchester Art Gallery |

**All seminar times are 10.00-15:30 (registration opens from 09.30) unless specified on the booking page.**

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### CONFERENCE

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**WHEN:** Saturday 14 November | London | 9.15-17.30

**COST:** Early bird £99 until 26 October (£129 thereafter)



### HOW TO BOOK

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education@biocare.co.uk



# OUR CONTRIBUTORS

Each issue, *Nutrition I-Mag* enjoys contributions from many leading authorities in the nutrition world. This issue, our writers include:



**MAXIME MAUNAND**

is a qualified Nutritional Therapist, with over five years' experience in the health and wellness industry, and three years supporting practitioners and customers through their journey at BioCare. In his own clinical practice, Max has expertise in men's health, particularly prostate health, weight loss, cardiovascular health and aiding those on vegan and vegetarian diets.



**WILL JORDAN**

BSc (Hons) MSc, is a Nutrition Advisor at Viridian Nutrition. He holds a Master's degree in Sports and Exercise Nutrition, and a BSc in Food and Nutrition. Having worked in the NHS, Will has a hands-on approach in providing nutritional advice to a wide range of people.



**DR MIGUEL TORIBIO-MATEAS**

is a clinical neuroscientist, nutrition researcher and applied microbiologist. He holds a professional doctorate on the gut microbiome and mental health, an MSc in Clinical Neuroscience and a BSc (Hons) in Nutritional Medicine. He is a Chartered Biologist and Member of the Royal Society of Biology, an Honorary Research Fellow at Cardiff University's School of Psychology, and a Senior Lecturer in Nutrition and Public Health at the University of West London.



**MIKE WAKEMAN**

has master's degrees in pharmaceutical analysis, nutritional medicine, clinical oncology, healthcare provision and is completing a PhD into the impact medications have on micronutrient status. His research has been published in over 30 journals. He is member of the Royal Society of Medicine, and an expert NHS ethics committee member. He is Head of Science and Innovation at Evera Nutrition and creator of the Go Lean Plus Weight Management programme.



**CHRISTINE BAILEY**

MSc BSc (Nutrition), Dip IOPN is an award-winning Registered Performance Nutritionist, Breathwork Practitioner, and author. Christine is trained in Functional Nutrition through the Institute of Functional Medicine and the Institute of Performance Nutrition (IOPN) and is Education Manager at Metagenics.



**LISSI BUCHER**

(Lissi B Nutrition) is a Naturopathic Nutritionist, trained at the College of Naturopathic Medicine (CNM), with a special interest in perimenopause, weight loss and sport nutrition for youth and senior athletes. A former international competitor herself, she coaches alongside her nutrition work, and supports clients with complex health cases through a personalised, root-cause approach. Lissi trusts and recommends Invivo supplements as part of her client protocols.



# For women with Dry and sensitive skin and membranes

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# NEWS BITES

A round-up of the news from the natural health industry.

## ION leads tributes following the death of Heather Rosa

**T**he Institute of Optimum Nutrition (ION) had led tributes following the sad death of its Dean, Heather Rosa.

ION announced with great sadness that Heather had passed away on July 16, following a brief illness.

Leading a large number of tributes paid to Heather, ION wrote: "This has come as a huge shock to us all. Heather was a cherished member of the ION family and wider nutritional therapy community. She has made an extraordinary contribution to the quality of nutritional therapy education and had a profoundly positive impact on the profession. She will be greatly missed by everyone who had had the privilege of knowing and working with her. I am sure you will join us in remembering Heather for her passion, knowledge and enthusiasm, and for the lasting difference she has made to the nutrition community and to the lives of so many people."

ION has also announced that to honour Heather's life, it is inviting the community to take part in a Sunrise Walk.

"She truly understood the importance of our circadian rhythms and would often be up at sunrise soaking up the first light of the day. It was a simple daily ritual that reflected so much of what she believed in and shared with others," ION wrote.

The date for the Sunrise Walk is August 8, and the location is your favourite place to watch the sunrise.

Also paying tribute was the British Association for Nutrition and Lifestyle Medicine (BANT), which wrote: "The nutritional therapy profession has lost a passionate, positive, wonderful human being with the sad passing of Heather Rosa. The BANT team are devastated at her loss and send their heartfelt condolences to her family, friends and ION colleagues.

"Heather was a well-deserving BANT Honorary Fellow who by her own words was 'an all-rounder' with knowledge in health, training, education and nutritional therapy, all of which she put to good use from the start of our profession over 29 years ago till her unexpected passing. Her passion for



people, education and health was undiminished, and she continued her work with the same dedication and drive as always, despite teasing us with retirement. BANT is grateful for her recent attendance at the NED Science Forum where she proudly showcased posters from recent ION graduates, and for the more intimate moments shared at this year's IPM congress, just a few short weeks ago. It was in those personal interactions that Heather's true qualities shone through."

The tribute continued: "In addition to being a Dean at ION, Heather was a strong advocate of nutritional therapy and collaborated with BANT, NTEC and many other organisations to advance the professional recognition and reach of nutrition therapy. Heather was involved in the

setting of National Occupational Standards for nutritional therapy and the Nutritional Therapy Core Curriculum, both of which today set the foundation of our regulatory standards. She has supported hundreds (perhaps thousands) of students and graduates to enter the profession, championing each and every one of them, and has worked tirelessly with training providers and allied healthcare professionals to add nutrition to their skillset. Heather has left a legacy that will continue to positively impact our profession. We will greatly miss her enthusiasm, positivity, knowledge and no-nonsense approach to think outside the box as we have navigated our professional landscape together. We will miss Heather greatly."



## Dr John Briffa pens new book on burnout



A new book to help build energy, performance and productivity has been penned by well-known expert, Dr John Briffa.

*The Performance Prescription: The Science of Sustainable Success* is authored by Dr Briffa, a medical doctor and considered a leading wellbeing expert.

Packed with science-backed guidance on everything from nutrition, sleep, stress management and breathwork through to how exactly to best set up your workspace, *The Performance Prescription* is a toolkit for building energy, performance and productivity.

Built upon Dr Briffa's Four Fundamentals framework, *The Performance Prescription* delivers the latest science and actionable real-world strategies designed for even time-poor professionals to tap into:

- **Emotional regulation** – how to master emotions, stay sharp under stress, and perform under pressure.
- **Energy** – practical guidance on nutrition, exercise, sleep and breathing for all-day endurance and effectiveness.
- **Environmental design** – science-backed ways to engineer the workspace for greater wellbeing, focus, and output.
- **Execution** – proven strategies for decluttering the mind, working efficiently,

and boosting productivity.

*The Performance Prescription: The Science of Sustainable Success* is published by Pinnacle Press.



## Conference to examine lifestyle medicine in the community

A forthcoming conference is to explore the role of lifestyle medicine in community-based healthcare.

The British Society of Lifestyle Medicine (BSLM) will host its annual conference at the University of Warwick, which this year will look at how lifestyle medicine can support the delivery of neighbourhood health.

As neighbourhood health moves from ambition into implementation, attention is increasingly focused on the practical requirements for success. This includes developing workforce and individual patient's skills, evidence and partnerships needed to support behaviour change, connect people with community resources, and strengthen collaboration across health and care. To make this effective, delivering neighbourhood health will require collaboration across healthcare, social care, local authorities and community organisations.

From September 19-12, BSLM's conference, under the theme Living Well in Your Community, will bring together clinicians, researchers and healthcare professionals from across the UK.

Dr Frances Elliot, Chair of the BSLM, commented: "Our theme of 'Lifestyle Medicine: Living Well in Your Community' is more important than ever with the challenges being faced in the NHS at present. Health is created where people live and ensuring that we work with people where they live, connecting them to others who can support them live well is a key element of what you will hear about at conference on the first day."

## Regenerus Laboratories secures £8m investment

Regenerus Laboratories is to drive its growth strategy and expand its diagnostic testing platform after securing £8m of investment.

The UK-based diagnostic health testing company has secured £8m to accelerate operational and market expansion and strengthen its diagnostic platform. The funds consist of £5m equity investment from Foresight Group and a £3m R&D grant from Scottish Enterprise.

The combined £8m will drive Regenerus's growth strategy across four key areas: strengthening of core offerings; expansion into the medical doctor market; advancing international logistics capabilities; and commercialising the digital platform. The fulfilment of these objectives will occur through new laboratory partnerships, early-stage detection testing, and further optimisation of the platform to deliver more powerful, evidence-based clinical reporting.

The round was led by Foresight Group, a leading regional private equity and real assets investment manager, which invested the £5m in equity to grow the business. Alongside this, the £3m grant came from Scottish Enterprise, Scotland's national economic development agency, which supports innovative businesses to grow and scale. Scottish Enterprise's involvement will specifically support the build-out of Regenerus's diagnostic platform, as well as research and development focused around the company's Edinburgh-based research centre.

Prof Ben Thomson, Chairman and Co-founder of Regenerus Laboratories, commented: "This investment marks a pivotal moment for Regenerus. With Foresight as an institutional

equity partner, coupled with grant support from Scottish Enterprise, we have the resources to scale decisively and drive the industry forward. We believe advanced diagnostic testing is a critical part of solving the increasing pressure on secondary care. This funding allows us to put better testing, better data and better clinical insights into the hands of more practitioners, so they can keep their patients healthier for longer."

At a time when the burden on healthcare services continues to grow, Regenerus is positioned to equip practitioners with preventative and robust tools that focus on enabling detection at the earliest stage and root cause intervention. Integral to this mission is 'Find A Practitioner', a platform feature that connects individuals with qualified professionals. Bridging the gap between functional testing and care, Find A Practitioner ensures individuals have the expert support required to understand complex health results and turn them into insights for better health.

Katie Gilmartin, Investment Manager at Foresight Group, added: "We're pleased to back the Regenerus management team at this stage in their journey. The business has a strong position in the functional health diagnostics testing market, improving access and connectivity across the ecosystem through education, scientific rigour and technological innovation. Regenerus has a clear vision for the future of advanced diagnostics, with healthcare professionals at the heart of its model and a strong focus on improving patient outcomes. We look forward to supporting the team as they scale the platform and deepen their impact across the sector."



# IN RESEARCH

*Nutrition I-Mag* rounds up the latest research studies in the nutrition world.

## Multinational study concludes exercise improves long-term effects of GLP-1

A major new study has revealed that exercise improves the long-term benefits of GLP-1 drugs.

As GLP-1 medications transform obesity treatment, the multinational research has found that pairing GLP-1 therapy with regular structured exercise could help improve long-term health outcomes, reduce downstream costs, and generate positive economic returns across multiple countries.

The white paper, *From Weight Loss to Lasting Value: Structured Exercise and the Economics of GLP-1 Therapy*, examined whether structured exercise can improve the long-term clinical and economic value of GLP-1 treatment. Developed by FTI Consulting's Center for Healthcare Economics and Policy, it compared the impacts of GLP-1 therapy as a standalone obesity treatment with GLP-1 therapy combined with exercise.

In partnership with a multinational coalition of fitness sector organisations, the analysis used a health-economic model adapted across Australia, Canada, New Zealand, the UK, and the United States. Across all five countries studied, the analysis found that a combined approach supports improved long-term health outcomes, reduced healthcare costs, and produced positive economic returns.

Combining regular exercise with GLP-1 therapy is estimated to generate around:

- **United Kingdom:** £2.7bn in economic and societal value over 10 years and a 164 per cent return on investment, rising to 717 per cent and £13bn over 30 years.
- **United States:** US\$120bn in economic and societal value over 10 years and a 496 per cent return on investment, rising to 1,572 per cent and US\$393 bn over 30 years.
- **Australia:** A\$182m in economic and societal



value over 10 years and a 59 per cent return on investment, rising to 457 per cent and A\$1.4bn over 30 years.

Compared with medication alone, the study found adding structured exercise to GLP-1 therapy can help preserve muscle during weight loss maintain strength, mobility, and bone health, keep more weight off over time, reduce weight regain after stopping medication, and lower the risk of costly health events later on. Consequently, ukactive, the Health & Fitness Association, the HFA Foundation, AUSactive, Exercise New Zealand, Fitness Industry Council of Canada are calling on policymakers, payers, and healthcare systems to integrate structured exercise into GLP-1 treatment pathways. Specifically, to recognise structured exercise, including strength training, as an essential part of obesity care, embed exercise support into GLP-1 care models, build referral pathways between healthcare providers and qualified exercise professionals and fitness facilities, and support patient access to qualified exercise professionals and fitness facilities.

Cameron Saunders, CEO of ukactive, commented: "The evidence is clear and the bill for inaction is one that health systems cannot keep picking up."

## Study finds shift to low carb/high protein, but fibre remains low

A new study examining UK diets has concluded that Brits have shifted to higher protein, lower carb diets, but fibre intake remains too low.

Writing in the *British Journal of Nutrition*, researchers explained that the prevalence of overweight and obesity in adults is increasing worldwide. Food portion size (PS) is an important environmental determinant of energy intake (EI) and may contribute to the obesity epidemic. However, UK evidence on the typical PS of commonly consumed foods in adults and how these may have changed over time is limited. And so, using combined data from Years 1-4 (2008/2009-2011/2012) and Years 9-11 (2016/2017-2018/2019) of the National Diet and Nutrition Survey (NDNS), the researchers examined trends in the PS of commonly consumed food groups over the last decade among UK adults.

It was found there was significant increases in both consumption frequency and PS were observed for pasta, rice and pizza, eggs, oils and spreads, vegetables, fruits, nuts and seeds and low-calorie carbonated/soft drinks. In contrast, bread, potato and potato products, condiments, and fruit juice and smoothies showed significant decreases in both frequency and PS. Divergent patterns were also evident: red meat showed increased frequency but reduced PS, while white meat and fish increased in frequency without significant changes in PS. Changes in PS alone were identified for milk and milk products, processed meat, alcoholic drinks and total beverages.

Although fibre intake increased, recommendations are still not being met. There was no clear evidence that overweight or obese individuals consumed greater PS than those with normal weight.

"These findings highlight changes in food patterns among UK adults over the past decade and the importance of continued monitoring," the study concluded.



## Saffron study confirms ability to support mood

Researchers have revealed that saffron could help improve mood and self-esteem in menopausal and post-menopausal women.

The results of the new trial found that low-dose saffron extract could help mitigate the interconnected challenges of low-mood, poor sleep, and low self-esteem.

The new clinical study of Affron, the natural saffron extract developed by Pharmactive Biotech Products, SLU, demonstrated positive effects on mood, sleep, and self-esteem in menopausal and post-menopausal women.

Published in the journal, *Frontiers in Nutrition*, the randomized, double-blind, placebo-controlled trial led by Adrian Lopresti, PhD enrolled 86 women aged 50-70 experiencing low mood and poor sleep. Participants were randomly assigned to receive either 28mg of Affron saffron daily or an identical looking placebo. They completed a series of validated self-report questionnaires before, during, and after the program to evaluate changes in mood, sleep, self-esteem, and physical appearance.

Nearly twice as many women responded to Affron compared with placebo. Following 12 weeks of supplementation, nearly half of the women taking Affron met the study's responder criteria for improvements in scores on the Depression, Anxiety and Stress Scale – Depression Subscale (DASS-D). This was almost double the proportion of responders observed in the placebo group (25.6 per cent), with improvements beginning to appear after only four weeks. The Affron group also experienced a 50.7 per cent reduction in low mood scores overall, compared with 31.9 per cent in the placebo group.

The study also explored whether Affron could influence areas closely



connected to emotional wellbeing, including self-esteem, sleep, and perceived appearance. Women taking Affron showed a 10 per cent improvement compared with 4.8 per cent in the placebo group.

"For this study, we focused on menopausal and post-menopausal women, as this is a period associated with increased vulnerability to mood disturbances, impaired sleep, and accelerated facial ageing," commented Adal Mena, R&D Scientist and Product Specialist for Affron "This is the first clinical trial showing that Affron can positively impact three closely connected aspects of wellbeing: mood, self-esteem, and the daily impact of poor sleep. The findings reinforce the need for holistic approaches to emotional wellbeing, and in addition positions Affron at the intersection of emotional wellbeing, healthy ageing, and beauty-from-within solutions."

## Study finds gaps in nutrition knowledge during pregnancy



Structured communication around nutrient supplementation during pregnancy is needed, according to a new study.

Researchers, writing in the *Nutrients* journal, carried out a study to ascertain whether pregnant women and healthcare professionals share consistent knowledge, beliefs, and supplementation practices.

Two parallel cross-sectional surveys using identical core items were conducted at a German tertiary care centre between April and November 2024. Pregnant women and healthcare professionals who initiated the survey completed anonymous QR-code-based questionnaires assessing

micronutrient-related knowledge, perceived dietary adequacy, and supplementation practices or recommendation patterns.

The results revealed that healthcare professionals demonstrated higher knowledge levels across most micronutrients. Knowledge gaps were most pronounced for vitamin B12, with 53 per cent of pregnant women unable to identify any foetal effect compared with 20 per cent of providers. Beliefs about dietary sufficiency were broadly aligned for folic acid and vitamin D, but diverged markedly for vitamin B12, where 79.2 per cent of providers considered dietary intake alone adequate compared with 47.3 per cent of pregnant women. Substantial differences were observed between patient-reported supplementation practices and provider-reported recommendation patterns: vitamin B12 (70 per cent vs. 3.8 per cent), vitamin D (76.2 per cent vs. 41.3 per cent), omega 3 fatty acids (76.2 per cent vs. 47.5 per cent), and folic acid (98.5 per cent vs. 81.3 per cent).

The internet was the most frequently cited information source among pregnant women (89.4 per cent), while healthcare professionals reported using both scientific literature (75 per cent) and internet-based resources (76.3 per cent), the latter primarily for accessing professional and scientific information.

In conclusion, the researchers said: "Substantial patient-provider differences in micronutrient knowledge, beliefs, and supplementation practices persist even within a highly educated population at a tertiary care centre. These findings suggest potential differences between patient-reported supplementation behaviour and provider-reported recommendation practices, particularly for vitamin B12 and vitamin D. These findings suggest that more structured communication regarding micronutrient supplementation during pregnancy is needed."



# NEW TO MARKET

*Nutrition I-Mag* brings you the latest product developments in the nutrition world.

## High fibre at Wild Nutrition



As awareness grows around the importance of fibre, Wild Nutrition has launched a new targeted supplement.

High Fibre Plus is designed to address significant market opportunity, as 96 per cent of UK adults fail to meet recommended fibre intake. Yet the evidence shows that plant fibre diversity is key to a more diverse and resilient gut microbiome, aiding the trillions of beneficial bacteria to produce the short-chain fatty acids (SCFAs) that are crucial not just for gut health, but robust immunity, cardiovascular health and long-term metabolic wellbeing.

High Fibre Plus delivers seven diverse plant fibres and 6g of fibre in every serving. It combines low FODMAP certified ingredients, UK-first NatureKnit, a fruit and vegetable fibre matrix, and Sunfiber partially hydrolysed guar gum (PHGG), sustainably harvested from guar bean seeds alongside organic ginger and seaweed-derived calcium.

The formulation has been developed to support both gut microbiome diversity and everyday energy with fibres that come complete with essential vitamins and minerals and fibre-bound polyphenols, all while providing gentler support than commonly used isolated fibres such as psyllium and inulin, which can cause digestive upset.

Isabelle Nunn, Head of Nutrition Science & Formulation at Wild Nutrition, commented: "In the thousands of consultations we hold each month, it's evident that many people are seeking simple, effective ways to improve their gut health, but struggle to find the right support. High Fibre Plus was carefully formulated with rigorously researched ingredients to support digestion and energy levels while being kind on digestion."

## Invivo drives sustainability with new packaging

As part of Invivo's commitment to sustainability, the brand has launched new packaging.

Invivo's Bio.Me Prebio PHGG Fibre Pouch has had a refresh. The format of both tin and pouch is a keep-and-refill system, a tin you hold onto, paired with a lightweight pouch you replace. The pouch is made from paper, plant cellulose and biopolymer corn starch. It's certified to break down in an industrial composting facility, rather than landfill.



It isn't the first time Invivo has rethought its packaging, having started with glass, and then moving to tin based on how much energy travels with every extra gram of weight – especially important for larger pack formats.

## Creatine launch for BioCare

Pure Creatine Monohydrate is the latest addition to the portfolio at BioCare.

Designed as a simple, effective way to support strength, power and performance, each serving of the new supplement provides a high 5g dose of premium micronised creatine, scientifically proven to enhance physical performance during short bursts of high-intensity exercise and support muscle strength when combined with resistance training.

With 99.9 per cent purity verified by independent, third-party testing and made with no unnecessary additives, the advanced micronised form mixes easily into any hot or cold drink, offering superior solubility and convenience, and is suitable for vegetarians and vegans.



## Gummy launch for Nourished



A supplement brand has launched three new gummies as part of an expanded range.

The personalised nutrition brand has launched the new Creatine+ Range, a collection of three science-backed gummies tailored to support different health, wellness and performance goals.

The launch marks Nourished's entry into one of the fastest-growing categories in health and wellness, as creatine continues to gain popularity beyond traditional sports nutrition circles and among a broader audience seeking support for

energy, cognitive performance, recovery and healthy ageing.

Developed using Nourished's patented advanced manufacturing technology, each product delivers a precise daily dose of 3g creatine monohydrate through a convenient gummy format, while combining additional functional ingredients tailored to specific wellbeing goals.

The range includes Creatine Mind, formulated with 3g creatine monohydrate with citicoline, zinc and B vitamins to support cognitive function, mental clarity and psychological performance, and Creatine Strength, with 3g creatine monohydrate with HydroCurc curcumin, vitamin D3 and K2 to support muscle function, physical performance and bone health. Finally, there is Creatine Energy, featuring natural caffeine with B vitamins and creatine to support energy-yielding metabolism and help reduce tiredness and fatigue.

The range is delivered in Nourished's signature sugar-free gummy format.

## FERMENTED GREEN PAPAYA ENZYME SINCE 1969

Fermented Green Papaya Enzyme is a 100% natural, raw fermented food. It is plant-based, gluten-free, non-GMO, and contains no additives. Backed by 130+ scientific studies, it is Japan's best-selling green papaya supplement. It helps reduce oxidative stress, rebalance the microbiome, and support heavy metal detoxification. As a result, many of our customers have shared testimonials about improvements in psoriasis, eczema, acne, and rosacea. Our products are suitable for both children and babies. The combination of oral intake and topical application (using a spray made from the granules or tablets) can be particularly beneficial for healthier skin.

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NaturesPlus Magnesium Glycinate is a highly bioavailable form of magnesium which also supplies glycine, an amino acid with its own benefits that works alongside magnesium to help reduce tiredness, support psychological function, muscle function and so much more. NaturesPlus Magnesium Glycinate is easy on the stomach, can be taken during daytime or night-time, and provides you with 210mg of elemental magnesium per serving as 100% purely magnesium glycinate with no magnesium oxide addition.

[www.naturesplus.com](http://www.naturesplus.com) - £17.95 for a 30-day supply or £ 32.45 for a 60 days supply



## RESTORFLORA™ SPORE + YEAST PROBIOTIC

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## WILD NUTRITION HIGH FIBRE PLUS

Introducing new High Fibre Plus: An innovative 7-in-1 blend of plant sources backed by over 60 scientific studies. Expertly formulated with organic ginger and seaweed-derived calcium for energy and digestive support, it delivers 6g of insoluble and soluble fibre in every serving. Packed with leading low FODMAP certified ingredients, UK-first NatureKnit® - a unique fruit and vegetable matrix, and rigorously researched Sunfiber® - a partially hydrolysed guar gum (PHGG), sustainably harvested from guar bean seeds. All carefully selected for their slow fermentation profiles for easier digestion. Because digestive health underpins whole-body health.

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## BONEBALANCE™ BUILDS STRONG, FLEXIBLE BONES

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- Features enzymes that are involved in the digestion of protein, carbohydrate, fat, and fiber and lactose

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# Stay ahead with *IHCAN's* Podcast

Continue your learning with the help of the *IHCAN* magazine Podcast.



Access high-quality, professional education to support your studies with the *IHCAN* magazine Podcast.

Target Publishing, publisher of *Nutrition I-Mag*, also publishes *Integrative Healthcare & Applied Nutrition* magazine, better known as *IHCAN*, and as part of the magazine's ongoing commitment to education, it now also produces the *IHCAN* Podcast.

Launched in 2023, the podcast brings together the expert education, practical insights and thought-provoking discussions that readers have come to expect from *IHCAN*, in a convenient audio format that fits around your day. Hosted by Nutritional Therapist, Kirsten Chick, each episode features engaging conversations with leading clinicians, researchers, educators and industry experts.

Whether you're commuting, exercising, walking the dog or simply taking a study break, the podcast allows you to access

high-quality professional education wherever and whenever it suits you. Episodes typically run for around 45 minutes, making them accessible while still offering the depth needed to provide genuine clinical value.

## A range of topics

The podcast covers a broad range of topics relevant to modern practitioners, including gut health, personalised nutrition, autoimmune conditions, circadian health, women's health, functional medicine, mental wellbeing and much more. Recent guests have explored subjects such as personalised prebiotics, alopecia areata, circadian alignment and emerging approaches to patient care. Recent episodes include:

- Timing Is Everything: The Science of Circadian Alignment.
- Alopecia Areata Uncovered: Key Tools, Tests & Finding Joy.

- Omega-3s in Practice: Health, Conversion and Sustainable Choices.
- Cracking the Code on Chronic UTIs.
- Working with Kryptopyrroluria (KPU).
- Nutrigenomics in Practice.
- Autism and ADHD – The First 1000 Days.

Guests have included VJ Hamilton, functional medicine practitioner and recipient of the Nutrition Network's Most Inspirational Practitioner award, presented by *IHCAN*, Circadian Nutritionist, Adriano dos Santos, Naturopath, Lucinda Miller, nutrigenomics practitioner, Anne Pemberton, and many, many more.

With more than 35 episodes already available and new content added regularly, there is a wealth of expert knowledge waiting to be explored. Listen free via Spotify, Apple Podcasts, at [ihcan-mag.com/podcast](http://ihcan-mag.com/podcast), or find us in all the usual podcast places by searching **IHCAN** magazine.

# Think you're underhydrated? Your gut probably noticed first

Share these digestible microbiome insights with your clients.

Whether you have a client training for a Hyrox, playing padel, chasing a new PB on their morning run, or simply trying to survive a packed summer social calendar, most think about hydration in fairly simple terms: move, sweat, drink water. But there's more to hydration than just feeling thirsty.

Beyond helping us perform physically, adequate hydration influences digestion, cognition, skin health, energy levels, and recovery. Even relatively mild fluid deficits of around one-two per cent of body mass can impair concentration, mood, reaction time and exercise performance, often before thirst becomes a reliable signal.<sup>1</sup>

Summer creates the perfect conditions for underhydration. We sweat more, travel more, exercise more, and often drink more alcohol, meaning the body has to work harder to maintain fluid balance.

## The gut-skin connection

Luckily, our bodies often provide their own clues. Often referred to as 'the mirror to the gut', the skin can act as a useful indicator of hydration status. Increased sensitivity to sun exposure, dullness, more noticeable creases around the eyes, or skin that suddenly feels tighter and less resilient can all be signs that fluid levels are out of balance.<sup>2</sup>

## Discover Invivo's NEW Bio.Me Travel Gut Bundle

Your gut notices when you travel, so it can be a great idea to nurture a resilient gut microbiome – before, during, and after travel with these two clinically researched supplements combined – Bio.Me Saccharomyces boulardii and Bio.Me Prebio PHGG.

• Find out more about the bundle at

[www.invivohealthcare.com/travelbundle](http://www.invivohealthcare.com/travelbundle)



While ageing, UV exposure and natural collagen decline all play a role, underhydration can exaggerate these effects by impairing skin barrier function and elasticity.<sup>3</sup>

The gut-skin axis describes ongoing communication between the digestive system, immune system, microbiome and skin. When gut barrier function becomes compromised, inflammatory compounds can circulate more freely throughout the body, influencing skin barrier function, recovery and sebum production.<sup>4</sup>

Your skin isn't necessarily the problem – it's often the messenger, telling you what changes are occurring much deeper within the gut.

## The gut's role in hydration

Emerging research suggests hydration status may directly influence the gut microbiome, the trillions of microorganisms living within the digestive tract that help regulate digestion, immunity, metabolism, and inflammation.<sup>5</sup>

## Getting the foundations right

Good hydration isn't simply about drinking more water. The gut plays an important role in how efficiently the body absorbs and utilises fluids, making the microbiome an often-overlooked part of hydration. Think of it like watering a lawn: the water matters, but so do the soil conditions that allow everything to thrive.

Polyphenols – plant compounds found in berries, cacao, coffee, green tea, herbs, spices, pomegranate, grapes and extra virgin olive oil – have been shown to interact closely with the microbiome. Research suggests they can help support beneficial bacteria, short-chain fatty acid production and gut barrier integrity.<sup>6</sup>

Alongside supporting gut health, maintaining fluid balance remains essential. Rather than waiting until you're thirsty, try to drink water consistently throughout the day, particularly after exercise, travel, alcohol consumption, or long periods in the heat.

Whether your goal is sharper focus at work, better recovery after training, healthier-looking skin or simply feeling more energised through the summer months, hydration remains one of the most important foundations of health. Increasingly, research suggests that hydration, gut health, and skin health are intrinsically connected.

## ABOUT THE EXPERT

Lara Mills is an experienced writer who runs Human Copywriting. She has a background in health and wellness and prepares content for the supplement brand, Invivo.



# STUDENT LIFE

In a series of features, we hear from students as they progress through their Nutritional Therapy studies. This issue is the turn of Olivia D'Silva, who explains what inspired a move from working in tax to pursue a career in nutrition.



## Q CAN YOU TELL US ABOUT YOUR CURRENT STUDIES?

I am studying the Graduate Diploma (Grad Dip) in Integrative Functional Nutrition at the Institute for Optimum Nutrition. I am in my final year of the two-year, part-time, Grad Dip course, although I decided to double up on modules so that I could complete my studies while on maternity leave.

## Q WHAT WAS YOUR CAREER BACKGROUND PRIOR TO THIS?

I've worked in tax consultancy for over 10 years, starting at a big four accountancy firm in London and then moving to New York for three years. I've been back in London for the last few years as part of the in-house tax team at a multinational e-commerce tech company.

## Q WHAT INSPIRED YOU TO STUDY NUTRITION?

I studied Physiology BSc (Hons) at Bristol University, so I've long been interested in how the human body works. Over the years, this developed into a deeper interest into the therapeutic effects of nutrition and lifestyle, particularly how more traditional approaches compare to modern ways of living, which was also influenced by my Goan/Indian heritage and exposure to Ayurveda.

My own health experiences played a role, where conventional medicine approaches did not fully address what I was going through. About a year after moving back to London, it felt like the right time to look at this again in a more structured way. I made some changes to my own diet and lifestyle, which had a really positive impact on my health. I also became a Board Trustee for the charity, Mind Over Mountains, which combines walking in nature with professional support for mental health wellness. I finally decided to make the investment in my own learning and applied for the Grad Dip to become a qualified Nutritional Therapist.

## Q HOW DID YOU DECIDE ON THE COLLEGE TO STUDY WITH?

Having already studied physiology and with a newborn, the two-year, part-time Grad Dip was the right pace for me. I researched various courses and institutions, but ION stood out for its functional medicine approach, blending evidence-based learning and clinical training. It's also a robust and well-respected qualification within the field.

## Q WHAT HAVE YOU ENJOYED ABOUT THE COURSE SO FAR?

I've really enjoyed the systems-based approach for each module. The case study assessments have been valuable in developing how to approach a real-life client. It has been particularly interesting to discuss topical and sometimes controversial areas, such as seed oils and the new American food pyramid.

## Q AND WHAT HAVE YOU FOUND CHALLENGING?

Balancing pregnancy, a newborn and the transition into motherhood alongside studying has been challenging and there have been times where I felt I'd taken on too much. On the flip side, it has also been extremely rewarding. It has required a lot of discipline and organisation, as well as compromise at times. I'm really grateful for the support from my family, who have been incredibly encouraging (and very good at dropping round snacks!), which made a huge difference.

## Q IS THERE ANYTHING YOU WISH YOU'D KNOWN BEFORE YOU STARTED STUDYING THAT YOU COULD ADVISE OTHER STUDENTS ON?

I probably underestimated the intensity in the lead up to assignment deadlines but some weeks at the start of each module were quieter than I expected. The course is a rigorous qualification – and rightly so, particularly at a time when misinformation can spread easily

without being backed by research. It takes time to get into the rhythm of things and back into a structured learning environment, but it does become more manageable.

## Q WHAT ARE YOUR GOALS WHEN YOU FINISH YOUR STUDIES?

When I'm qualified, I would love to open up a part-time clinic. I'm particularly interested in ancestral approaches to nutrition and lifestyle, so I can see that influencing the direction I take. I've started to look into other avenues alongside practice, such as hosting a podcast, developing a cookbook based on ancestral nutrition and lifestyle principles, and contributing to health and wellness content from a nutrition perspective. I enjoy attending health and wellness conferences in London, which are a great way to meet like-minded people, discover brands and hear the latest research from experts in the field. There's always so much positive energy at these events, which is really motivating.

## Q DO YOU HAVE AN AREA YOU WOULD LIKE TO SPECIALISE IN? IF SO, WHY?

My main area of interest is in ancestral living nutrition and lifestyle principles, and health considerations linked to this can be quite broad!

## Q WHAT ADVICE WOULD YOU GIVE TO STUDENTS AS THEY ARE STARTING THEIR COURSE?

Studying nutritional therapy has been both challenging and fulfilling. For anyone starting, I would say be prepared to put the work in and make the most of the community around you. It makes a big difference, and the knowledge sharing is invaluable. I'm always happy to answer any questions about studying nutritional therapy – you can find me on Instagram at [@oliviadsilvanutrition](https://www.instagram.com/oliviadsilvanutrition).

■ If you are a student and would like to share your story, we would love to hear from you. Email [rachel.symonds@targetpublishing.com](mailto:rachel.symonds@targetpublishing.com) to be featured in a future issue.

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# Stress and anxiety – advice and interventions

Often described as a ‘modern epidemic’, stress and anxiety are having concerning effects on our collective health. Here, the experts discuss the supportive role of nutritional therapists.

In an ever-increasing climate of stress and anxiety, people have become accustomed to living in a constant state of fight or flight. But this is having concerning effects on our collective health; heightened stress, especially over a prolonged period, affects a whole host of body systems, and, worryingly, raises our risk of some serious health issues, not to mention leaving us nutrient depleted.

Putting the scale of the problem into perspective, Hannah Trueman BHSc, mANP, mGNC, Clinical Nutritional Therapist at Wild Nutrition, commented: “Stress and anxiety are a modern epidemic, and most of the people we speak to are struggling with them to varying degrees. Statistics indicate that nine in 10 adults report experiencing high or extreme levels of stress, with almost one in five facing it every single day. Persistent stress and the constant physiological pressure it places on the body can contribute to systemic disruption. In terms of our health, there isn’t really a system or process in the body that isn’t impacted by it in some way. When we are chronically flooded with stress hormones, the effects are multisystemic and our entire biology pays the price.”

Christine Bailey Nutrition Education Manager at Metagenics UK and Ireland, added: “Anxiety is now the most common mental health condition in the UK, and the trend is moving in the wrong direction: ONS data show 22.6 per cent of adults reported high anxiety levels at the end of 2024, more than one in five and higher than at any point in the five years before the pandemic. Stress, meanwhile, is close to universal as a lived experience, even where it does not meet clinical thresholds for an anxiety disorder, and the two overlap substantially in practice.

“We see this play out in hormone-related presentations too: a 2026 study of college-aged women found that 32.9 per cent reported clinically relevant PMS symptoms, with perceived stress the single strongest predictor of severity (Zeng et al., *BMC Nursing*, 2026), a useful reminder that stress and hormonal symptoms

are often the same underlying picture viewed from two different angles, rather than separate problems. In clinic, it is now rare to see a client, across almost any presenting complaint, where stress or anxiety is not a meaningful contributing or maintaining factor, which is exactly why I think it deserves to be assessed as routinely as diet or sleep in any nutritional consultation.”

Lindsay Powers, Nutritional Therapist and Head of Nutrition at Good Health Naturally, also advised: “Stress and anxiety are extremely common in the UK and appear to be becoming more prevalent. According to the latest Adult Psychiatric Morbidity Survey, around 22.6 per cent of adults aged 16 to 64 in England are living with a common mental health condition, such as anxiety or depression, up from 18.9 per cent in 2014. Young adults are particularly affected, with around one in four 16- to 24-year-olds now meeting the criteria for a common mental health condition.

“Stress levels are also high. Surveys suggest that almost three-quarters of UK adults have felt so stressed at some point during the past year that they felt overwhelmed or unable to cope. Women consistently report higher levels of both stress and anxiety than men. In 2022/23, 37.1 per cent of women reported high levels of anxiety compared with 29.9 per cent of men.”

And why are we seeing such high rates of stress and anxiety?

Keri Briggs, Senior Brand Specialist at Lamberts, advised: “Both stress and anxiety appear to be on the increase and several factors such as Covid-19, the cost-of-living crisis and world events may be to blame for some of this rise. A study in 2020 found that the same group of adults felt more stress in the 2010s than they had in the 1990s. This may also be due to increasing responsibilities and worries as we move into middle age. Increases in technology and changes in working from home have made it more difficult for many people to maintain a sensible work/life balance. We tend to connect less with nature and are exposed to higher levels of both noise and environmental pollution, which can all increase stress.”





Trueman continued: "This is a growing problem. Changes in society and family dynamics, increasing pressure on women to do it all, financial pressures and more are major contributing factors to this ever-growing issue. Beyond these pressures, we now have the hyperconnected digital world to contend with, meaning the boundaries between work and rest are blurred – not to mention the effects of night-time doomscrolling on sleep. Ultimately, there is a profound mismatch between our fast-paced modern lifestyles and our ancient evolutionary biology, which simply wasn't built to be constantly switched on."

Bailey added: "Contributory factors span psychological, biological and environmental, and in practice, they rarely act alone. Life events, work and financial pressure, relationship stress and earlier adverse experiences shape both brain circuitry and evidence increasingly (though less definitively than for HPA programming) suggests the gut microbiome and baseline HPA reactivity, sometimes from early in life. Biologically, gut dysbiosis is an underappreciated driver; it raises peripheral inflammation,

impairs tryptophan metabolism toward serotonin, and disrupts vagal signalling – people with generalised anxiety tend to show a distinct microbial signature, with reductions in bacteria such as *Eubacterium*, *Coprococcus* and *Faecalibacterium* compared with healthy controls (Butler et al., *Current Psychiatry Reports*, 2025).

"Blood sugar dysregulation is another frequently missed contributor: glycaemic variability is independently linked to depression and anxiety risk regardless of diabetes status, and in non-diabetic individuals glycaemic variability and insulin resistance may track anxiety symptoms more closely than HbA1c (Mishra et al., *Frontiers in Psychiatry*, 2023), and insulin resistance and HPA reactivity are thought to interact bidirectionally. Separately, a large 2024 UK Biobank study of over 340,000 adults found that both cardiometabolic health and social connection were independently associated with depression and anxiety risk (Huang et al., *Psychological Medicine*, 2024)."





## What happens when we stress

From a physiological perspective, a huge amount happens in the body when we experience stress, and our systems were simply not designed to be in this constant fight or flight mode.

"When we experience stress, the body activates the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis, triggering the release of adrenaline and cortisol," Powers explained. "Heart rate and blood pressure rise, blood flow is diverted away from the digestive system towards the muscles, and blood sugar levels increase to provide a rapid source of energy. While this response is designed for short-term survival, chronic activation can have widespread consequences. Persistently elevated cortisol may disrupt sleep, impair digestion, affect blood sugar control, increase inflammation, alter immune function and contribute to fatigue, anxiety, poor concentration and other symptoms commonly seen in clinical practice.

"When we feel anxious, many of the same physiological pathways involved in the stress response are activated. The brain perceives a threat, whether real or anticipated, and signals the amygdala, which in turn activates the sympathetic nervous system and the hypothalamic-pituitary-adrenal (HPA) axis. This leads to the release of adrenaline and noradrenaline, followed by cortisol. These hormones prepare the body for action by increasing heart rate, blood pressure and breathing rate, while releasing glucose into the bloodstream to provide a readily available source of energy. Blood flow is redirected away from processes considered less essential for immediate survival, such as digestion and reproduction, and towards the muscles and brain."

Bailey continued: "Stress triggers two overlapping systems. The fast-acting sympathetic-adrenal-medullary axis releases adrenaline and noradrenaline within seconds, raising heart rate and blood pressure and redirecting blood flow from digestion and reproduction toward skeletal muscle, the classic fight-or-flight response. In parallel, the slower hypothalamic-pituitary-adrenal (HPA) axis releases cortisol via CRH and ACTH, mobilising glucose through glycogen breakdown and gluconeogenesis and temporarily suppressing functions the body deems non-essential in a crisis.

"Almost every system feels this. Digestion slows, motility and secretions drop, and gut barrier integrity can be compromised with repeated activation. The immune system shifts; acutely helpful, but chronically it raises inflammatory cytokines, such as IL-6 and TNF-alpha. Reproductive hormone signalling is suppressed, since cortisol dampens GnRH, which can disrupt menstrual regularity and worsen perimenopausal symptoms. Cardiovascular load rises through sustained increases in heart rate and blood pressure. Cognitively, the prefrontal cortex, responsible for planning and rational appraisal, is deprioritised in favour of faster, amygdala-driven threat processing, which is why clear thinking becomes harder under stress. Blood glucose and insulin resistance both rise. This is an entirely appropriate, adaptive response to short-term threat; the issue, clinically, is what happens when the system never gets the signal to switch back off."

Looking further at anxiety, Bailey continued: "Anxiety recruits the same acute stress circuitry but with a persistent, hypervigilant

quality. Noradrenaline tends to dominate, particularly in panic and hypervigilance states, producing the racing heart, muscle tension, hyperventilation and gastrointestinal symptoms many clients describe. At a neurotransmitter level, GABA is underactive, so the nervous system loses its capacity to dampen excitatory signalling, while glutamate activity at NMDA receptors goes relatively unchecked; magnesium normally sits inside the NMDA channel acting as a natural brake, so when magnesium is depleted, which chronic stress itself accelerates via increased urinary excretion, that brake is lost.

"Serotonin availability can also be functionally reduced, even with adequate dietary intake, because inflammation diverts tryptophan down the kynurenine pathway toward quinolinic acid, itself an NMDA receptor agonist, compounding the excitatory load. Cortisol and thyroid hormones sit upstream of all this: chronically elevated

cortisol impairs the hippocampus's capacity for fear extinction, while undiagnosed hyperthyroidism can produce a clinical picture, palpitations, tremor, insomnia, racing thoughts, almost indistinguishable from an anxiety disorder, which is why I always encourage thyroid screening in presentations that seem disproportionate or treatment resistant.

"The relationship runs in both directions thyroid-wise: hypothyroidism is also independently associated with higher rates of depression and anxiety, most likely via slowed serotonergic and noradrenergic

turnover and general fatigue-driven stress reactivity, a link confirmed in a large 2024 UK Biobank cohort study (Fan et al., *Depression and Anxiety*, 2024). Hypoglycaemia can trigger the same adrenaline and cortisol surge, producing palpitations and panic-like symptoms independent of any psychological trigger."

And how closely linked is anxiety to stress?

"Extremely closely; they share the same underlying physiology," Bailey advised. "Both involve the HPA axis and sympathetic nervous system activation, amygdala hyperactivation, reduced prefrontal regulation, and lower vagal tone (heart rate variability). Chronic stress is one of the most consistent triggers and maintainers of anxiety and is associated with reduced GABAergic signalling, the brain's principal inhibitory brake; stress reduces GABA, which allows more anxiety, which generates more stress, in a genuinely self-reinforcing loop.

"I would describe anxiety, in many clients, as what happens when the stress response fails to switch itself off: the same glucocorticoid receptor resistance that breaks the HPA axis's negative feedback loop under chronic stress may plausibly contribute to some people staying in a persistently activated, hypervigilant state, even once the original stressor has passed – this is my working clinical framework rather than a proven single mechanism, since anxiety persistence is multiply determined. It is also genuinely bidirectional rather than one-directional; psychological factors like rumination and worry increase amygdala activity and reduce prefrontal control, which further dysregulates the HPA axis and raises cortisol and noradrenaline output, which then fuels more anxious thinking. This is why nutritional, physiological and psychological approaches, such as CBT, EMDR, breathwork and nutritional intervention, address the same interconnected system, and tend to work better together than any one alone."

*"Chronic stress is one of the most consistent triggers and maintainers of anxiety and is associated with reduced GABAergic signalling, the brain's principal inhibitory brake..."*

## Impact on health

Many people understand the immediate effects of stress, but it's important that your clients understand the other impacts on health.

Briggs explained: "Short-term stress to prevent harm is a normal physiological response, but issues occur when the process becomes dysfunctional and lasts for a prolonged length of time. Stress and the response to it can be categorised into three types; 'good' stress, categorised by rising to a challenge, 'tolerable' stress, when the individual has sufficiently good coping mechanisms and support systems to allow resilience to develop, and 'toxic' stress, when limited support, brain architecture and duration of stress will have an effect on the rest of the body and cause overload and distress.

"Chronic stress is a long-term condition and often considered to be a dysfunctional state, which can have effects on many other areas of health. It occurs when the systems involved in the normal stress response become overloaded or out of balance and can lead to behaviours which further deteriorate the body's normal reaction; avoidance of friends, overconsumption of foods and alcohol, reducing physical exercise and sleep disruption. Repeated or

chronic stress is known to cause many other issues which can have significant detrimental effects on a variety of areas of health. It increases the retention of sodium and water by the kidneys, as well as blood volume, which all lead to higher blood pressure. Over time, this leads to the heart working harder and changes to occur to the structure of the heart and arteries, along with an increased deposition of plaque in the blood vessels.

"Elevated levels of the stress hormones can also have effects on immunity and inflammation. Chronic stress causes reduced immune function, slower healing and increases in susceptibility to viral infections. There are also changes in insulin sensitivity and thyroid hormone production. Long-term exposure to stress hormones can also be associated with changes in brain function such as poor cognitive function and memory problems. Significant changes in brain volume have also been seen and chronic stress has been associated with both mild cognitive impairment.

"Stress can also affect the production and effect of a variety of neurotransmitters, including dopamine (associated with reward and learning), serotonin (involved in mood), melatonin (sleep) and GABA (involved in

relaxation and reducing anxiety). Therefore, long term stress is likely to increase other disorders such as depression, anxiety and sleep disturbances, which may, in turn, increase stress."

Trueman added: "When we feel stressed or anxious, our sympathetic nervous system, or 'fight or flight' response, takes over, instantly shifting our physiology to focus on survival. Resources are immediately diverted towards the systems needed for urgent action in response to the perceived threat. This means blood flow, energy and signalling resources are prioritised towards the cardiovascular and musculoskeletal systems. This triggers a rapid increase in heart rate and blood pressure so that oxygen-rich blood reaches the major muscle groups. It also quickens our breathing rate and stimulates the liver to release a surge of glucose to provide instant energy.

"At the same time, systems not required for this immediate response, such as gastrointestinal processes, are temporarily downregulated. In practice, this can mean reduced digestive secretions, including a drop in saliva production that gives us that classic dry mouth, as well as a reduction in stomach acid and enzymes. These physiological shifts may also contribute to altered motility, which can manifest as nausea or sudden colonic urgency. Nutrient processing may be affected as blood flow is temporarily redirected away from the gut wall.

"In the short-term, the stress response is a helpful evolutionary adaptation designed to keep us safe. However, when it is repeatedly activated, the pathways that are helpful in the short-term can become highly disruptive to our overall health. From a gut-health perspective, ongoing HPA-axis activation and chronic cortisol signalling can significantly compromise intestinal permeability, trigger localised immune activity and inflammatory signalling and alter our microbial composition. This can lead to changes in beneficial metabolites and disrupt vital communication pathways between the gut and the brain. The consequences can also reach far beyond the digestive tract. Prolonged muscle tension can lead to chronic headaches and physical pain, while long-term cardiovascular strain increases the risk of high blood pressure. Prolonged cortisol elevation can suppress immune defences and disrupt metabolic health, affecting insulin sensitivity, cholesterol and our natural sleep-wake cycles."

Bailey went on: "This is where the concept of allostatic load becomes clinically useful: the cumulative physiological wear from repeatedly activating stress-response systems that were designed for short bursts, not permanent activation. Chronic stress has been associated





with altered glucocorticoid receptor sensitivity, meaning the HPA axis's own negative feedback loop stops working properly and the system cannot switch itself off. This has measurable structural consequences, including reduced hippocampal volume and impaired fear-extinction capacity, which may be part of why some people get 'stuck' in anxious patterns that respond only partially to psychological therapy alone; this is a clinical hypothesis I find useful rather than an established causal mechanism, and addressing cortisol load alongside therapy is a reasonable adjunct, not a prerequisite.

"Metabolically, sustained cortisol promotes visceral fat deposition and insulin resistance; immunologically, the body's own anti-inflammatory braking mechanisms (regulatory T-cells and IL-10) become overwhelmed, raising chronic low-grade inflammation and, over time, autoimmune risk. This peripheral inflammation doesn't stay peripheral: sustained cytokine exposure can increase blood-brain-barrier permeability, allowing IL-6 and TNF-alpha to reach the brain and activate microglia and astrocytes, which then perpetuate a self-sustaining neuroinflammatory loop that further impairs mood-regulating circuitry. Reproductive hormone suppression can persist, affecting cycle regularity and fertility. Because falling BDNF and mitochondrial dysfunction are associated with a reduction in the brain's capacity to adapt and recover, chronic stress genuinely impacts resilience over time, rather than simply causing temporary discomfort."

And Powers advised: "Prolonged stress can have significant consequences for physical and mental health. When cortisol and other stress hormones remain elevated for extended periods, they can contribute to poor sleep, fatigue, anxiety, low mood and impaired cognitive function. Chronic stress may disrupt blood sugar regulation, increase inflammation and negatively affect digestive health, immune resilience and cardiovascular function. Over time, it can accelerate biological ageing and increase risk of conditions such as hypertension, metabolic dysfunction and depression. From a nutritional perspective, chronic stress may also increase the body's demand for key nutrients, further compounding its effects.

"When anxiety becomes chronic, the body can remain in this heightened state of alertness for prolonged periods. This may contribute to muscle tension, digestive disturbances, palpitations, sleep disruption, fatigue, poor concentration and increased sensitivity to stress. Long-term activation of these pathways can also influence inflammation, immune function, blood sugar regulation and neurotransmitter balance, helping to explain why anxiety often affects both physical and mental wellbeing."



## STRESS MANAGEMENT TECHNIQUES

There are a range of strategies that can form part of a supportive plan for clients experiencing stress and these will, naturally, be individual to the person and the reasons behind their stress. But there are some general measures to be advised.

"Prioritise morning light. Aim to get 10 to 15 minutes of natural sunlight within 30 minutes of waking to help regulate your circadian rhythm and support a healthy cortisol balance throughout the day," Trueman recommended. "Spend time in nature every day. Even a quick walk through a green space can help lower blood pressure and shift the body out of 'fight or flight, sympathetic dominance, and into 'rest and digest', or parasympathetic dominance. Stimulate the vagus nerve; simple practices such as splashing cold water on your face, humming, gargling with warm water or practising deep, diaphragmatic breathing, making your exhalations longer than your inhalations, can help promote a parasympathetic shift."

Powers continued: "Diet and lifestyle interventions can play a valuable role in supporting resilience to stress and anxiety. Regular physical activity is one of the most effective strategies, helping to regulate stress hormones, improve mood and support sleep quality. Prioritising restorative sleep, spending time outdoors and incorporating relaxation practices such as mindfulness, breathing exercises or yoga can also help calm an overactive stress response."

And Bailey advised: "Movement matters; regular moderate exercise supports vagal tone



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and helps regulate the HPA axis. I would also actively recommend vagal tone practices: slow diaphragmatic breathing, structured breathwork (a randomised waitlist-control trial found a large effect on anxiety scores; Blake, *Journal of Affective Disorders*, 2026), time in nature (a 2026 meta-analysis of 25 studies and almost 1,900 participants found forest therapy produced medium-to-large reductions in both anxiety and depression symptoms; Qin et al., *BMC Public Health*, 2026), and even brief animal contact, which lowers physiological stress markers via oxytocin release."

And Briggs advised: "Lifestyle medicine offers some useful strategies, not just for reducing stress but increasing resilience and coping mechanisms. Exercise, meditation, yoga and mindfulness work well in increasing the individual's ability to cope with stress, making it less likely to be ongoing and detrimental to other areas of health. Other techniques often suggested are building a support network, taking time out for yourself, challenging yourself to learn a new skill to build resilience and trying to avoid 'self-medicating' with food, alcohol or tobacco. One of the most important aspects of developing resilience is easing some of the pressure that you might face, by learning to say no."

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## Diet and stress

You will be well aware of the impact of poor nutrition and the body's ability to manage stress and anxiety. So, what should be considered in terms of a nutrition protocol?

Powers explained: "Chronic stress and anxiety can increase the body's demand for certain nutrients and may contribute to depletion over time. The stress response is metabolically demanding, requiring a constant supply of nutrients to support the production of stress hormones, neurotransmitters and cellular energy. Chronic stress can also affect eating habits and digestive function, potentially reducing nutrient intake and absorption. Some may experience reduced appetite, while others rely more heavily on highly processed convenience foods, creating a cycle that can further compromise nutritional status and resilience to stress.

"Maintaining stable blood sugar levels by eating regular meals rich in protein, fibre and healthy fats may help support mood and energy levels throughout the day. Reducing excess caffeine and alcohol can be beneficial, particularly for those prone to anxiety. A nutrient-dense diet rich in vegetables, fruits, whole grains, nuts, seeds and oily fish provides many of the vitamins, minerals and omega 3 fatty acids involved in nervous system function. Certain nutrients, including magnesium and B vitamins, are also commonly considered when supporting individuals experiencing ongoing

stress."

And Bailey recommended: "The single best-evidenced dietary strategy is adopting a genuinely Mediterranean-style pattern. The SMILES trial demonstrated that dietary improvement alone produced significant reductions in depression scores compared with social support (Jacka et al., *BMC Medicine*, 2017), and this pattern works through several converging mechanisms: fibre feeding short-chain-fatty-acid-producing gut bacteria that support BDNF, omega 3s lowering neuroinflammation, and a lower glycaemic load reducing the adrenaline and cortisol surges that come with blood sugar swings. Practically, that means reducing ultra-processed food and refined sugar, eating regular protein-containing meals, including breakfast, which supports morning cortisol rhythm, moderating alcohol and caffeine with awareness that individual tolerance varies genetically, and prioritising fibre-rich and fermented foods for the gut-brain axis."

Briggs added: "A Mediterranean style diet focuses on vitamin C and magnesium-rich fruits and vegetables, nuts and seeds which contain omega 3 and 6 fatty acids, olive oil and lean meats and oily fish, such as herring, mackerel, salmon and sardines, which are also rich in omega 3. Processed foods are discouraged, and the emphasis is on the consumption of fresh, unprocessed or minimally processed foods, which are naturally much lower in sugar, salt

and trans and hydrogenated fats.

"This diet has also been shown to alter the gut microbiome, and a diverse microbiome is associated with a high level of good cholesterol. This is likely due to the high levels of plant foods included as The American Gut Project found eating 30 different plant foods a week improved diversity of bacteria in the gut. These foods are also fibre-rich, which can improve the mix of bacteria in the gut as well as the numbers. Studies have suggested the gut microbiome can play a role in stress reactivity and stress can equally damage the gut and adversely affect the range of bacteria."

Trueman continued: "Eating at regular times is key. The body, and particularly the nervous system, likes consistency. Regular meals can help prevent blood-sugar spikes and crashes, which the body can interpret as a physiological emergency, triggering a cascade of stress hormones and further cortisol release. Aiming for around 30g of protein per meal can help stabilise energy levels and provides the essential amino acids needed to build mood-regulating neurotransmitters.

"The body uses B vitamins more rapidly when under stress. Food sources include organ meats, legumes, eggs, whole grains and leafy green vegetables. Vitamin C, which helps to replenish levels used by the adrenal glands during the stress response. Food sources include berries, tomatoes, citrus fruits and peppers."



## NUTRIENT DEPLETION

Stress and anxiety can be common triggers in depleting the body of important nutrients – at a time when body systems need it the most. And as the research continues to expand, there is plenty you could consider from a recommendation perspective.

“Stress is incredibly demanding on our biochemistry. Changes in digestive function can significantly impair our ability to absorb and metabolise the nutrients we eat. In addition, sympathetic nervous system activation is a highly nutrient-hungry state,” Trueman explained. “This means key cofactors, particularly B vitamins and magnesium, may be used at a much faster rate as the body works to mount and sustain the stress response, draining our nutritional reserves when we need them most.”

In terms of the specifics, magnesium is one of the most important.

Briggs explained: “Stress can impact on nutrient levels within the body, and this may affect the stress response and the ability to cope. Several studies have documented a decrease in magnesium levels during periods of chronic stress, linked to an increase in excretion in the urine. Magnesium is involved in moderating the stress response, but this effect is diminished in periods of prolonged stress. Low magnesium status is also associated an enhanced susceptibility to stress, leading to a vicious cycle where stress increases and magnesium becomes increasingly depleted. Zinc can be similarly affected by chronic stress, and this can influence the production of neurotransmitters such as GABA and dopamine.”

Bailey added: “I always position supplements as adjuncts to diet, sleep and stress management foundations, Magnesium (glycinate or bisglycinate, 300–400mg a day) is usually my first port of call; it modulates GABA-A receptors and normally occupies the NMDA receptor channel in a voltage-dependent manner, helping regulate excitatory neurotransmission. This isn’t just mechanistic reasoning: several RCTs have tested magnesium specifically for anxiety rather than PMS, with doses of 248–300mg a day of elemental magnesium (with or without added B6) producing significant improvements in GAD-7 or DASS anxiety subscale scores within two to six weeks (Tarleton et al., *PLoS One*, 2017; Pouteau et al., *PLoS One*, 2018; Noah et al., *Stress and Health*, 2021); a 2024 systematic review found benefit in five of seven interventional studies, tempered by heterogeneity and small sample sizes (Rawji et al., *Cureus*, 2024).”

Powers continued: “Omega 3 fatty acids from fish oil or krill oil may also be beneficial. EPA and DHA are important structural components of the brain and nervous system, and research suggests they may help support mood, cognitive function and a healthy inflammatory response. Saffron is another promising option. Clinical studies have shown that saffron extract may help support emotional wellbeing and reduce symptoms of mild anxiety and low mood. Some research has also demonstrated benefits for sleep quality, which is often disrupted during periods of stress.”

Various vitamins are also crucial.

Briggs commented: “Vitamin D is a nutrient which can both be affected by stress and play a role in the stress response. Vitamin D supplementation reduces cortisol level, and the effects of this nutrient can also be inhibited by cortisol. Adequate vitamin D

***“Stress is incredibly demanding on our biochemistry. Changes in digestive function can significantly impair our ability to absorb and metabolise the nutrients we eat.”***

also has an effect on immune function, which is compromised by high cortisol and stress.”

Powers added: “B vitamins are important, particularly vitamins B6, B12 and folate. These nutrients are involved in energy metabolism and the production of neurotransmitters such as serotonin, dopamine and GABA, which help regulate mood and emotional wellbeing. A comprehensive B-complex can be particularly useful during periods of prolonged stress. Vitamin C is concentrated in the adrenal glands, where it is involved in the production and regulation of stress hormones. During periods of prolonged stress, utilisation may increase.”

Bailey went on: “Cortisol and catecholamine (adrenaline and noradrenaline) production place direct demand on B vitamins, particularly B6 and B5, and on vitamin C, which is a required cofactor for noradrenaline synthesis and for regenerating BH4, itself needed for serotonin production, so the biochemical machinery of the stress response is quite literally consuming these nutrients faster under chronic activation. Increased oxidative stress from sustained HPA and inflammatory activity raises demand for antioxidant nutrients including vitamin C, vitamin E, zinc and selenium.

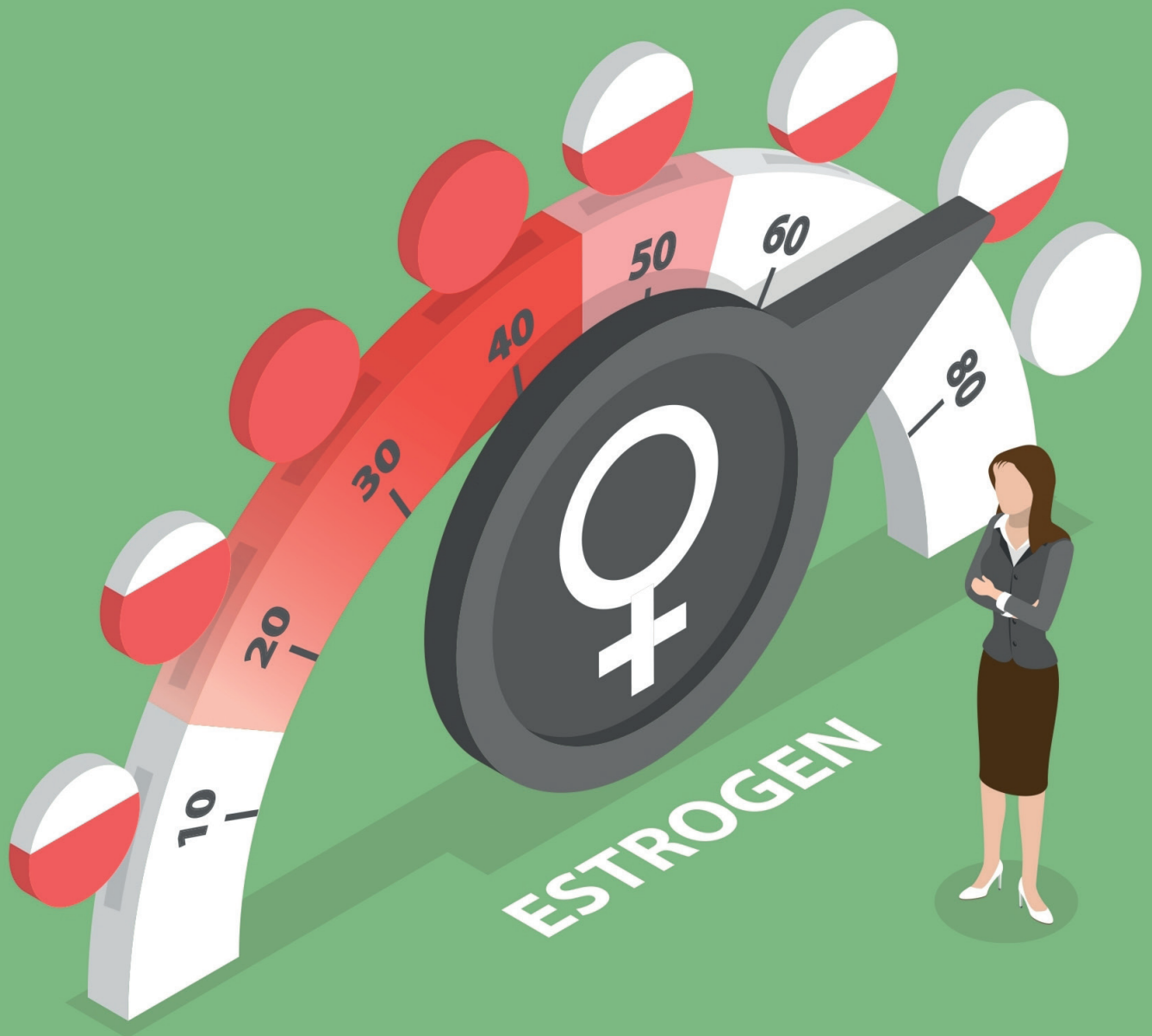
“This is compounded behaviourally, as people under chronic stress often eat less well, skip meals, or lean on alcohol and ultra-processed convenience foods, all of which further deplete magnesium and B vitamins at exactly the point demand is highest. The clinical implication is important: low magnesium does not just reflect stress, it actively worsens it, by leaving NMDA receptors under-inhibited and glutamate signalling unchecked. Nutrient repletion is therefore not incidental support; it is addressing part of the actual mechanism.”

She added: “*Rhodiola rosea* is a useful alternative for mental fatigue and performance under stress. Saffron (28–30mg a day) has reasonable evidence for mood and anxiety via serotonin reuptake modulation, and targeted psychobiotic strains, particularly *L. helveticus* R0052 combined with *B. longum* R0175, shown to reduce psychological distress and urinary free cortisol in healthy volunteers (Messiaoui et al., *British Journal of Nutrition*, 2011), are also worth considering via the gut-brain axis.”

Trueman advised: “Ashwagandha provides adaptogenic support to help regulate the HPA axis, support healthy cortisol levels and help the body adapt to mental and physical stress.”

Briggs added: “L-Theanine, an amino acid found naturally in tea, can also be useful, as it increases the level of alpha waves in the brain, which are associated with feeling relaxed yet alert. It also improves sleep quality, lowers blood pressure, and regulates stress levels.”





# A practitioner guide to **HORMONE BALANCE**

An in-depth guide to balancing hormones through nutritional and lifestyle interventions.



Hormones are most commonly discussed from a female perspective, both in relation to the menopause, and also PMS. And while these are obvious areas of focus, given the impact on so many people, hormone health extends much wider than that and affects both sexes.

And given the critical role hormones play in so many aspects of health, and the relative ease in our modern world for them to fall out of balance, it is really important for practitioners to be up to date with the latest guidance and protocols to consider.

Alice Bradshaw, Head of Nutrition Education and Information at Terranova, advised: "Hormones are the body's chemical messengers, released by endocrine glands to coordinate activity across tissues.

Although often linked to puberty, fertility or menopause, their influence reaches far beyond reproductive health. They help regulate metabolic rate, appetite, energy production, sleep, mood, immune activity and the way we respond to stress. Even in tiny concentrations, hormones have significant physiological impact. They operate within a tightly connected network, where one hormone often shapes the behaviour of another. This constant communication allows the body to maintain homeostasis and adapt to daily internal and external demands."

She added: "Interest in hormone health has grown rapidly, but the endocrine system remains highly complex. There are no quick fixes or hacks that can optimise hormones overnight. The strongest evidence continues

to support the fundamentals: balanced nutrition, regular movement, adequate sleep, effective stress management and appropriate clinical assessment when symptoms persist. Supporting hormone health is ultimately about creating the conditions in which the body can do what it is designed to do."

Eleanor Faulkner, Nutrition Advisor at Viridian Nutrition, added: "Some of the processes hormones are responsible for include metabolism, growth, puberty, and reproduction. Some of the well-known hormones include testosterone, oestrogen, cortisol, thyroxine, adrenaline, noradrenaline, and others that are less commonly spoken about include luteinising hormone (LH) and follicle-stimulating hormone (FSH). All these hormones bring about a different response in the body."





## HORMONE SCIENCE

Let's start by examining what hormones are.

Christine Bailey Nutrition Education Manager at Metagenics UK and Ireland, advised: "Hormones are chemical messengers produced by endocrine and related tissues, released into the bloodstream to regulate the activity of target cells that express specific receptors. In contrast to the nervous system, which transmits rapid electrochemical signals through discrete neural circuits, endocrine signalling operates over longer timescales, coordinating systemic processes such as metabolism, growth, reproduction, circadian rhythm, mood, and stress adaptation.

"The endocrine system functions as an integrated network rather than isolated glands, organised through feedback-controlled axes including the hypothalamic-pituitary-adrenal (HPA), hypothalamic-pituitary-gonadal (HPG), and hypothalamic-pituitary-thyroid (HPT) axes. These regulatory loops continuously integrate internal signals (for example, energy status, inflammation, and nutrient availability) and external cues (for example, light exposure, food intake, and perceived threat), adjusting hormone secretion accordingly.

"From a systems biology perspective, hormones enable inter-organ communication across the brain, gut, adipose tissue, liver, and reproductive organs, allowing coordinated physiological adaptation. Dysregulation typically arises from interacting factors across these axes rather than a single isolated defect, although primary endocrine disorders can and do occur. For example, chronic activation of the stress response can alter HPA axis dynamics, influencing reproductive hormone pulsatility and thyroid hormone metabolism through central and peripheral regulatory mechanisms."

She continued: "Some hormonal fluctuation is entirely normal: the rise and fall of oestrogen and progesterone across the menstrual cycle, the larger shifts of perimenopause, and the surges of pregnancy are all expected physiology. Problems arise when fluctuations become exaggerated, poorly buffered or badly timed, and this is where modifiable factors take centre stage.

"Chronic stress can disrupt hypothalamic GnRH pulsatility via HPA axis activation and is associated with increased severity of luteal-phase symptoms in observational studies; women under high stress report significantly higher rates of moderate-to-severe PMS (Gollenberg et al., *Journal of Women's Health*, 2010). Poor sleep, blood sugar instability, nutrient insufficiency (particularly magnesium, B6 and zinc), gut dysbiosis affecting oestrogen clearance via the 'estrobolome', and exposure to endocrine-disrupting chemicals all add to the load.

"Clinically, this may show up as PMS and PMDD (irritability, anxiety, bloating, breast tenderness, low mood), perimenopausal symptoms (hot flushes, night sweats, brain fog, joint pain and heightened anxiety as oestrogen, progesterone and testosterone decline together), and PCOS-related symptoms driven by insulin resistance and androgen excess. A 2026 study of college-aged women found PMS symptoms in 32.9 per cent of participants, with perceived stress the strongest predictor and moderate physical activity protective (Zeng et al., *BMC Nursing*, 2026), a good illustration of how psychosocial and lifestyle factors, not just hormones behaving badly, shape the symptom picture."

Faulkner continued: "Some of the main hormones which impact women are oestrogen, progesterone, and testosterone but there are other hormones like cortisol, follicle-stimulating hormone (FSH), and luteinising hormone LH), which also have an impact. Oestrogen is one of the main hormones which impact women. During puberty, oestrogen promotes the development of breasts and other secondary sexual characteristics. Its main function throughout

the reproductive years is to regulate the menstrual cycle. As well as reproductive functions, it also helps to maintain bone density, supports skin health by promoting collagen production and contributes to heart health by influencing cholesterol levels. It also plays a role in brain function, including mood, memory, and cognition. During the menopause, oestrogen levels decline.

"Progesterone is a hormone produced after ovulation and throughout pregnancy. It plays a vital role in regulating the menstrual cycle by preparing the lining of the uterus for the implantation of a fertilised egg and helping to maintain a healthy pregnancy. Progesterone also works with oestrogen to regulate the growth of the uterine lining and prevent excessive thickening. In addition to its reproductive functions, it is thought to have a calming effect and may help promote relaxation and improve sleep. Low progesterone levels may contribute to irregular menstrual cycles, difficulty maintaining an early pregnancy, and some symptoms associated with PMS, such as mood changes and irritability.

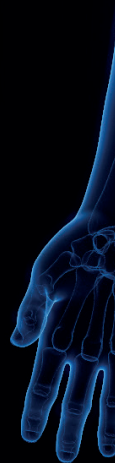
"Fluctuations in hormones is natural for women through the menstrual cycle, which lasts on average 28 days. This cycle starts for women as soon as they get their first period. The luteal phase in the menstrual cycle often causes the most symptoms for women. In this phase, progesterone levels rise, which causes the uterine lining to thicken and prepare for egg implantation. Progesterone levels then rapidly fall if pregnancy does not occur and hormone like compounds called prostaglandins cause the shedding of the uterine lining. This huge shift in hormones during this stage can contribute to typical premenstrual symptoms like mood changes, headaches, bloating, breast tenderness, water retention and swelling, fatigue, headaches, brain fog, and digestive symptoms. When progesterone and oestrogen both drop, menstruation starts."

"During the luteal phase of the cycle, symptoms of PMS include irritability, low mood, and low energy whilst PMDD is a diagnosed condition where women experience severe low mood, sometimes with feeling of suicide. PMDD impacts 1.6-eight per cent of women globally, however, this number could be higher due to underdiagnosis. Cortisol is another hormone which can have an impact on women's health. Cortisol is known as the stress hormone and its main function is to support the body during stress. It regulates blood sugar, suppresses inflammation, and increases heart rate. However, if cortisol levels are chronically high, it can impact sleep and impact other female hormones and lead to inflammation around the body."

Bradshaw went on: "Because hormones influence multiple systems, changes in their activity can present in many ways. Fatigue, mood changes, sleep disruption, appetite shifts, cognitive difficulty, altered weight and reduced energy are all possible. When reproductive hormones are involved, menstrual irregularities, fertility challenges or menopausal symptoms may appear. These symptoms are not exclusive to endocrine issues, so persistent changes warrant proper assessment rather than assumptions."

And we must then look in detail at the varied role they play in our health.

Lissi Bucher (Lissi B Nutrition), Naturopathic Nutritionist, commenting on behalf of Invivo, advised: "Oestrogen supports the follicular phase, bone density and cardiovascular health. Progesterone, produced after ovulation, has a calming effect on the nervous system and balances oestrogen's effect on the uterus lining. Testosterone is often overlooked, but it supports libido, lean mass and energy levels. Not reproductive health specific, but in clinic, I deal a lot with cortisol and thyroid hormone levels when addressing female hormonal pictures."



***“Problems arise when fluctuations become exaggerated, poorly buffered or badly timed, and this is where modifiable factors take centre stage.”***



Bradshaw added: “For women, reproductive hormones shift across the menstrual cycle and throughout life. Oestrogen and progesterone govern ovulation and menstruation, but their influence extends to bone density, cardiovascular health, cognition and mood. Testosterone, although present in smaller amounts, contributes to muscle mass, bone strength, energy and libido. These hormones are regulated through the hypothalamic–pituitary–ovarian axis, highlighting how interconnected endocrine signalling really is. Alongside reproductive hormones, others play equally important roles: insulin manages glucose homeostasis, thyroid hormones drive metabolic rate and cellular energy, and cortisol shapes the body’s response to physical and psychological stress. Together, they influence how women feel, function and recover day to day.”

Bailey went on: “Several hormones do the heavy lifting in female physiology, and they rarely act alone. Oestrogen (oestradiol) is often thought of purely as a reproductive hormone, but it is genuinely a whole-body regulator, supporting bone density, cardiovascular and metabolic health, cognitive function and mood (it modulates serotonergic signalling through multiple mechanisms, including effects on serotonin synthesis, receptor expression, and transporter activity in experimental and human studies, in a region- and context-dependent manner) and even immune regulation (Mauvais-Jarvis et al., *Endocrine Reviews*, 2013).

“Progesterone, dominant in the luteal phase, is converted to allopregnanolone, which acts on GABA-A receptors much like a natural benzodiazepine, explaining why declining progesterone in perimenopause so often shows up as ‘wired but tired’ and anxious at night. Testosterone, frequently overlooked in women, supports libido, motivation, muscle and dopamine/serotonin signalling, and often declines before oestrogen in perimenopause. Cortisol, our primary stress hormone, interacts closely with the reproductive axis. Chronic activation of the HPA axis suppresses hypothalamic GnRH secretion and can impair luteal progesterone production. Thyroid hormones (T3/T4) govern metabolic rate, and chronic stress may alter HPT-axis signalling and reduce peripheral conversion of T4 to T3. Insulin, FSH and LH complete the picture, driving blood sugar regulation and the ovarian cycle. A recent review in *Nutrients* (Natalucci et al., 2026) reinforces that these hormones define a physiological context rather than a fixed, deterministic effect, with nutrition acting as a key modifiable factor shaping how symptoms and metabolic responses play out for the individual.”



# HORMONE

## FACTORS AFFECTING HORMONE BALANCE

Many elements are involved in our hormone function. Some, such as age, are relatively outside of our control, but there are many factors that are modifiable – and often a by-product of our modern living.

Bradshaw advised: “Hormonal fluctuation is a normal part of physiology. Some hormones follow circadian rhythms – cortisol rising in the morning, melatonin increasing in the evening – while others respond to food intake, movement, stress, illness and life stage. Reproductive hormones shift predictably across the menstrual cycle, pregnancy and menopause. Hormone function is shaped by genetics, age, life stage and underlying health conditions. Alongside these fixed factors, everyday behaviours exert considerable influence. Sleep quality, dietary patterns, physical activity and stress all affect hormone signalling. Chronic stress can alter cortisol rhythms; inadequate sleep disrupts appetite-regulating hormones and insulin sensitivity; and consistently low energy intake may affect reproductive hormones. Smoking, excess alcohol and obesity also influence endocrine activity. While lifestyle measures cannot resolve every endocrine disorder, they create the physiological environment in which hormones can function optimally.”

Bailey agreed, adding: “Genetics, age and underlying medical conditions set the stage, but it is the modifiable factors that determine how hormones actually behave day to day, and they are doing far more of the work than most people assume. Diet quality affects blood sugar stability, fibre intake (may support healthy oestrogen metabolism through effects on the gut microbiome), and intake of alcohol and caffeine, can impact levels of magnesium and certain B vitamins and HPA reactivity. Sleep quality matters enormously: poor sleep disrupts melatonin, which has direct anti-inflammatory properties, while also raising next-day cortisol and ghrelin.

“Exercise is a double-edged sword – while incredibly beneficial, excessive high-intensity training with insufficient recovery raises cortisol, which is particularly problematic once oestrogen and progesterone’s natural cortisol-buffering effect declines in perimenopause. Gut microbiome health, body composition, and exposure to endocrine-disrupting chemicals (BPA, phthalates, parabens) add further modifiable load, with a 2023 *Reproductive Toxicology* review linking these chemicals specifically to hormone-driven conditions like endometriosis (Dutta et al., 2023). In practice, genetics loads the gun, but diet, sleep, stress and environmental exposure pull the trigger, which is precisely why nutrition and lifestyle medicine has so much to offer here.”

Faulkner also commented: “Many factors can cause hormones to become imbalanced, including medical conditions like thyroid and adrenal gland disorders, medications, and hormonal contraception. Liver and gut health are also important, as the liver helps process and remove hormones, while adequate fibre intake and regular bowel movements support their elimination. If constipation occurs, hormones that would normally be excreted may be reabsorbed into the bloodstream, potentially contributing to hormone imbalance.”

Looking specifically at female health, Bucher advised: “Fluctuation is the cycle. Oestrogen rises through the follicular phase, peaks around ovulation before progesterone takes over in the luteal phase before both drop if pregnancy doesn’t occur. This is a normal and expected rhythm. Clinically, we are interested in when that rhythm becomes exaggerated or disrupted. This can show up as PMS, irregular cycles, sleep disruption, mood swings and low energy. Persistent imbalance is linked to increased risk of endometriosis and fibroids as well as insulin resistance and bone density loss amongst others. Factors such as chronic stress, blood sugar swings, poor oestrogen clearance and



nutrient gaps can be common drivers for hormones to be out of balance, as well as perimenopause. Diet and lifestyle inputs can make such a huge difference. Blood sugar stability, sleep and stress levels all impact how hormones are made, used and cleared."

Faulkner added: "Issues in the liver can affect hormone balance because the liver helps metabolise and remove hormones from the body. If the liver can't effectively remove oestrogen, for example, it can cause relative oestrogen dominance, which may lead to other issues like polyendocrine metabolic ovarian syndrome (PMOS). If the liver is not functioning properly, hormones may build up. The contraceptive pill can also affect the balance of other hormones due to it containing synthetic hormones that alter the body's natural hormone production."

And what happens to our health if we have prolonged hormone imbalance?

"Endocrine disruption can have meaningful long-term consequences. Impaired insulin signalling increases the risk of type 2 diabetes and cardiovascular disease. Thyroid disorders, when untreated, affect metabolic rate, bone turnover and cardiac function. The natural decline in oestrogen after menopause contributes to increased osteoporosis risk," Bradshaw explained. "Hormones also influence

body composition, cognitive function, immune regulation and healthy ageing."

Faulkner went on: "Long-term hormone imbalances can cause irregular, absent or heavy menstrual cycles and may lead to PMOS. In some cases, long-term oestrogen exposure can increase the risk of developing endometriosis. Hormonal imbalance can also lead to temporary infertility. Hormonal imbalances which involve oestrogen, progesterone, FSH and LH can disrupt ovulation and make it difficult for an egg to be fertilised. Long-term hormonal imbalances can impact neurotransmitters like serotonin, dopamine and GABA, which can impact mood and mental state. Over time, if hormones like oestrogen, thyroid hormones and cortisol remain out of sync, it can lead to chronic anxiety, depression, and brain fog. Long term, hormonal imbalance can lead to issues like blood sugar dysregulation issues, chronic fatigue, low energy, sleep issues, thyroid dysfunction. For some people, hormonal imbalances may also lead to acne and hair loss."

Bailey highlighted the importance of education around the long-term effects.

"This is where practitioners most need to widen the lens beyond symptom relief," she commented. "As oestrogen declines at perimenopause, visceral fat increasingly

behaves as an active, pro-inflammatory endocrine organ rather than passive storage: adiponectin falls while TNF-alpha and IL-6 rise, driving insulin resistance and cardiovascular risk. Bone density falls as oestrogen's protective effect on osteoclast activity is lost, raising osteoporosis risk. Oestrogen's anti-inflammatory, immunomodulatory role also means its decline is linked to shifts in autoimmune disease activity: rheumatoid arthritis, thyroid autoimmunity and lupus can all change in prevalence or severity around the menopause transition, alongside accelerating joint and musculoskeletal changes.

"Chronic HPA-axis dysregulation from ongoing hormonal and stress load can reduce hippocampal volume and impair fear-extinction circuitry, with real implications for long-term mood and cognitive resilience; a 2026 review applies this same brain-heart-axis, allostatic-load model specifically to loneliness – itself a common chronic psychosocial stressor – as a contributor to cardiovascular disease and cognitive decline risk (Warren, *Frontiers in Aging*, 2026); the same wear-and-tear mechanism is thought to extend to chronic stress more broadly. Intervening earlier, around perimenopause rather than a decade later, offers a meaningfully better window for shifting these long-term outcomes."



## Hormone protocols

There are various steps to take when supporting clients with hormone imbalance, and testing may help to point towards obvious issues. Looking at protocols, there are key factors to build in.

Bailey recommended: "Looking at the research, the Mediterranean-style of eating with sufficient protein, plenty of vegetables, oily fish, legumes, nuts and seeds is a great foundation. A few elements are worth highlighting specifically. Dietary fibre, at least 25-30g a day from wholegrains, nuts, seeds, vegetables and legumes, helps support a diverse gut microbiome and may influence microbial  $\beta$ -glucuronidase activity involved in oestrogen recycling. Cruciferous vegetables and broccoli sprouts provide sulforaphane and indole-3-carbinol, which may influence oestrogen metabolism toward greater 2-hydroxylation. Omega 3-rich foods, oily fish one to two times a week, walnuts, flaxseed and chia, help correct the omega 6 to omega 3 imbalance that can impact inflammatory prostaglandin production. Adequate protein and low-glycaemic carbohydrates at each meal stabilise luteal-phase blood glucose, since insulin sensitivity declines modestly during the luteal phase.

"Phytoestrogens from soy, flaxseed and legumes are generally supportive, though their effect depends on individual gut microbiome and receptor context. Conversely, ultra-processed foods and refined sugar are genuinely detrimental; a case-control study found a Western-style dietary pattern (high in fast food, soft drinks and processed meat) was associated with significantly higher odds of PMS, while healthy and traditional dietary patterns were protective (MoradiFili et al., *Public Health Nutrition*, 2019). Excessive alcohol intake may impair magnesium status and reduce absorption and utilisation of several B vitamins."

Bradshaw continued: "Dietary pattern matters more than any single food or supplement. Hormone synthesis, transport and metabolism rely on consistent energy and nutrient availability, so restrictive or nutritionally poor diets can have wide-ranging effects. A varied diet rich in vegetables, fruit, wholegrains, legumes, nuts, seeds, healthy fats and quality protein provides the substrates required for hormone production and metabolism. Fibre supports digestive health and assists with the clearance of hormones such as oestrogen once they've been metabolised. Emerging research also highlights the role of the gut microbiome in influencing hormone metabolism. Rather than searching for foods that 'fix' hormones, the evidence continues to support balanced, consistent eating patterns."

And Bucher recommended: "Protein and fibre for blood sugar stability, cruciferous vegetables for healthy oestrogen metabolism, and enough high-quality healthy fats required as building blocks for steroid hormones. Fibre is also needed to ensure the body is supported to eliminate used hormones rather than recirculating them. Gut health plays such an important role in hormonal health. In clinic, this is something I often must explain to clients as they often believe the systems work in isolation."

Faulkner continued: "I would recommend focussing on whole, minimally processed, anti-inflammatory foods. Eating enough protein and healthy fats is important, as protein helps keep blood sugar levels stable, reducing large spikes and crashes that can trigger the release of the stress hormone, cortisol. Healthy fats, including omega 3 fatty acids, and adequate dietary cholesterol are also essential because many hormones are made from cholesterol, so extremely low-fat diets are not

recommended.

"A diet rich in fibre, particularly from vegetables and whole grains, ensures spent hormone elimination, while cruciferous vegetables like broccoli, cauliflower and kale may help the body process and excrete excess oestrogen. For some women, avoiding prolonged fasting may also help reduce unnecessary stress on the body and support more stable hormone regulation."

We must also not underestimate the power of lifestyle and the positive changes that moving away from sedentary behaviour can bring.

Bucher suggested: "In clinic, the two biggest lifestyle factors that reliably deliver the best results are sleep hygiene and parasympathetic nervous system supporting exercise. Leave the phone outside the bedroom and ensure hours before midnight are protected, alongside moving away from either zero exercise or intense HIIT and moving towards Pilates, Tai Chi, yoga and walking outside."

Bailey added: "Beyond diet, sleep is probably the single most underrated lever: seven to nine hours matters because melatonin also exhibits antioxidant and immunomodulatory actions and experimental evidence suggests interactions with oestrogen signalling. Exercise should be tailored rather than maximised. Regular moderate aerobic activity plus resistance training improves insulin sensitivity, preserves muscle and may reduce peripheral aromatisation associated with excess adiposity. High training volumes without adequate recovery may increase physiological stress in susceptible women, so exercise should be individualised. One to two higher-intensity sessions a week is suitable alongside zone 2 training.

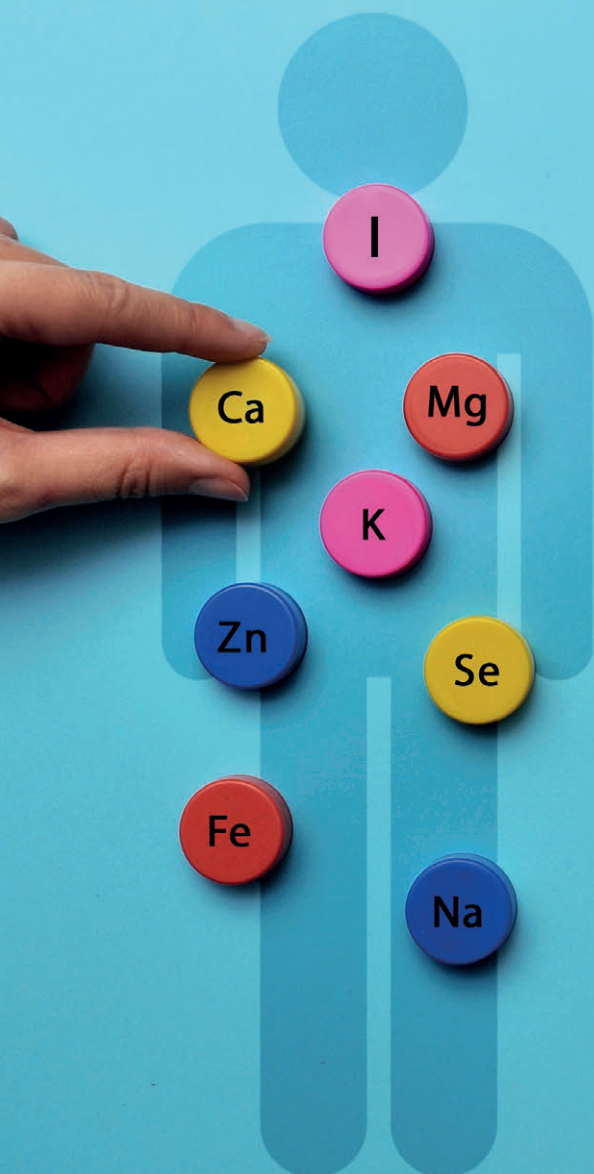
"Actively managing stress matters just as much; chronic activation of the HPA axis suppresses hypothalamic GnRH secretion and alters ovarian steroidogenesis, resulting in lower luteal progesterone production. Breathwork, yoga and, where appropriate, adaptogens such as high-concentration ashwagandha root extract (of the type commercially marketed as KSM-66), shown to reduce cortisol and perceived stress in randomised trials (Chandrasekhar et al., 2012), are genuinely relevant hormonal interventions rather than simply relaxation extras. Finally, reducing unnecessary exposure to endocrine-disrupting chemicals where practical, for example swapping to glass or stainless steel food and drink containers."

Bradshaw continued: "Regular physical activity supports metabolic health, insulin sensitivity, muscle mass and bone strength. Good-quality sleep is essential for the normal release of cortisol, melatonin and growth hormone. Stress management is equally important. Chronic stress can influence multiple hormone pathways, so practical strategies – time outdoors, movement, mindfulness or restorative activities – can help support overall endocrine balance."

Faulkner went on: "Managing stress is one of the most important lifestyle factors to manage hormone balance, as chronically elevated cortisol can affect many other hormones. Incorporating activities that you can unwind and relax to make a big difference in bringing cortisol levels down. Think activities like walking, yoga, or anything else you find enjoyable where you can be present. Regular physical activity, including both strength training and aerobic exercise like running, can help to improve blood sugar regulation, enhance insulin sensitivity, and reduce stress. Maintaining a healthy body weight, getting adequate sleep, and limiting alcohol intake can also support healthy hormone balance."



*“Protein provides amino acids needed for peptide hormone synthesis, while healthy fats supply cholesterol and essential fatty acids required for steroid hormone production.”*



## NUTRIENTS FOR HORMONES

So, what nutrients would be considered the most important to support hormone function?

Faulkner explained: “Several nutrients play an important role in maintaining healthy hormone balance. Vitamin B6 is involved in hormone production and has been shown to support hormone regulation, particularly in relation to menstrual health. Magnesium supports healthy hormone balance and is involved in over 300 cellular processes. It directly regulates cortisol, promotes oestrogen clearance, and helps to balance blood sugar levels. It also helps convert inactive thyroid hormones into their active forms. Chronic stress and elevated cortisol levels can deplete magnesium stores, so it’s recommended to supplement to help with hormonal support.

“In addition to nutrients, some herbal supplements such as milk thistle may support liver function, while adaptogenic herbs like ashwagandha and rhodiola have been traditionally used to help the body manage chronic stress, and therefore hormone balance. Lemon balm, in combination with the amino acid, L-theanine, can also be helpful for managing stress symptoms, whilst saffron is beneficial for helping manage PMS symptoms including low mood and cravings and poor sleep.”

And Bradshaw recommended: “Many nutrients contribute to healthy endocrine function. Protein provides amino acids needed for peptide hormone synthesis, while healthy fats supply cholesterol and essential fatty acids required for steroid hormone production. Micronutrients also play essential roles. Iodine and selenium support thyroid hormone production and activation. Magnesium contributes to hundreds of enzymatic reactions relevant to energy metabolism and hormone signalling. Zinc supports reproductive and immune function. Vitamin D influences bone, muscle and immune health. Iron remains important for individuals experiencing menstrual blood loss, and B vitamins underpin energy metabolism, which supports hormone-dependent processes.”

Meanwhile, Bailey suggested: “A handful of nutrients come up again and again in the research, largely because they act as cofactors for the pathways that clear and metabolise hormones, or for neurotransmitter synthesis that hormones influence. Magnesium supports GABA-A receptor function, dampens HPA reactivity and may influence prostaglandin production. I typically use 200–400mg a day as glycinate or bisglycinate. Vitamin B6, ideally as active P5P, is essential for GABA, serotonin and dopamine synthesis and for oestrogen methylation; a crossover RCT found a modest but significant benefit for anxiety-related PMS symptoms specifically from the combination of B6 with magnesium, rather than from B6 alone (De Souza et al., 2000).

“Zinc plays roles in steroid hormone synthesis, prostaglandin regulation and histamine clearance, with a recent 2025 systematic review and meta-analysis, suggesting benefit for PMS psychological symptoms at 30mg a day or more (Haider et al., *European Journal of Obstetrics & Gynaecology*, 2025). Omega 3 (EPA/DHA, around 2g a day) reduces inflammatory prostaglandins. Vitamin D modulates serotonin synthesis and immune regulation, though benefit is mainly seen in women who are deficient (Tartagni et al., 2016). Calcium (1000–1200mg a day) has shown a significant reduction in PMS symptom scores in trials, around 48 per cent improvement versus 28 per cent with placebo (Thys-Jacobs et al., 1998). Folate (as 5-MTHF) and B12 support methylation and oestrogen clearance (Zeitoun & El-Sohemy, 2025), while iodine and selenium are essential for thyroid hormone production and conversion, underpinning the whole metabolic and mood picture.”

Bucher went on: “Magnesium for progesterone production and stress resilience, B vitamins for liver support for clearing used oestrogen, zinc for ovulation support, omega 3 for prostaglandin balance, vitamin D for regulating cycle (low levels have been associated with irregular cycles), iodine and selenium for thyroid support, and iron through food sources, which supports energy levels particularly important with heavy periods.”



## HORMONAL HEALTH



# Human 2.0: Hormones Under Attack

Hormonal health is no longer simply an endocrine issue.  
It is a window into the health of the entire human organism.

### Why the future of our health depends on protecting the body's most delicate communication system

**W**e are witnessing a silent epidemic. Across the developed world, fertility is declining, obesity is rising, puberty is changing, metabolic diseases are appearing earlier in life, and disorders affecting mood, cognition and development are becoming increasingly common. While these conditions may appear unrelated, many scientists are asking whether they share a common denominator: disruption of the endocrine system.

Taking Italy as an example: it reflects this global trend. According to the latest ISTAT data, only 355,000 babies were born in 2025, the lowest number ever recorded. Fertility has fallen to just 1.14 children per woman, well below the replacement rate of 2.1, continuing a pattern that extends across Europe, North America and much of Asia. At the same time, male fertility has declined dramatically, with average sperm counts falling by more than 50% over the past four decades. Obesity, insulin resistance, thyroid disorders and reproductive challenges continue to increase, even among young adults.

These statistics are more than demographic observations.

They may represent one of the clearest biological signals that modern human health is under unprecedented pressure. Our hormones act as the body's master communicators. They regulate growth, reproduction, metabolism, immunity, brain development, sleep, mood and ageing. Even small disturbances within this intricate network can create ripple effects throughout the entire organism.

Today, this delicate system is being challenged from multiple directions. Thousands of endocrine-disrupting chemicals, including bisphenols, phthalates and PFAS, have entered our environment. Air pollution, ultra-processed foods, chronic psychological stress, disrupted circadian rhythms, sedentary lifestyles and nutritional deficiencies all contribute to a growing physiological burden. Scientific literature continues to document how these factors can interfere with normal hormonal signalling, particularly during pregnancy, childhood and adolescence, when the endocrine system is most vulnerable.

As an A.R.T.\* (Autonomic Response Testing®) practitioner, however, I have learned that hormones rarely tell the whole story on their own. Rather than viewing endocrine dysfunction as an isolated diagnosis, A.R.T. encourages us to understand the body as an integrated biological system. Hormonal imbalance is often closely connected with autonomic nervous



### About Dr h.c. Daniela Deiosso, MSc

Daniela Deiosso holds an honorary doctorate (Dr h.c.) in Integrative Medicine and Medical Education awarded by Kennedy University, a Master's degree in Neuroscience from King's College and a Post-Graduate Diploma in Anthroposophic Medicine from Goetheanum Medical Section. She is the co-founder of the Klinghardt Institute and founder of A.R.T.\* Global Education and Ki Science. Daniela has been instrumental in advancing Autonomic Response Testing® (A.R.T.\*), pioneering its teaching and education programmes. Drawing on her anthroposophical training and A.R.T. expertise, she collaborates with practitioners worldwide and focuses her clinical work on neurodevelopmental disorders and autism.



system regulation, chronic inflammatory processes, environmental toxicology, nutritional status, microbial burden, emotional stress and even oral health. These systems constantly communicate with one another, and when one loses balance, the effects are rarely confined to a single organ or gland.

This systems-based perspective is becoming increasingly relevant as we observe younger generations facing health challenges that were once considered uncommon. Earlier puberty, metabolic dysfunction, fertility concerns, chronic fatigue, autoimmune diseases and complex neurodevelopmental presentations are all placing new demands on clinicians. At the same time, there is growing attention to the increasing number of young people presenting with questions surrounding gender identity and gender dysphoria. While the causes are likely multifactorial and remain an active area of scientific research, these broader trends remind us that endocrine, neurological, psychological and environmental health cannot be considered in isolation.

The challenge facing medicine today is therefore not simply to replace hormones or suppress symptoms. It is to understand why the body's regulatory systems are becoming increasingly vulnerable and how we can restore resilience through prevention, environmental awareness, personalised care and interdisciplinary collaboration.

These questions will form the focus of the 8th International Our Health, Our Future Congress, taking place in Rome on 3 October 2026 at the TH Roma Carpegna Palace Hotel.

Entitled "Human 2.0: Hormones Under Attack," this year's conference will bring together internationally recognised physicians, researchers and scientists to explore one of the defining public health challenges of our time. Topics will include endocrine disruptors, environmental toxicology, fertility, obesity, metabolism, neurodevelopment, nutrition, biological dentistry, personalised medicine and practical strategies to protect hormonal health across all stages of life.

Among the distinguished international faculty are Professor Angus Dalgleish, Professor Giovanni Frajese, Dr Nicola Antonucci, Dr Dietrich Klinghardt, Dr Sarah Myhill, Gillian Crowther MA (Oxon) ND/NT, Dr Rob Verkerk and myself, alongside other experts who share a commitment to advancing a more integrative understanding of human health.

The future of medicine will not belong to one discipline alone. It will belong to those willing to connect endocrinology with neuroscience, environmental medicine with nutrition, biological dentistry with immunology, and scientific evidence with a truly patient-centred approach.

If we are to protect the health of future generations, we must first understand the invisible systems that sustain human life. Our hormones are among the most fundamental of these systems. Protecting them may prove to be one of the most important medical priorities of the twenty-first century.

## Join us in Rome!

### Our Health, Our Future Human 2.0: Hormones Under Attack 8th International Conference

#### Why Attend?

Join leading international physicians, researchers and healthcare professionals for a full day dedicated to understanding one of the greatest health challenges of our time: the growing disruption of the human endocrine system. Discover the latest scientific evidence and practical clinical strategies on:

- Endocrine disruptors and environmental toxicology
- Hormonal health across the lifespan
- Fertility and reproductive health
- Obesity, metabolism and insulin resistance
- Thyroid and adrenal function
- Neurodevelopment and the hormonal brain
- Nutrition and lifestyle medicine
- Biological dentistry and systemic health
- Integrative and personalised medicine
- Prevention and clinical approaches for the future

#### International Faculty

Prof. Angus Dalgleish

Prof. Giovanni Frajese

Dr Nicola Antonucci

Dr Dietrich Klinghardt, PhD

Dr Sarah Myhill, MB BS

Gillian Crowther, MA (Oxon), NT/ND

Dr Rob Verkerk, PhD

Dr h.c. Daniela Deiosso, MSc

ECM/CPD Accreditation: credits available for eligible healthcare professionals.

#### Our Health, Our Future

Exploring today's science. Shaping tomorrow's medicine.

#### Registration

[www.luma.com/ohf2026](http://www.luma.com/ohf2026)

#### Further information

[info@klinghardtinstitute.com](mailto:info@klinghardtinstitute.com)

#### Time and location

Saturday, 3 October 2026

9:00 am to 6:00 pm

TH Roma Carpegna Palace Hotel

Via Aurelia 481

Rome, Italy

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# OPTIMISING IMMUNE HEALTH

Understand immunity and the long-term consequences of poor function, and help guide clients to better immune balance.

**T**he most common time of year to focus on immune health is just ahead as autumn arrives. Yet, far from being a narrow window to 'boost' immunity at a given time of year, achieving immune balance consistently is something that should be seen as a year-round focus.

There is no doubt that this requires education around consistency, especially when you consider the body systems that can be affected by low immunity, particularly over a prolonged period. But what the autumn seasons does provide practitioners with is an opportunity to highlight the importance of immune health, given it is the time when people need it the most.

Lindsay Powers, Nutritional Therapist and Head of Nutrition at Good Health Naturally, advised: "In winter, most of us spend more time indoors, often in closer contact with others and in environments with central heating and poor air circulation. This creates ideal conditions for viruses such as the common cold and influenza to spread. Additionally, cold air tends to be dry, and indoor heating reduces humidity even further. This can dry out the nasal passages and throat. These mucous membranes form a vital first line of defence in the immune system, helping to trap and expel microbes. When they become dry, they're less effective, making it easier for infections to take hold."

Siobhan Carroll, Medical Herbalist at A.Vogel, added: "Autumn and winter create the perfect storm for coughs and colds. As the weather gets colder, we spend more time indoors in close contact with other people, making it easier for viruses to spread. Schools,

universities and workplaces become major hubs for passing bugs around, particularly when children return to the classroom after the holidays. The body is also adapting to changing seasons, which can weaken the immune system. At the same time, many people are under more stress, get less daylight exposure and may have lower vitamin D levels. Supporting the immune system before winter arrives can make a real difference."

## The immune system explained

The immune system is a complex network, involved in many functions.

William Jordan, Nutrition Advisor at Viridian Nutrition, explained: "The body's defence system of cells, tissues and organs that fight off pathogens including harmful bacteria, virus, fungi, and parasites. There are two sides to the immune system, being innate and adaptive immunity. The innate system is what we are born with, it is fast acting and immediately targets any pathogens non-specifically. The adaptive immune system is slower and highly specialised. This immune system 'learns' from previous infections, or vaccines, creating immunological memory for faster and targeted responses to previous pathogens. There are several factors that can lower or weaken our immune system, including stress, poor sleep, restricted diets, and low physical activity. Smoking and drinking excessive alcohol can also weaken the immune system. Finally, underlying medical conditions or certain medications may also cause immune system dysfunction."

Powers went on: "The immune system is

a sophisticated network that works tirelessly to protect us, including the skin, which acts as a natural barrier, immune cells that fight invaders, and antibodies that help manage infections and allergies. Innate immunity is the defence system we are born with. It is the first line of defence against microbes entering the body and eliminates them quickly if they do. It includes physical barriers such as the skin and mucous membranes in the throat and gut. If pathogens manage to breach these barriers, a second line of defence is activated, involving antimicrobial substances, inflammation, fever, and white blood cells such as natural killer cells and phagocytes.

"If a pathogen manages to evade these innate defences, the adaptive immune system takes over. The adaptive response develops over time. Each time a microbe enters the body, it triggers an immune response. Lymphocytes recognise the antigen and produce antibodies that bind to it, flagging it for destruction by other immune cells, such as phagocytes. The body builds a 'library' of antibodies, known as immunological memory, enabling it to recognise and respond more rapidly when exposed to the same pathogen

"Approximately 70 per cent of immune tissue resides in the digestive system, in what's known as gut-associated lymphoid tissue. The gastrointestinal tract is technically 'outside' the body and home to many potentially harmful microorganisms. To manage this, the gut's mucosal lining is rich in immune cells, including lymphocytes and macrophages. Ongoing research shows that gut microbiota plays a key role in the development and regulation of both innate and adaptive



immune responses.

"A poor diet and an unhealthy lifestyle can significantly weaken the immune system. If the body doesn't receive the daily nutrients it needs, the immune response will be compromised and more vulnerable to illness and infection. Consuming too many processed foods, sugary snacks, and refined carbohydrates not only increases the risk of deficiencies but may disrupt gut bacteria and trigger chronic inflammation. This can activate the innate immune system while impairing the adaptive response, weakening the body's ability to fight off pathogens. Smoking, excessive alcohol intake and chronic stress can further deplete vital immune-supporting nutrients such as vitamin C and zinc. Without these key nutrients, the body may struggle to mount a strong immune defence.

"Sleep is a critical time for the body

to carry out immune maintenance. It is when the body replenishes energy stores, repairs tissues and produces essential immune proteins such as cytokines. These cytokines are necessary for regulating immune responses, especially during times of infection, inflammation or stress. If sleep is lacking, cytokine production drops, weakening the body's natural defences. Chronic stress can weaken the immune system. Obesity has a significant negative impact on immune health. Excess fat tissue promotes chronic low-grade inflammation and interferes with immune cell function. It alters cytokine production and can reduce the effectiveness of key immune cells like macrophages and natural killer cells."

Ella Owen, Nutrition Advisor at Kinetic, which has brands including Nature's Answer and Trace Minerals, continued: "Immune cells develop in the bone marrow

and thymus. The spleen and lymphatics are involved in activating and circulating immune cells throughout the body. A large proportion of immune cells reside in the gut as gut-associated lymphoid tissue (GALT). The immune system also has an important role in coordinating the body's inflammatory response and supporting repair and recovery after injury. There are two main parts to the immune system; the innate and acquired (adaptive). Innate immunity is a generalised response to harmful agents and is the first line of defence. Acquired immunity learns from previous exposure and is highly specific in its response by activation of T cells and B cells.

"From a nutritional perspective, immune function is influenced by a wide range of underlying factors, including gut health and microbiome activity, nutritional status, metabolic health, stress load and sleep





# Immunity



quality. Inadequate intake of key nutrients such as protein, zinc, iron, and vitamins A, C and D may contribute to impaired immune regulation and chronic low-grade inflammation. Psychoneuroimmunology (PNI) is a discipline that looks at the interaction between the immune system, endocrine system and nervous system. This body of research shows that increased stress over periods of time can significantly affect the function of the immune system and be a risk factor for many health problems.”

Carroll continued: “Some of the biggest immune saboteurs are chronic stress, poor sleep, a diet high in processed foods and sugar, excessive alcohol consumption and lack of exercise. Modern life unfortunately tends to tick quite a few of those boxes. When immunity is struggling, you may find yourself catching every bug going around, taking longer than usual to recover from infections, or developing secondary infections such as sinusitis or chest infections after a cold. Other signs can include fatigue, slow wound healing, frequent cold sores and digestive issues

“It is interesting to note that short-term stress can increase immunity (for example, the stress our bodies get from exercising). However, research confirms that long-term, chronic stress, which most of us are dealing with at the moment, has consistently been shown to have negative effects.<sup>1</sup> It is also worth noting that sleep quality, as well as circadian rhythm, play a role in immune function, as highlighted in research.<sup>2</sup> So, it is worth getting to bed before midnight (when the hours of sleep are more restorative) and maintaining regular times for going to sleep and getting up to maintain a balanced circadian rhythm.”

## PERSISTENT LOW IMMUNITY

There are some obvious immediate symptoms someone may need to nourish immunity, such as catching a cold. But the true picture in terms of the health impacts goes much further.

“Prolonged low immunity can increase vulnerability to a range of health issues,” Powers explained. “A weakened immune system makes it easier for viruses and bacteria to take hold, leading to more frequent or severe colds, infections and respiratory problems. In addition, wounds may take longer to heal, as the skin’s ability to repair itself is compromised when immunity is low.”

Carroll added: “What many people don’t realise is that a healthy immune system doesn’t just help us fight off coughs and colds. It also plays a role in wound healing, inflammation, recovery from illness and even how energetic we feel day to day. In fact, we come into contact with countless germs every day and often never become ill because our immune system quietly deals with them before symptoms ever develop.

“One of the biggest benefits of a robust immune system is that even when people around you are getting sick, you can often fight off an infection before symptoms show up. But, when immune function is low, you seem to come down with every bug going around and it can also take much longer to get better. You may also be prone to secondary infections, for example, a bacterial chest or sinus infection, when your immune system has taken a hit from a cold-causing virus. Some people notice persistent fatigue or ongoing low energy following illness, sometimes lasting weeks or months.”

Jordan continued: “Signs that you have a weakened immune are that you will experience frequent, lingering infections, have slow healing of wounds, constant fatigue, and even persistent digestive issues. There are some potential long-term health issues with prolonged, low immunity. You are more likely to experience frequent, severe, and lingering infections and slow wound healing. You can also experience fatigue and weakness as your body is having to work constantly to fight off infections. More extreme health issues can be organ damage, or systemic infections such as sepsis.”

## IMMUNE HEALTH STRATEGY

Consistent healthy habits are important to support immunity throughout the year, but when educating clients around the factors that can lower immunity, there are some key points.

Owen explained: "Lowered immunity means we have less resistance to viruses and pathogens, and this can manifest as constant colds, coughs, sore throats, tiredness and fatigue. Recovery time after exercise can be prolonged, as with healing from illness or injury. We may first notice that cuts and grazes not healing up as quickly as they have done before. Many health issues are affected by immune dysregulation, which includes recovery from all types of infections. Immune dysregulation can lead to chronic low-grade inflammation, which is thought to be an underlining factor in many common health issues from arthritis to heart health. An overgrowth of unfriendly microbes can upset the sensitive balance of our microbiome, making us more susceptible to digestive issues like IBS, skin issues and more. Chronic fatigue syndrome has also been linked to compromised immunity."

Jordan added: "Sleep is a critical biological pillar for immune health. Sleep allows the body to regulate immune responses, inflammation, and infection. Chronic sleep deprivation can increase vulnerability to infections and increase risk of chronic diseases. Aiming to get seven to nine hours of sleep per night is essential to support the immune system. Short-term stress can temporarily boost immunity, however, chronic long-term stress overworks the body and floods it with the stress hormone, cortisol. This can suppress immune function and increase inflammation, making the immune system less effective."

Owen also suggested: "The lifestyle choices we make to manage our responses to mental and physical stressors can positively influence immune status. Make a daily habit of something that helps you feel grounded and connected, such as walks in nature, gentle movement, meditation, craft making, painting, and so on. Wearing scarfs and warm outdoor clothing on cold winter days will help protect the throat and lungs from external factors."

Powers added: "Physical activity is another cornerstone of immune health. Aim for at least 20 minutes of moderate-intensity aerobic exercise a day, like walking, cycling or jogging. Resistance training is also important for maintaining muscle strength and mobility. Managing stress through practices such as mindfulness, meditation, yoga, Tai Chi, and Pilates can help build resilience."

From a dietary perspective, this requires some relatively straightforward changes.

Owen pointed out: "An official health survey for England in 2018 found that only 28 per cent of adults were eating the recommended five portions of fruit and vegetables per day. What with nutrient depleted soils, as well as nutrient deficiencies caused by digestive issues and stress, it is likely that many people fall short of the immune-supportive nutrients that a varied, plant-rich diet supplies. The colour pigments in fruits and vegetables are nutritional powerhouses, rich in flavonoids and anthocyanins. Focus on zinc, contained in seafood, egg yolk, seeds, red meat and whole grains. Brazil nuts are a good source of selenium. Reduce foods that negatively impact the immune system, notably sugar, alcohol, heavily processed foods and refined carbohydrates."

Powers added: "Our food choices can have a profound impact on

immune health. A nourishing diet rich in vegetables, fruits, healthy fats, nuts, seeds and pulses with good-quality meat and fish helps ensure a wide range of vitamins, minerals and antioxidants, which are all needed to support immunity. Fibre and fermented foods such as kefir, kombucha, and sauerkraut will help support the microbiome, which is closely linked to immune function.

"Vitamin C-rich foods such as oranges, blackcurrants, peppers, and broccoli can also help strengthen immunity, particularly in the colder months. Since vitamin C cannot be stored in the body, it must be consumed daily. A deficiency can increase susceptibility to infections. Research suggests flavonoids can help reduce the risk of respiratory infections. Good sources include blackberries, apples, bananas, pears, tomatoes, aubergines, onions, celery, artichokes, walnuts, pecans, and beans.

"Turmeric, commonly used in curries, contains curcumin, a compound known for its antioxidant and anti-inflammatory properties. It may help reduce inflammation and inhibit viral replication. Garlic,

used for centuries to support immunity, contains allicin and other compounds shown to combat bacteria, viruses and fungi, potentially reducing the severity and duration of colds and flu."

And Carroll advised: "The most effective immune support always starts with the basics. Focus on a diet built around real, minimally processed foods rather than ultra-processed products, aiming to include a wide variety of colourful vegetables, berries, leafy greens, nuts, seeds, beans and good-quality protein. An immune-supportive diet naturally provides key nutrients such as vitamin C, antioxidants and phytonutrients that help the immune system function optimally. Garlic, onions, mushrooms and

ginger are particularly valuable additions and are easy to include regularly in everyday cooking.

"One often-overlooked factor is gut health, as a large proportion of the immune system is linked to the digestive tract. Supporting a healthy microbiome through fibre-rich foods and a diverse range of plant foods is key – some people find it helpful to aim for around 30 different plant foods a week to encourage microbiome diversity. Fermented foods such as yoghurt, kefir and sauerkraut can also help support beneficial gut bacteria. How and when we eat can also make a difference. Constant snacking or eating late into the evening can keep the body focused on digestion, leaving less capacity for repair and recovery processes. Where possible, it can be helpful to allow clear breaks between meals and avoid eating too close to bedtime, unless there is a specific medical reason not to."

Jordan added: "Stable blood sugar levels directly support strong immune function. High blood sugar creates constant inflammation which forces the immune system to constantly work and leaves fewer resources available to fight off real threats. Including a wide range of colourful fruit and vegetables as these will provide a range of vitamins and minerals, including vitamin C and vitamin A, and nuts, seeds, seafood, and wholegrains will provide a good amount of zinc.

"Fermented foods like sauerkraut, kefir, live yoghurt, and kimchi will help support your gut microbiome, alongside prebiotic foods as well. Omega 3 fatty acids are also important for supporting the health of the mucous membranes which are a key factor in the immune system, so aiming to have oily fish at least twice a week and chia and flax seeds can help too."

*"It is interesting to note that short-term stress can increase immunity. However, research confirms that long-term, chronic stress, which most of us are dealing with at the moment, has consistently been shown to have negative effects."*



## NUTRIENTS OF NOTE

There are some key vitamins, minerals and botanicals that are important for immune health. This relates to both supporting immunity, but in aiding symptom relief if people do fall ill with a bug.

Essential fatty acids rank as one of the most important, with Jordan advising: "Low omega 3 levels weaken the immune system by leaving cell membranes stiff and unable to send signals properly. Additionally, this can cause chronic inflammation and poor infection recovery."

Powers also suggested: "Supplementing with zinc and selenium can help support immunity. Due to modern soil depletion, levels of these minerals in our food may be lower than in the past, making supplementation a practical option for many. Olive leaf extract is increasingly recognised for its immune-supportive properties. It contains a powerful compound called oleuropein, which has been shown to have antiviral, antibacterial and anti-inflammatory effects. Some studies suggest it may shorten the duration and severity of cold or 'flu-like symptoms."

And Owen recommended: "If you want to supplement with nutrients such as zinc to prepare for the cold season, start early as it could take weeks to replenish levels. Zinc maybe difficult for some to absorb, so consider a liquid format such as ionic zinc, which also offers flexible dosing."

The gut also requires focus, with Jordan advising: "Ensuring the gut microbiota is full of beneficial bacteria is key for immune health. Specific bacteria strains, such as *Lactobacillus rhamnosus* GG helps to support and strengthen the immune system. Alongside this, prebiotics are vital to support them. Acacia gum is a probiotic which has been found to defend against infection."

From a symptom management perspective, Jordan went on: "Beta 1/3, 1/6 glucan can be a good addition to the more well-known immune supporting nutrients. Beta glucans can aid in the defence against of pathogens by modulating inflammatory and antimicrobial activity. Additionally, it can reduce incidence and symptom severity of upper respiratory tract infections. Elderberry is one of the most commonly used medicinal plants in the world, with a long history of use in traditional medicine for upper respiratory tract infections. Elderberry is packed with antioxidants, which can help to manage inflammation and reduce cell damage.

"Elecampane has a real affinity for the



lungs, especially if there is a lot of mucous. It has a warming, expectorant quality and is very restorative to lung tissue. Studies suggest garlic has anti-viral action and may lower your chances of catching 'flu or a common cold. It can also reduce severity and duration. These effects are thought to be from its ability to block viral entry into cells, viral replication, and its ability to encourage the immune system to respond when it encounters a virus.

"Andrographis is also helpful for relieving symptoms of the common cold. Not only does it help relieve sore throat and nasal congestion, but it also reduces the tiredness that often accompanies a cold. This extends to respiratory infections too, where it reduces duration of infection and helps relieve symptoms when taken as the infection starts. Echinacea provides a broad spectrum of effects on the immune system alongside its anti-viral and bacterial effects. Another herb is ashwagandha; traditionally used for bronchitis and asthma, as an adaptogen it can be supportive to those who have high stress and therefore immune suppression."

Carroll continued: "Once you've actually come down with a cold, I think it's often more helpful to focus on your overall diet rather than obsessing over individual nutrients. Your body needs plenty of nourishment to mount an effective immune response, so prioritise warming soups, stews, broths, vegetables, fruit and adequate protein. At the same time, try to reduce foods that can work against recovery, particularly sugar and highly-processed foods, which can promote inflammation. Some people also find reducing dairy helpful

if congestion and excess mucus are an issue. Herbal remedies can be particularly useful at this stage too. Ginger, garlic and elderberries are also excellent foods and herbs to include when you're feeling under the weather.

"Echinacea is one of the most well-researched herbs for immune health and is my go-to recommendation for supporting the body's natural defences throughout the colder months. Foods and herbs such as elderberries, garlic and ginger are also fantastic additions, providing natural compounds that support immune resilience alongside a healthy diet and lifestyle. Support from herbs such as passiflora, avena sativa, lemon balm and valerian can be useful for calming the nervous system; while adaptogens like Siberian ginseng may help the body cope with periods of sustained stress."

Owen added: "Mullein leaf is traditionally used to support the respiratory system, particularly where a dry cough is present. Classified as both an expectorant and a demulcent, it may help the body expel excess mucus while also soothing irritated mucous membranes. Its demulcent, mucilage-rich constituents give a soothing quality used to coat and lubricate tissue surfaces to support comfort and healing. This botanical has been used as a supportive, healing aid for conditions including dry cough, hoarseness, tonsillitis, catarrh, allergic rhinitis (hay fever) and bronchitis.

"For multi-system family cough support, consider a natural cough syrup containing mullein, marshmallow, plantain, elderberry, and English ivy in pure honey (without added sweeteners) to help clear mucus, soothe an irritated throat, and ease coughing."

## Vitamin focus

Let's examine the key vitamins needed to support immune health and how they can be obtained.

Vitamin D ranks as one of the most important for immune health, with Jordan commenting: "Vitamin D deficiency is common among those with low immunity. This often occurs over the autumn and winter months when we are unable to make our own vitamin D in our skin from sunlight. Low vitamin D symptoms include fatigue, muscle weakness or aches, low mood, and frequent infections."

And Powers advised: "Low immunity can have many contributing factors, but nutritional status is one important consideration. Deficiencies in nutrients such as vitamin D, vitamin C, zinc, selenium, iron and vitamin A may affect normal immune function. Vitamins C and D are usually at the top of the list when it comes to supplementing for immune support.

"Research increasingly shows vitamin D plays a vital role in immunity and low levels have been linked to an increased risk of colds and infections. With limited sunlight exposure during the colder months, vitamin D supplementation is widely recommended. Vitamin C supports various cellular functions of the immune system and helps protect against oxidative stress. The body can't store vitamin C, so it must be consumed daily, either through diet or supplementation."

And Owen suggested: "Consider vitamin K2 alongside vitamin D3, especially for those supplementing high dose vitamin D3

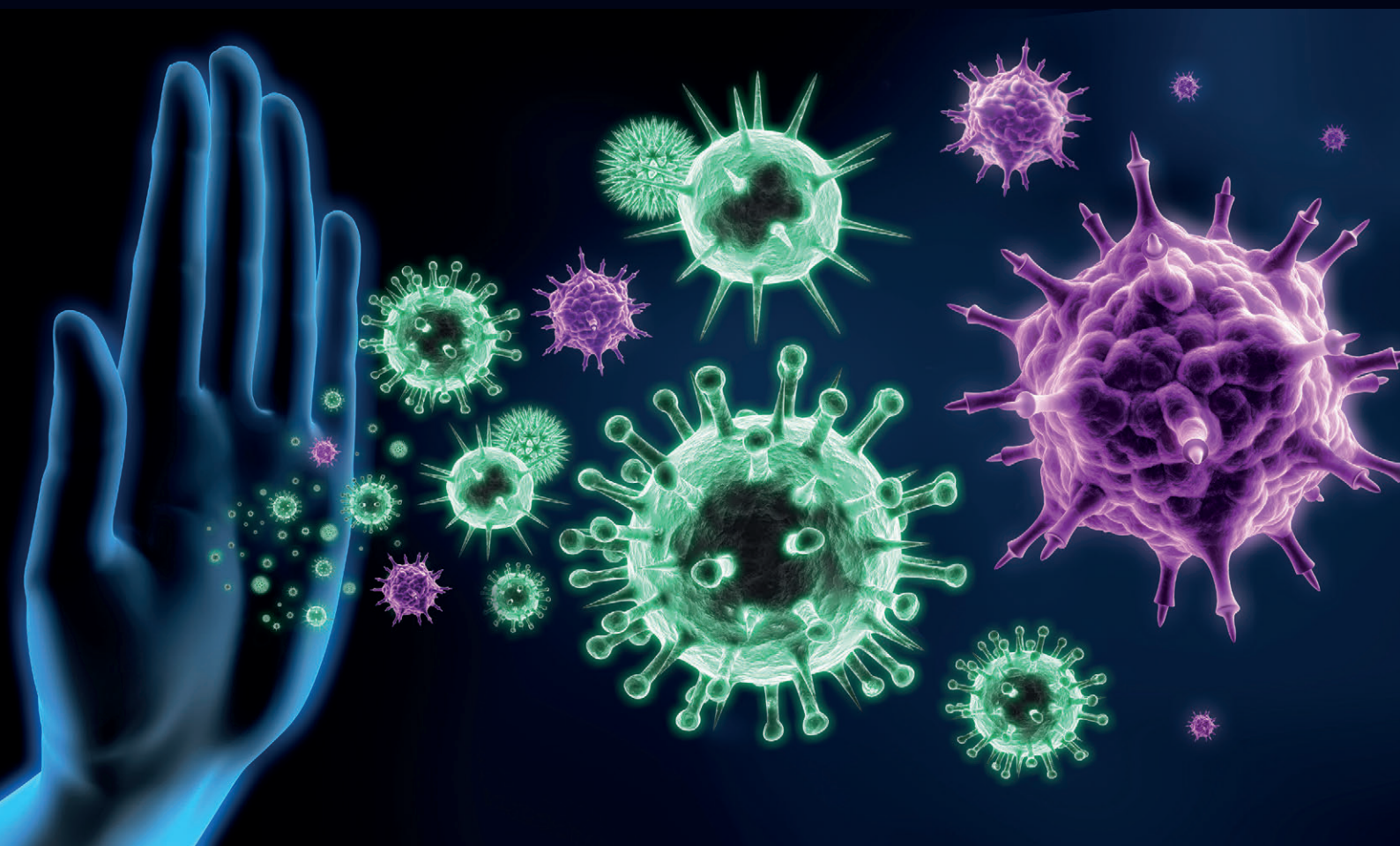
(above 1000iu or 2000iu daily) or from midlife onwards. We know that vitamin D3 supports absorption of calcium from the diet and vitamin K2 assists the transportation of calcium to the bones where it is needed, working to prevent calcium building up in the arteries and soft tissues. Ideally, for effective absorption, go for a vitamin D3 and K2 supplement suspended in a pure MCT oil or olive oil base, as these nutrients are fat soluble."

In terms of other vitamins, Jordan went on: "Vitamin A deficiency directly weakens the immune system by impairing both physical barriers, including the skin and gut mucosa, and the function of white blood cells. Vitamin C supports both the innate and adaptive immune systems. It promotes blood cell function, acts as a cellular antioxidant, and helps to maintain the skins barrier against pathogens. There is also evidence vitamin C may help prevent respiratory infection induced asthma.

"B vitamins, particularly B6, folate (B9), and B12, are essential for keeping the immune system functioning smoothly. Those following restricted diets, or plant-based diets may be low in any of these vitamins. B vitamins help produce antibodies, maintain mucosal barriers, and ensure immune cells have the energy needed to fight off pathogens and combat inflammation."

Owen added: "Vegans and those on a plant-based diet need to be careful to consume adequate amounts of vitamin B12 in their diet as B12 is needed for normal immune function, as well as energy levels, a supplement of vitamin B12 may be advisable."

***"Deficiencies in vitamin D, vitamin C, zinc, selenium, iron and vitamin A may affect normal immune function. Vitamins C and D are usually at the top of the list when it comes to supplementing for immune support."***





# The gut can turn up the volume: How gut-brain signalling influence ADHD symptom expression

With a new book focused on ADHD, nutrition and gut/brain health, Dr Miguel Toribio-Mateas, clinical neuroscientist, nutrition researcher and applied microbiologist, writes for *Nutrition I-Mag* on the role of the gut-brain in ADHD.

An ADHDer can wake after poor sleep, forget breakfast, run on coffee, push through a morning of sensory and cognitive demands, then wonder why their patience has disappeared by late afternoon. Their ADHD has not suddenly become more severe because of one meal, or because the 'wrong' microbes have taken over. But the biological conditions in which their ADHD is being expressed have changed. Blood glucose may be unstable. Hunger cues may have been missed. Stress chemistry is running high, while the gut, immune system and brain are all responding to the same difficult day.

This is the more useful way to think about the gut-brain connection in ADHD. The gut does not cause ADHD, and improving gut health will not remove a neurodevelopmental difference. It can, however, influence the background physiology that makes impulsivity, stress sensitivity, brain fog and emotional regulation feel easier or harder to manage.

Confusing a modifiable influence with a cause opens the door to cure claims and self-blame when they fail. Framing it as one source of modulation gives us a practical, proportionate area of support, alongside medication, psychological care, sleep and environmental adjustments.

## ADHD is not hiding in the microbiome

Researchers have found differences between the gut microbial profiles of some people with ADHD and those without it, but the findings are

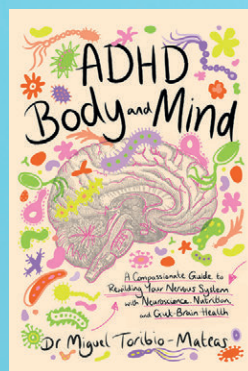
inconsistent. Age, diet, geography, medication, stress, sampling and laboratory methods all affect what is found. A bacterium reported as more abundant in one study may be less abundant in another. Systematic reviews and meta-analyses, therefore, do not support a single, reliable ADHD microbiome (Shirvani-Rad et al., 2022; Wang et al., 2022).

I find that reassuring. ADHD is not the result of one missing bacterial strain, and nobody needs a stool test that claims to reveal the microbial cause of their attention or impulsivity. The microbiome is better understood as one responsive part of a much larger system that's influenced by food, sleep, stress, medication, hormones, movement, social conditions and early-life exposures. In turn, it produces and modifies signals that reach the nervous and immune systems.

In *ADHD Body & Mind*, I describe the microbiome as part of the landscape in which ADHD is lived. Landscapes affect what can grow and how much effort growth requires, but they do not determine the identity of the person living within them.

## Several conversations are happening at once

It'd be simpler if the gut-brain axis consisted of a single wire, but gut-brain communication travels through various routes, including the



vagus nerve, immune mediators, hormones and microbial metabolites. These pathways overlap, which is why a period of stress may be felt at once as altered digestion, a more reactive nervous system, disrupted appetite and less emotional room to manoeuvre.

The immune pathway deserves particular attention.

A diverse microbial ecosystem helps maintain the gut lining and produces short-chain fatty acids (SCFAs), including butyrate, acetate and propionate, when microbes ferment certain fibres. These small molecules help nourish cells in the colon, influence immune activity and participate in gut-brain signalling (O'Riordan et al., 2022). If microbial function and gut-barrier integrity are disturbed, inflammatory signalling may increase. Chronic stress can add to this pressure, creating a loop in which stress changes the gut environment and immune activation increases sensitivity to further stress.

This matters because inflammatory processes can affect neurotransmitter function, cognition and mood. Research is still developing, and inflammation is certainly not present in the same way in every ADHDer. However, an inflammatory biotype has been identified in a subgroup of people with ADHD and linked with chronic stress (Schnorr et al., 2024). A recent review also describes plausible routes connecting gut dysbiosis, oxidative

stress and neuroinflammation with ADHD-related difficulties (Lewis et al., 2025). These findings point towards symptom modulation rather than a new explanation for the origin of ADHD.

The vagus nerve provides another route. It carries information between the internal organs and brain, helping to coordinate digestion, heart rate, immune activity and stress responses. Much of the early mechanistic work comes from animal studies. In one widely cited experiment, a strain of *Lactobacillus rhamnosus* altered GABA-receptor expression and stress-related behaviour in mice, but the effects disappeared when vagal signalling was interrupted (Bravo et al., 2011). Human research is a lot more tentative. Associations between microbial patterns, vagal activity and inflammatory markers continue to be found, but they cannot tell us that particular microbes cause better regulation (Mörkl et al., 2022). That distinction matters when colourful mechanistic science is translated into supplement marketing.

## Beyond the serotonin slogan

Gut-brain discussions frequently rely on the claim that most of the body's serotonin is produced in the gut. The statistic distracts from the biology that is actually relevant. Serotonin produced in the gut belongs largely to the peripheral system; it does not simply travel into the brain and top up mood. That's the Instagram version. The neurobiological reality is that brain and peripheral serotonin are distinct pools.

The microbiome can still influence serotonin-related biology, but through more indirect and interesting routes. Gut microbes can and do influence how tryptophan, the amino-acid precursor to serotonin, is metabolised. Tryptophan may enter the serotonin pathway or be directed towards kynurenine and other compounds with immune and neurological effects (Agus et al., 2018). Microbial metabolites can also influence the gut barrier, immune signalling and cells that communicate with the nervous system. We therefore have a network of influences, not a gut-based serotonin reservoir waiting to be filled with yoghurt.

This is also why the language of 'boosting neurotransmitters' is usually too crude. Mood regulation, motivation and impulse control emerge from interacting brain networks, physiological state and lived context. Food can support those systems, but it does not operate like medication and should never be presented as a replacement for appropriate ADHD care.

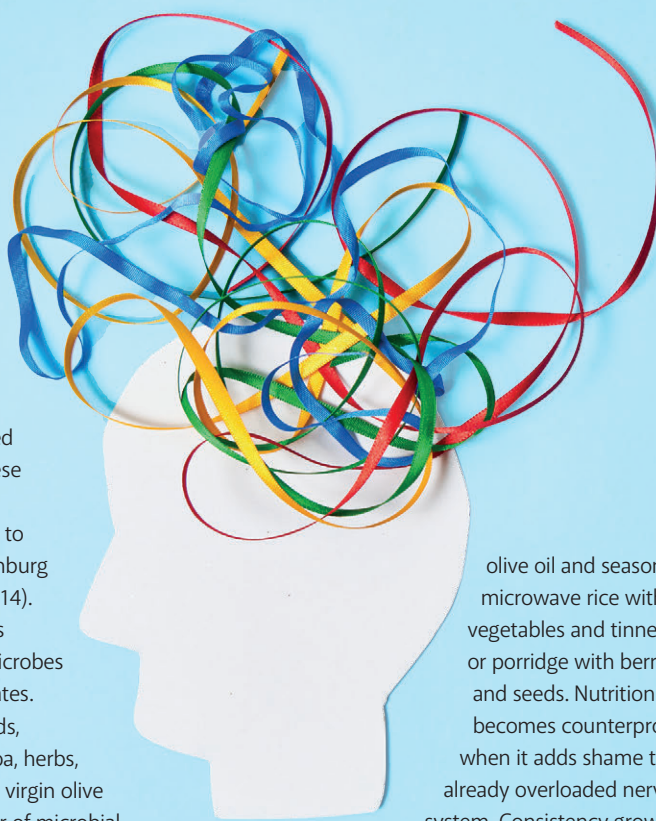
## What does gut support look like on an ordinary day?

The evidence does not give us a special ADHD diet. It supports a flexible pattern that feeds microbial function while respecting appetite,

sensory needs, executive capacity, culture and cost. In practice, that may mean adding one source of microbiota-accessible carbohydrate to a meal you already eat: oats, beans, lentils, fruit, onions, garlic, whole grains, or cooked and cooled potatoes or rice. These fibres give microbes material from which to make SCFAs (Sonnenburg and Sonnenburg, 2014).

Plant variety helps because different microbes use different substrates. Polyphenol-rich foods, such as berries, cocoa, herbs, spices, tea and extra virgin olive oil, add another layer of microbial nourishment. Fermented foods can be useful too, although their effects differ from those of fibre and vary considerably between products and people (Schneider et al., 2024). Sensory safety is important, though. If sour flavours, mixed textures or strong smells are difficult, there is no virtue in forcing kimchi into your life. A tolerated yoghurt, a familiar cheese, or no fermented food at all may be the more supportive choice.

Capacity matters too. In fact, that is a subject that I'm spending a lot of time and energy researching right now. On a depleted day, gut-friendly eating might be a tin of beans with



olive oil and seasoning, microwave rice with frozen vegetables and tinned fish, or porridge with berries and seeds. Nutrition advice becomes counterproductive when it adds shame to an already overloaded nervous system. Consistency grows more

readily from reduced friction than from an ideal plan that cannot be lived.

This relationship between physiology, capacity and self-kindness runs through *ADHD Body and Mind: A Compassionate Guide to Rewilding Your Nervous System with Neuroscience, Nutrition & Gut-Brain Health*. I wrote it to make the science usable without turning food into another performance standard. The gut-brain connection gives us valuable ways to support ADHD health, provided we hold the claims carefully. Your gut can turn the volume of certain difficulties up or down. It does not write the whole song, and it was never responsible for who you are.



## ABOUT THE EXPERT

**Dr Miguel Toribio-Mateas** is a clinical neuroscientist, nutrition researcher and applied microbiologist whose work centres on the gut-brain axis, ADHD, mental health and our relationship with food. He holds a professional doctorate focused on the gut microbiome

and mental health, an MSc in Clinical Neuroscience and a BSc (Hons) in Nutritional Medicine. He is a Chartered Biologist and Member of the Royal Society of Biology, an Honorary Research Fellow at Cardiff University's School of Psychology, and a Senior Lecturer in Nutrition and Public Health at the University of West London. Miguel brings over 20 years of nutrition practice and research, alongside lived experience as an autistic ADHDer. His work connects neuroscience, microbiology and nutrition with the realities of appetite, sensory processing, executive function, chronic stress and limited capacity.

His book, *ADHD Body and Mind: A Compassionate Guide to Rewilding Your Nervous System with Neuroscience, Nutrition & Gut-Brain Health*, published by Jessica Kingsley Publishers, combines more than 450 scientific references with clinical experience, personal reflection and practical tools.

• *Nutrition I-Mag* is offering readers 20 per cent off the book when bought on the Jessica Kingsley Publishers website. Simply enter **MIGNUT20**.



# EXPERT ADVICE

Our panel of nutritional experts offer readers advice on dealing with a variety of issues.

## Q

**Can you explain what NAD is and the role it plays in healthy ageing?**

**WILL JORDAN ADVISED:** Ageing is a natural part of life. It is the biological, physical, and social process of getting older. One of the features of ageing – something that affects every member of a species – is thought to be a reduction in NAD+ and cellular energy production.

Supporting cellular health is fundamental to longevity. The more effective your cells are at producing energy, managing inflammation and oxidative stress, the longer your life

expectancy, and your healthy years, or 'peakspan'. Longevity affects all aspects of health, from joint health, and bone health, to inflammation and cognitive health.

Nicotinamide adenine dinucleotide (NAD+) is a key co-enzyme that fuels production of adenosine triphosphate (ATP), the energy currency of the body by acting like a metabolic battery in the Krebs cycle and electron transport chain (ETC). In simple terms, this is a series of chemical reactions that help breaks down and release energy stored in food, which takes place in the mitochondria.

Supplementing with NAD+ itself has been found to effectively increase NAD+ levels in the body and also support different aspects of health, including inflammation, cognitive

functioning and cardiovascular health.

There are several actives which also increase NAD+ levels in the body and support cellular energy production.

- **Nicotinamide** (vitamin B3) is the raw material and foundational building block the body needs to produce NAD+. Supplementation has been found to increase NAD+ levels in healthy adults. Nicotinamide is used by the cell in a process called the Nicotinamide Salvage Pathway to create NAD+ ready for the Krebs cycle to use and charge to create energy.

- **Nicotinamide riboside** (NR) is a precursor to NAD+ that has been extensively studied in humans, and it has found that both nicotinamide (vitamin B3) and NR enter the cell relatively easily and are then converted into nicotinamide mononucleotide (NMN), and eventually to NAD+. Multiple studies have consistently demonstrated NR supplementation improve NAD+ concentrations when baseline levels are low.

Both NR and NMN are both precursors to NAD+, however, NMN is often converted into NR to enter cell. While in the cell, NMN is closer to NAD+, from a food supplement point of view, NMN is further away from NAD+ than NR.

Supporting cellular health alongside targeted supplements containing NR, and vitamin B3 that effectively raise the body's natural NAD+ levels can also go a long way to improving longevity.



## ABOUT THE EXPERT

**Will Jordan, BSc (Hons) MSc**, is a

Nutrition Advisor at Viridian Nutrition. He holds a Master's degree in Sports and Exercise Nutrition and a BSc in Food and Nutrition. Having worked in the NHS, Will has a hand-on approach in providing nutritional advice to a wide range of people.

# Q

**With the rise in GLP-1 jabs, can you suggest a healthy weight management protocol that naturally supports GLP-1?**

**MIKE WAKEMAN RECOMMENDED:** The remarkable success of GLP-1 receptor agonists has fundamentally changed our understanding of obesity management. These medicines have demonstrated that appetite regulation is central to successful weight loss, but they have also highlighted an important point: healthy metabolism is about far more than simply eating less.<sup>1,2</sup>

GLP-1 is not an on-off switch. It is one component of a complex physiological network involving nutrient sensing, the gut microbiome, gastrointestinal hormones, skeletal muscle, sleep, circadian biology and physical activity. Rather than attempting to replicate pharmaceutical GLP-1 activity, nutritional interventions should aim to support endogenous GLP-1 biology, while preserving metabolic flexibility, lean muscle mass and long-term dietary adherence.<sup>1,2</sup>

A practical protocol therefore begins with protein distribution. Consuming 25–40g of high-quality protein at each meal not only supports satiety but also helps preserve skeletal muscle during weight loss. This is particularly important because muscle is the primary site of glucose disposal and a major determinant of resting metabolic rate. Preserving lean mass should be considered a therapeutic priority alongside fat loss.<sup>6,7</sup>

The second pillar is dietary fibre and the gut microbiome. Fermentable fibres are metabolised by beneficial gut bacteria into short-chain fatty acids (SCFAs), particularly acetate, propionate and butyrate. These metabolites stimulate intestinal L-cells to release endogenous GLP-1 and peptide YY (PYY), while also supporting gut barrier integrity, insulin sensitivity and appetite regulation.<sup>4,5</sup> Approximately one-third of endogenous GLP-1 secretion is thought to arise from nutrient sensing in the distal intestine, where microbial fermentation products act directly on enteroendocrine L-cells. This provides a compelling biological rationale for prioritising fibre quality and microbiome health as part of non-pharmacological weight management strategies.<sup>4,5</sup>

Thirdly, practitioners should encourage



polyphenol-rich dietary patterns. Experimental and emerging clinical evidence suggests that polyphenols from foods such as green tea, berries, cinnamon and other botanicals may influence glucose metabolism, alter gut microbial composition and, in some cases, enhance endogenous incretin signalling. While these effects are considerably smaller than those achieved with pharmacological GLP-1 receptor agonists, they illustrate how multiple dietary signals can work together to support metabolic homeostasis.<sup>10</sup>

Exercise should combine resistance and aerobic training. Resistance exercise provides the anabolic stimulus required to preserve muscle mass during energy restriction, while aerobic exercise improves insulin sensitivity, mitochondrial function and metabolic flexibility. Together, they help ensure that weight loss is driven predominantly by reductions in fat mass rather than lean tissue.<sup>8</sup>

Finally, sleep and circadian health should not be overlooked. Inadequate sleep increases hunger, alters appetite-regulating hormones, reduces insulin sensitivity and may impair dietary adherence. Weight management protocols that ignore sleep are unlikely to deliver sustainable long-term outcomes.<sup>9</sup>

For some individuals, a comprehensive nutritional formulation may complement these lifestyle interventions. Products such as one that combines soluble fibre, botanicals and micronutrients to support appetite regulation, blood glucose control, gut health and normal energy metabolism as part of an energy-controlled diet. Such products should be viewed as an adjunct to, rather than a substitute for, dietary change, regular physical

activity and behavioural support.

Ultimately, the greatest lesson from GLP-1 medicines may not be that we need more powerful appetite suppressants. Rather, they remind us that successful weight management depends on supporting the body's own regulatory systems. The future of nutritional practice may therefore lie not in attempting to imitate pharmaceutical GLP-1 activity, but in optimising the biological networks that naturally govern appetite, metabolism and long-term metabolic resilience.



## ABOUT THE EXPERT

**Mike Wakeman** is a pharmacist, writer,

researcher and healthcare consultant. He has master's degrees in pharmaceutical analysis, nutritional medicine, clinical oncology, healthcare provision and is currently completing a PhD examining the impact medications have on micronutrient status. His research has been published in over 30 peer reviewed journals, and he has twice won the product innovation category of Nutraingredients. He is member of the Royal Society of Medicine, former Chair of the Guild of Health Writers, and an expert NHS ethics committee member. He is Head of Science and Innovation at Evera Nutrition, formulator of Women's Balance, and creator of the Go Lean Plus Weight Management programme.





# Practitioner guide to COLLAGEN

Nutritional Therapist, Maxime Maunand, explores how collagen works and which type to recommend.

Collagen is comfortably the most abundant protein in the body, comprising up to 35 per cent of it.<sup>1</sup> Collagen provides the structural scaffolding for our tissues, giving strength and elasticity to bones, skin, muscle, tendons and cartilage.<sup>2</sup>

Our body can make its own collagen, requiring amino acids like glycine and proline, as well as other cofactors like vitamin C.<sup>3</sup> However, beginning around our mid-20s,<sup>4</sup> the synthesis of collagen decreases by around one per cent each year, which can be accelerated by factors such as oxidative stress from pollutants, chemicals, toxins, and UV exposure (in the context of skin collagen).<sup>5</sup>

Growing evidence suggests that oral indigestion of supplemental collagen may not only help slow the signs of collagen depletion but also rebuild it. But with so many different types of collagen that our body uses, how do we know which one is right for our individual needs? This article will help shed light on some different forms of collagen and what they are used for.

## Type I – skin, tendons, ligaments and bone

Type I collagen is the dominant collagen in the body. It is found in the dermis and accounts for 80 per cent of the collagen in our skin, providing strength and elasticity. It is also a major component in tendons, ligaments and bones.<sup>1</sup>

It has been found to decay at a rate of around 1.5 per cent each year, and its synthesis is prohibited by photodamage.<sup>6</sup> Collagen type I is regulated by the *COL1A1* gene and plays a part in the later stages of wound healing and tissue regeneration.<sup>7</sup>

The changes in oestrogen and testosterone balance as a result of ageing may impact collagen production,<sup>8,9</sup> making type I collagen particularly relevant for skin ageing. Randomised controlled

trials have shown improvements in the appearance of wrinkles after taking type I collagen.<sup>10</sup> Type I collagen breakdown can also be accelerated by the overexpression of matrix metalloproteinases, enzymes that degrade collagen and remodel the extracellular matrix. This can affect the structural environment surrounding cells within tissues and organs. This overexpression is influenced by UV radiation, smoking and oxidative stress.<sup>11</sup>

Type I collagen is commonly obtained from bovine hide and fish skin, scales and bones. *VERISOL* collagen is an example of a bovine collagen, containing specific bioactive type I collagen peptides, and has been found in randomised controlled trials to reduce wrinkle appearance and stimulate production of procollagen,

***“These collagen types don’t work in isolation, and the health of our connective tissue depends on a wider matrix of collagen, elastin, hyaluronic acid, antioxidants, hormones, immune balance and mechanical loading.”***

elastin and fibrillin.<sup>12</sup>

Marine collagen is predominantly type I and is often used when skin and connective tissue are the main focus. A hydrolysed marine source has been found effective for skin wrinkles, hydration, elasticity, firmness and radiance,<sup>13</sup> and a systematic review and meta-analysis of 26 randomised controlled trials reported benefits for skin hydration and elasticity from use of oral marine hydrolysed collagen.<sup>14</sup>

## **Type II – cartilage and joint structure**

Type II collagen is the main fibril-forming collagen in cartilage, consisting of 95 per cent all types.<sup>15</sup> Its molecular structure is similar to type I but the chain composition is different.<sup>16</sup> Low levels of type II collagen are associated with diseases such as skeletal dysplasia, rheumatoid arthritis and osteoarthritis.<sup>17</sup> It is also an important signalling molecule, which can regulate chondrocyte (cartilage cells) proliferation, differentiation, and metabolism.<sup>18</sup> Furthermore, decreased collagen type II can cause chondrocyte hypertrophy in osteoarthritic cartilage, and mutations of the *COL2A1* gene, which codes for collagen type II, can lead to a variety of disorders, including dysplasia.<sup>16</sup>

As an abundant matrix molecule of cartilage, type II can improve stiffness and mobility.<sup>19,20</sup> Randomised controlled trials have found it effective for joint discomfort and pain after exercise,<sup>21</sup> knee joint flexibility and extension,<sup>22</sup> and osteoarthritic knee pain and quality of life.<sup>23,24</sup> Type II collagen is often found in bovine or chicken cartilage sources.

## **Type III – soft tissue, vessels and early repair**

Collagen type III makes up about 15 per cent of the collagen in the skin, and is also found in the blood vessel wall, and reticular fibres of tissues including lungs, liver and spleen.<sup>1</sup> It works together with collagen type I for wound healing, being more responsible for the early healing phases and tissue regeneration, regulated by *COL3A1* gene.<sup>7</sup>

Type III collagen can be thought of as a ‘repair and flexibility collagen’ and the balancing between type III and type I is often essential for comprehensive connective tissue support. Bovine collagen peptides naturally provide type I and III, and are thus often positioned around skin, ligaments, tendons and general connective tissue support.<sup>25</sup>

## **Type V – the collagen organiser**

Type V collagen is less abundant than types I, II and III, but no less influential, as it helps regulate collagen fibril formation. It controls diameter and organisation in the tissues of the skin dermis and cornea, affecting their structure, clarity, strength and mechanical behaviour.<sup>26</sup>

Type V collagen can therefore be considered somewhat of an ‘architect’, responsible for how collagen is assembled, not just its quantity. The *COL5A1* gene codes for one chain of type V collagen, and mutations in this gene have been linked to Achilles tendon issues.<sup>27</sup> Mutations in both the *COL5A1* and *COL5A2* genes are also linked to Ehlers-Danlos syndrome, characterised by skin hyperextensibility, fragile skin, delayed wound healing, easy bruising and joint hypermobility.<sup>28</sup>

Type V collagen is not commonly available as an isolated supplement, but rather a natural component organic connective tissue, particularly eggshell membrane, which also contains collagen types I, V and X, and elastin.<sup>29</sup> Research done on eggshell membrane is therefore based on the whole membrane matrix, not just type V alone. Randomised controlled trials have found eggshell membrane may improve joint function, pain and stiffness in people with knee osteoarthritis.<sup>30,31</sup>

## **Type X – growth plate, cartilage maturation and bone formation**

Type X collagen is a short-chain, non-fibrillar collagen, making it different from the more familiar collagen structures, and is mainly produced by hypertrophic chondrocytes, which are cartilage cells at a late stage of maturation.<sup>32</sup> It is heavily involved in cartilage to bone replacement during skeletal development, which is known as endochondral ossification, where cartilage cells enlarge and new bone formation occurs, as well as growth plate activity and other processes involved in repair.<sup>33</sup> Because of this, collagen type X is used as a chondrocyte hypertrophy marker, and its expression has been linked to bone composition changes seen in osteoarthritis.<sup>34</sup>

The *COL10A1* gene codes for type X collagen, and mutations are linked to a skeletal disorder known as Schmid metaphyseal chondrodysplasia, which affects growth plate function.<sup>35</sup> This emphasises the importance of type X collagen for cartilage maturation, mineralisation and skeletal development.

Like type V, type X collagen is not usually taken as a standalone collagen supplement and is naturally present in eggshell membrane.<sup>29</sup> This reinforces the use of eggshell membrane as a broader connective tissue matrix, as opposed to a simple type I, V or X collagen source.

## **Which collagen type should you choose?**

If the goal is skin structure, elasticity, tendons, ligaments and bone matrix, type I collagen is the central form to consider, particularly when sourced from good quality bovine or hydrolysed marine peptides. If cartilage and joint structure are the focus, type II collagen may be the most relevant. Type III is best thought of as type I’s close partner in supporting skin, but also blood vessels, early tissue repair and wound healing. Type V is the organiser, helping to regulate the assembly and architecture of collagen fibre, and type X is the specialist, linked to cartilage maturation, growth plates and bone formation.

In practice, these collagen types don’t work in isolation, and the health of our connective tissue depends on a wider matrix of collagen, elastin, hyaluronic acid, antioxidants, hormones, immune balance and mechanical loading. As is often the case, a comprehensive, multifaceted approach yields the greatest outcomes, with certain specific considerations to consider based on personalised requirements.



## **ABOUT THE EXPERT**

**Maxime Maunand** is a qualified Nutritional Therapist, with over five years’ experience in the health and wellness industry, and three years supporting practitioners and customers through their journey at BioCare.

In his own clinical practice, Max has built up expertise in men’s health, particularly prostate health, weight loss, cardiovascular health and aiding those on vegan and vegetarian diets. As he continues to broaden his knowledge and experience in nutrition, Max aspires to share the latest, most groundbreaking and most practical research available to those who need it most.



# The Invivo difference

In a defining year for Invivo Healthcare, the leading practitioner brand details its commitment to sustainability, the importance of being rooted in microbiome science, and the future plans.

With sustainability such a key topic in today's climate, we see many brands talking about being greener, but with little in the way of tangible action.

Then we have brands like Invivo Healthcare, which is demonstrating its commitment to being more sustainable with investment in new packaging and as a certified B Corp, while continuing to lead as a science-backed, microbiome supplement company.

In what has been a busy year for the brand, Katharina Child, Head of Impact at Invivo Healthcare, commented: "It has been a defining year for us. We have sharpened who we are: Invivo is the human microbiome supplement and education company, working alongside our sister company, Microba, whose world-leading metagenomic testing science continues to inspire and inform our thinking. As a supplement company, we support not one microbiome but many. The gut, oral, vaginal, and urinary microbiomes each shape health in their own way, and our range is built to reflect that breadth, rather than treating the gut as the whole story.

"We are on a sustainability journey with our packaging, first of which is strengthening the credentials for our compostable refill pouch for PHGG; we have moved through a considered evolution with our packaging,

steadily removing single-use plastic out of our range. Underpinning all of it, we remain a proud Certified B Corporation – our social and environmental commitments continue to sit at the centre of how the business is run."

And what can we expect for the future from this forward-thinking brand?

"Our direction is set by the same principle that started the company: using microbiome science in products that positively and genuinely impact people's health. That means continuing to grow our education alongside our supplements, so the two stay seamlessly connected," Katharina added.

## The Invivo approach

Practitioners will be familiar with Invivo, such is its reputation in our industry, and there are key reasons for this centred around its ethos.

"Our thinking begins with a simple idea: the microbiome is an ecosystem, and human health cannot be separated from the health of the world around us," Katharina explained. "That principle of interdependence runs through everything we do. In practice that means three things. We are science-grounded but human-first, genuinely excited to share microbiome science, and careful to make it accessible rather than clinical. We are holistic and functional, focusing on specific areas of the body while never losing sight of the whole person. And we are sustainable at our core, treating environmental responsibility as inseparable from wellbeing, rather than an add-on. Our mission captures it: restoring human health and ecology. You can find us at the intersection between human and nature."

Today, the product range stands at around 22, built across three families, and focused around a different area of the microbiome.

Katharina explained:

• **Bio.Me** – a range of live bacteria formulations,

prebiotics and polyphenols, including Prebio PHGG, Prebio GOS, Femme V, Femme UT, Oral, Saccharomyces boulardii, Barrier, IB+, Mind + Mood and Essential.

• **Bio.Clear** – targeted nutrient and botanical formulations that support metabolic and eliminatory processes, including Virome, Microbia, Oestro and Endotox LV

• **Bio.Revive** – restorative nutrient and botanical formulations, including Digestive+, Beta Immune+, Kinetic and Mucin+

"Our supplements are formulated on the evidence: live commensal strains are selected for their strain-specific clinical evidence, and prebiotics and botanicals are chosen based on both the available research and traditional use."





Moving onto the quality, how does Invivo ensure consistent standards, from product idea through to launch?

Katharina explained: "Quality is built in at every stage, beginning with how we choose who we work with. We operate a formal supplier approval process, assessing partners against defined criteria before any ingredient enters the range, and we hold certificates of analysis for all ingredients we use in our products. We work closely with our suppliers, rather than at arm's length. We build long-term

relationships with clients, which lets us improve not only the quality of what they provide but the environmental and social impact of our supply chain, from how ingredients are grown and processed to the conditions of the people who produce them."

This process is aided by a team that brings with it rich experience in the field.

"Our strength is the breadth of expertise we bring together; microbiome science, clinical practice, nutrition and education under one roof. It means the science that shapes a product is

never far from the people who understand how it is used in practice," Katharina advised.

"A good example is Lesley Harper, our UK Clinical Lead and Senior Clinical Educator, a registered Nutritional Therapist who came to the field through her own health journey and continues to work directly with individuals experiencing chronic gut issues. That combination of lived experience, clinical practice and education is characteristic of the wider team."



## Commitment to sustainability

Sustainability and brand responsibility has risen hugely in terms of importance in recent years, and it is something that Invivo takes very seriously.

Katharina explained why it is of such importance: "Because it follows directly from the science. If human health is bound up with the health of the natural world, then a company built on microbiome science cannot treat sustainability as optional, it is the same idea applied to how we operate. Systems thinking and interdependence sit behind both our products and our business decisions. That is also the philosophy at the heart of the B Corp movement, which is why the two fit so naturally together for us. We work to reduce our impact not as a marketing position, but as an expression of what we believe about health and ecology."

Looking at the sustainability aspect in more detail, what investments has the business made to be greener?

A current example is packaging," Katharina advised. "We have deliberately reduced single-use plastic by switching our PHGG product to a compostable refill pouch – using only paper cellulose and corn starch. It is an ongoing programme rather than a finished project. Sustainability,

for us, is inseparable from community – the same interconnection we see in the microbiome. In 2026/27, we are partnering with NoSH, the Network of Stroud Hubs, a local charity that strengthens the voluntary organisations feeding and supporting people across our hometown of Stroud. Our commitment goes beyond funding: we are contributing capacity, skills and advocacy, because a healthy community is part of a healthy ecosystem."

Extending the sustainability drive, Invivo is also registered as a B Corp, and this is important to the business.

Katharina commented: "B Corp matters to us because it holds the whole business to account, not just our products. As a Certified B Corporation, we are part of a global movement working to benefit people and the planet, meeting verified standards for social and environmental business practices. Certification looks at every part of the company, governance, our workers, our community, our customers and the environment and requires evidence, not intention. Achieving and maintaining our certification has meant formalising how we make decisions, how we look after our team and how we account for our environmental and social impact."



# High fibre with Hugh



Hugh Fearnley-Whittingstall helps the nation up their intake with his new cookbook, *High Fibre Heroes*.



ROAST MUSHROOM AND KIMCHI SOURDOUGH SARNIES



RIBBONED CARROT AND QUINOA SALAD



TOMATO DHAL WITH GREENS



# ROAST MUSHROOM AND KIMCHI SOURDOUGH SARNIES

Serves 2

Plant count: 5

Fibre count: 10g

This is immensely satisfying food: fat mushrooms, roasted until charred and oozing their dark juices, sandwiched in toasted sourdough with roasted red onion and a generous amount of kimchi (or kraut). Give it a go in one piece if you like, but no one will think less of you if you serve it as an open sandwich, or even partially dismantle this chunky sarnie before tucking in.

## INGREDIENTS:

- 2tbsp olive oil
- 4 large, open cap mushrooms, such as portobello
- 1 large or 2 medium red onion(s), cut into 4 thick rounds
- 4 slices of wholegrain sourdough, or 2 sourdough rolls, split
- About 4 heaped tbsp of your favourite kimchi or spicy sauerkraut
- Sea salt and black pepper

## METHOD:

- There's no need to preheat your oven for this, unless it's a non-fan oven that takes a while to heat up.
- Trickle the olive oil into a roasting dish and spread it around with a brush. Add the mushrooms, gill side down and use the brush to get some oil on the top of them. Add the onion rounds to the dish and oil these too. Season everything well with salt and pepper.
- Put the roasting dish into a cold oven and set to 180°C Fan/200°C/Gas 6. Cook for 20 minutes, or until the mushrooms are well shrunk and darkened and onion is soft (it might take a little longer in a non-fan oven).
- Take the dish out and use tongs to flip everything over. Season again and return to the oven for 15-20 minutes or until everything is completely tender and nicely caramelised.
- Meanwhile, toast the sourdough slices (or rolls).
- Take one slice of toasted sourdough (or

toasted roll base) and lay a whole mushroom on it. Put a spoonful of kimchi/kraut on top and add a round or two of caramelised onion. Cover with a second mushroom and a little more kimchi/kraut, then top with another layer of onion. Repeat with the other toast, mushrooms, kimchi/kraut and onion to make the second sarnie. Squeeze the lids on top and serve, with the rest of the kimchi/kraut on the side.

## OPTIONS:

- If you don't have kimchi, whip up a simple spicy slaw instead: finely shred  $\frac{1}{4}$  small white cabbage, and mix with 1 grated medium carrot, 1tsp harissa and 2tsp mayo or plain yoghurt (plant-based or regular).
- A slice of cheese, such as Gruyère, Cheddar or even a luscious soft Brie or Taleggio, melts deliciously on the hot mushrooms.





# RIBBONED CARROT AND QUINOA SALAD

**Serves 3 as a light meal, 4 as part of a sharing spread**

**Plant count: 12**

**Fibre count: 13g**

Quinoa is a grain (technically a seed) that offers 'complete' protein, i.e. it has all the amino acids we need. Cook it and cool it ahead of time for this delicious and satisfying salad. Tahini makes for a lovely creamy dressing, but if its distinctive taste is not your thing, use peanut butter.

## INGREDIENTS:

- 150g quinoa
- 1tsp veg bouillon powder or ½ veg stock cube
- 1 small-medium red onion, thinly sliced
- 150g carrots (1 large or 2 small), scrubbed or peeled
- Juice of 1 lemon
- 400g tin lentils, drained, or 250g drained pre-cooked lentils or from a jar/pouch, rinsed and patted dry
- 35g raisins (optional)
- 1tbsp extra virgin olive oil
- Sea salt and black pepper

## TAHINI/PEANUT BUTTER DRESSING:

- 2tbsp tahini or smooth peanut butter
- 1 small garlic clove, grated
- A pinch of dried chilli flakes
- Juice of ½ lemon
- ½ tsp soft brown sugar
- 2tbsp extra virgin olive oil

## TO FINISH:

- A few hazelnuts, ideally toasted, roughly chopped
- A small handful of parsley or chives, chopped

## METHOD:

- Cook the quinoa ahead of time: rinse it thoroughly in a sieve then tip into a saucepan. Dissolve the bouillon/stock cube in 500ml boiling water and add to the pan. Bring to a simmer and cook, uncovered, for 15-20 minutes until all the water is absorbed, then take off the heat and leave the pan covered for 10 minutes.
- Fluff up the quinoa with a fork, transfer to a bowl and leave to cool completely. Refrigerate if cooking well ahead.
- Meanwhile, put the sliced onion into a large bowl. Cut the carrots into ribbons using a veg peeler and drop them straight into the bowl. You'll be left with a thin

stick of carrot, which you can eat, or slice with a knife and add to the salad. Squeeze over the lemon juice, add a good pinch of salt and mix well. Set aside in a cool place.

■ In the meantime, make the dressing: in a small bowl, mix the tahini or peanut butter with the garlic, chilli flakes, lemon juice, sugar and some salt and pepper. Add the extra virgin olive oil and stir in thoroughly. The dressing may 'seize' or go grainy, but don't worry, just whisk in 1tbsp water, and then another, and it will become smooth again. Taste to check the seasoning and adjust as necessary.

■ Stir the lentils through the quinoa and toss in the raisins too, if using. Stir in the 1tbsp extra

virgin olive oil and season with salt and pepper.

■ To serve, heap the lentil/quinoa mix onto a large serving plate, or individual plates. Top with the carrot ribbons and onion and trickle over the juice from the bowl. Spoon the tahini dressing generously over the salad, and finish with chopped nuts and a scattering of parsley or chives.

## OPTIONS:

- Swap the quinoa for cooked brown rice or barley.
- Instead of the tahini/peanut butter dressing, use some good shop-bought pesto, let down with a little more oil.





# TOMATO DHAL WITH GREENS

**Serves 4**

**Plant count: 12**

**Fibre count: 9g**

This is based on a delicious dhal recipe from my book, *Much More Veg*, with some lovely fresh greens stirred in at the end, turning a classic side dish into a hearty meal.

## INGREDIENTS:

- 2tbsp rapeseed oil
- 1 black cardamom pod or 3 green cardamom pods, bashed to split open
- 1tsp brown mustard seeds
- 1tsp cumin seeds
- 1 bay leaf (optional)
- 1 large red or brown onion, sliced
- 2 garlic cloves, grated, plus 2-3cm piece of fresh root ginger, grated, or 1 blob of garlic and ginger paste
- 2tsp ground turmeric, or a 2-3cm piece of fresh turmeric, grated
- 400g tin whole plum tomatoes
- 200g dried red lentils, rinsed
- About 200g greens, such as spring greens, kale or chard
- ½-1tbsp soy sauce or tamari
- A squeeze of lemon or lime juice
- Sea salt and black pepper
- Chilli oil, to finish (optional)
- Brown rice or wholegrain flatbreads, to serve (optional)

## METHOD:

- Heat rapeseed oil in a large saucepan over a medium heat then add cardamom, mustard and cumin seeds, and bay leaf if using. When the seeds start to pop, add the onion and lower the heat. Cook, stirring now and then, for five to seven minutes, until the onion starts to soften. Add the grated garlic and ginger (or garlic and ginger paste) and turmeric, stir well and cook for a minute or two.
- Now add the tinned tomatoes, mashing them with a potato masher as they go in. Bring to a brisk simmer and cook for about 10 minutes, stirring now and then, to reduce and concentrate the tomatoes.
- Add the rinsed red lentils and 800ml water. Stir well and bring back to a simmer. Cook for about 20 minutes, until lentils are tender, stirring often to prevent sticking. You can add a little water if the mixture gets a bit thick.



- Meanwhile, tear spring greens or kale off the stalk (chard doesn't need to be destalked) and roughly shred the greens.
- Add the greens to the almost-cooked dhal with ½ tsp salt. Stir in well then continue to cook at a low simmer for 10 minutes, or until the greens are tender and lentils have broken down to a creamy purée. Take off the heat and stir in ½ tbsp soy/tamari, a few twists of pepper and a squeeze of lemon or lime juice. Taste and adjust the seasoning with more salt, soy or lemon/lime juice as needed.
- Ladle the dhal into warmed bowls, trickle with chilli oil if you like, and serve straight away. This is a meal in itself, but brown rice alongside, or wholegrain flatbreads for scooping, makes it really substantial.

## OPTIONS:

- Replace the cardamom and spice seeds with 2tsp curry powder or paste, letting it sizzle for just a minute before adding the onions.
- Instead of the greens, add green beans, cut into short lengths.

Extract taken from  
*High Fibre Heroes*  
by Hugh Fearnley-Whittingstall  
(Bloomsbury Publishing, Hardback, £26).  
Photography ©Emma Lee.





# I-MAG GIVEAWAYS

We showcase a selection of giveaways on offer to readers this issue.

## Metagenics MegaMag 10-in-1 Chews

Your daily magnesium routine made simple. Between busy schedules, demanding days and modern lifestyles, it can be difficult to get enough magnesium every

day. MegaMag 10-in-1 Chews are designed to make daily magnesium support simple, delivering a superior triple action formula with up to four times better absorption in a delicious berry-flavoured chew – 10-in-1 support for:

- Psychological and nervous system function.
- Energy levels and reduced tiredness and fatigue.
- Muscle function and electrolyte balance.
- Healthy bones, teeth and cellular processes.

Perfect for busy lifestyles, first-time magnesium users, and families. No water required, gentle on the stomach, and suitable for adults and children aged three and over.

**I:Win: We have five to give away.**

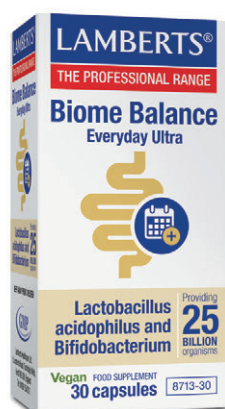


## Lamberts bundle

Lamberts Imuno-Strength is a tasty elderberry gummy which retains the natural benefits of the fruits. Lamberts adds vitamin

C and zinc for normal immune function and they are free from added sugar, sweeteners and gelatin. Biome Balance Everyday Ultra is a one-a-day, live bacteria product, in delayed-release capsules, with desiccant packaging, to ensure the bacteria reach the gut alive. It provides 25 billion bacteria, as four well-researched strains which have been used in more than 100 studies.

**I:Win: We have 20 bundles, each comprising both products, to give away.**



## Bare Biology High Flyer Creatine Monohydrate

High Flyer delivers 5g of premium Creavitalis creatine monohydrate in every scoop. Meticulously sourced to Bare Biology standards, and made by AlzChem in Germany, the gold standard trusted by researchers, it is third-party tested, nearly 100 per cent bioavailable, uber pure and micronised for easy mixing. Suitable for vegetarians and vegans, it is formulated to support the strength, power and resilience women need to perform at their best, whether that's in the gym, at work or keeping up with everyday life.

**I:Win: We have five to give away.**



## Microbiome Labs EpicDefense

EpicDefense brings you potent, clinically studied next-generation immunobiotics – LGG, BB-12, and EpiCor

– backed by science to ease seasonal challenges, promote nasal and respiratory comfort, and support daily, year-round immunity. EpicDefense also includes Albion Minerals' immune-promoting zinc bisglycinate, chelated for ultra-absorption and bioavailability. Together, these ingredients improve immune resilience, mucosal immunity and modulate the gut-lung axis.

**I:Win: We have five to give away.**



## Pure Encapsulations Curcumin C3 Complex

Curcumin C3 Complex is a high-quality, clinically-studied turmeric extract featuring high-potency turmeric extract standardised to curcuminoids. It provides a guaranteed amount of curcumin in each capsule and features the full-spectrum of curcuminoids including curcumin, demethoxycurcumin, and bisdemethoxycurcumin. Free-from synthetic and chemical additives common in curcumin products

**I:Win: We have three to give away.**



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Bryan, Ph.D**



**Sarah  
Osborne, So  
Nutrition**



**Dr James  
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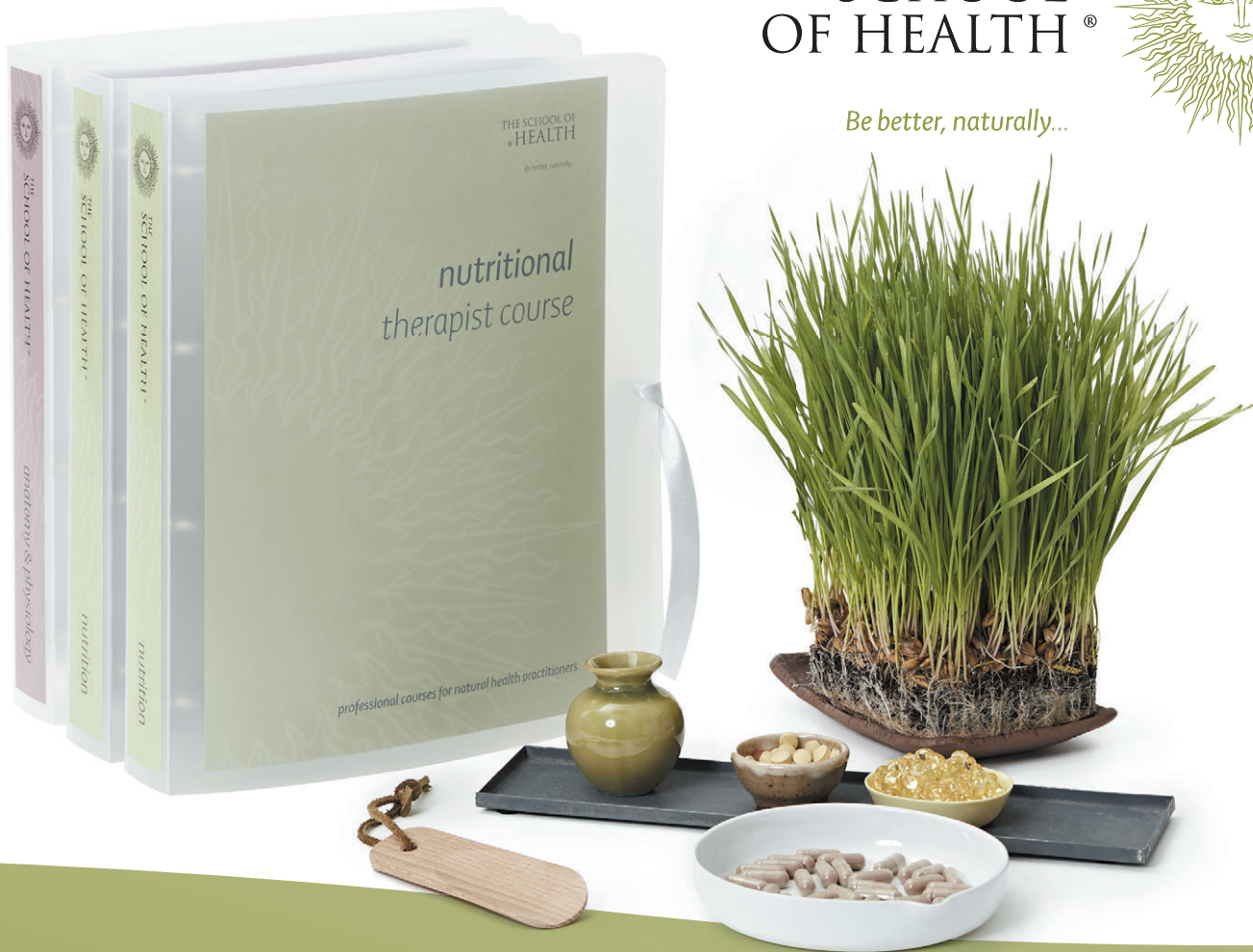
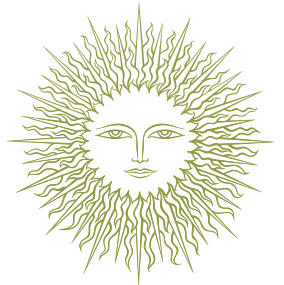
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