



Nutrition I-Mag

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RESEARCH AND EDUCATION FOR TOMORROW'S PRACTITIONER

JULY/AUGUST 2020

BACTERIA BALANCE

An update on the latest science around probiotics

Guide to mycology

Why medicinal mushrooms could play an important part in client recommendations

Feeding the mind

Experts explore the critical role of nutrition and mental health



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Welcome

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'Sunshine diet everyone should be on,' 'Vitamin D research is aiming for a Coronavirus breakthrough' and 'Coronavirus – the evidence is mounting that vitamin D makes a difference' are all headlines we've seen in recent weeks as scientists hail vitamin D as a potential breakthrough in the fight against Coronavirus.

A host of media outlets have been reporting on a number of studies examining vitamin D deficiency and its potential link with increased risk of Covid-19, particularly among the BAME community. This, coupled with the news that the National Institute for Clinical Excellence (NICE) has announced a rapid review of the evidence, means that vitamin D has been

placed firmly under the spotlight.

Of course, we can't just take a handful of studies as evidence and caution must be exercised when looking at those that are yet to be published or peer reviewed, but the fact that leading organisations such as NICE and Public Health England consider a review so urgent is encouraging – and places the role of nutrition firmly in the public's consciousness. Click here for the full story.

We also want to remind all our readers that just because conferences are currently unable to physically take place, the learning doesn't need to stop and that's certainly the message from us here at *Nutrition I-Mag* as we continue to offer our virtual education in the form of the IHCAN Conference webinars. Click here to read about some of our upcoming events, and remember to keep an eye on www.ihcanconferences.co.uk as new webinars are being added all the time. You can also find out more about our postponed conference dates, confirmed to be resuming in early 2021.

RACHEL SYMONDS, EDITOR

Rachel

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The *Nutrition I-Mag* is published by Target Publishing Limited, the leading publisher and conference organiser serving the natural, complementary health markets, as well as the leisure, education, sport and eco markets.

www.targetpublishing.com
 ISSN 2049-4017

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NUTRITION I-MAG GIVEAWAYS

OUR CONTRIBUTORS

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



Kirsty Gillmore

Kirsty Gillmore works as the Marketing Manager at the nutritional supplement company, G&G Vitamins, and is also a Registered Nutritional Therapist (BA (Hons), DipCNM, mBANT, CNHC).



Colette Healy

Colette Healy works as a herbalist in Cork City, Ireland. She completed a science degree in Herbal Science, as well as studying more traditionally. She works with native herbs as much as possible, as well as medicinal mushrooms. She is involved in a local herbal project, Cork Herb Bike, as well as working as Practitioner Health Advisor for Hifas da Terra UK.



Kim Plaza

Kim Plaza is a qualified Nutritional Therapist, having graduated at Masters level from the University of Worcester in 2013. She holds a BSc (Hons) in Health, Nutrition and Fitness, is registered with the British Association for Nutrition and Lifestyle Medicine and listed on the Complementary and Natural Health Care Council's accredited register. She worked as Nutritional Advisor at ADM Protexin for four years, before moving to Technical Advisor.



Sarah Oboh

Sarah Oboh is registered with the Association for Nutrition, and has a BSc (Hons) degree in Human Nutrition. Driven by her passion for developing personalised dietary and lifestyle interventions to target ill health, she began as a Nutritionist in private and public health, then pursued a role at OptiBac Probiotics, where she educates practitioners on the significance of the microbiome in health and disease.



Tanya Borowski

Tanya Borowski Dip CNM, mANP, IFMCP holds a Diploma in Nutritional Therapy from the College of Naturopathic Medicine and completed The Institute of Functional Medicine certification in 2016, becoming one of only 25 fully certified practitioners in the UK. She has undergone training with respected functional medical doctors, including Dr Tom O'Bryan, Dr Datis Kharrazian, Dr Mark Hyman and Dr Jeffery Bland. She runs a clinic and wellbeing store in Lewes, East Sussex, and is Consultant Nutritionist for Time Health.



Rachel Hoyle

Rachel Hoyle, BSc, a science graduate, has been involved in the development of special nucleotide-based products in collaboration with Dr Peter Köppel since the 1990s. Her initial responsibility was to develop natural products that reduce dependency on antibiotics in animal nutrition. More recently, Rachel has researched and developed nucleotide supplements for human health. Her company, Nucleotide Nutrition, markets these products, which are all based on the Nutri-tide formula.

News bites

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

Rapid summary confirmed for vitamin D in Covid-19 context

Public health authorities have confirmed an urgent review of vitamin D in the context of Covid-19 as research continues to suggest it can play a role in lowering risk of the virus.

Vitamin D has hit the headlines in recent weeks amid a range of studies suggesting it may play a role in the fight against Covid-19. In light of this, the National Institute for Clinical Excellence (NICE) has confirmed vitamin D is under review.

A NICE spokeswoman told *Nutrition I-Mag*: "I can confirm that NICE is currently working on a Covid rapid evidence review on vitamin D, though at this time, I am unable to share any details on the review. We are aiming to publish the document shortly."

NICE added that its evidence reviews are different from guidance that NICE produces in that they do not include recommendations, but offer an assessment of the available evidence for a selected topic. The review may then be used alongside other available information (such as the specific patient circumstances), to inform individual health care decisions.

As Nutrition I-Mag went to press, NICE updated

its guidance to say: "There is no evidence to support taking vitamin D supplements to specifically prevent or treat COVID-19. However, all people should continue to follow UK Government advice on daily vitamin D supplementation to maintain bone and muscle health during the COVID-19 pandemic."

The review comes after vitamin D has been highlighted in recent research, with one study finding an association between low average levels of vitamin D and high numbers of Covid-19 cases and mortality rates across 20 European countries.

The research, led by Dr Lee Smith, of Anglia Ruskin University (ARU) and Mr Petre Cristian Ilie, Lead Urologist of Queen Elizabeth Hospital King's Lynn NHS Foundation Trust, has been published in the journal, *Aging Clinical and Experimental Research*. They explained previous studies reported association between low vitamin D and susceptibility to acute respiratory tract infections. Vitamin D modulates the response of white blood cells, preventing them from releasing too many inflammatory cytokines. Covid-19 causes excess of pro-inflammatory cytokines.

The researchers explained that Italy and Spain have

experienced high Covid-19 mortality rates, and the new study shows both countries have lower average vitamin D levels than most northern European countries. This is partly because people in southern Europe, particularly the elderly, avoid strong sun, while skin pigmentation reduces vitamin D synthesis.

Dr Smith, Reader in Physical Activity and Public Health at Anglia Ruskin University, commented: "We found a significant crude relationship between average vitamin D levels and the number of Covid-19 cases, and particularly Covid-19 mortality rates, per head of population across the 20 European countries. Vitamin D has been shown to protect against acute respiratory infections, and older adults, the group most deficient in vitamin D, are also the ones most seriously affected by Covid-19. A previous study found that 75 per cent of people in institutions, such as hospitals and care homes, were severely deficient in vitamin D. We suggest it would be advisable to perform dedicated studies looking at vitamin D levels



in Covid-19 patients with different degrees of disease severity."

Mr Ilie added: "Our study does have limitations, however, not least because the number of cases in each country is affected by the number of tests performed, as well as the different measures taken by each country to prevent the spread of infection. Finally, and importantly, one must remember correlation does not necessarily mean causation."

Another study, carried out in the Philippines used a multinomial logistic regression to predict clinical outcomes of patients infected with Covid-19 based on 25-hydroxyvitamin D [25(OH)D] levels, the barometer for vitamin D status. It was found that serum 25(OH)D level was lowest in critical cases, but highest in mild cases.

The researchers wrote: "Majority had insufficient vitamin D status, most of them were not severe. Vitamin D status is significantly associated with clinical outcomes. The results suggest that an increase

Stress, anxiety and tiredness among causes of unhealthy eating habits in lockdown, research finds

in serum 25(OH)D level in the body could either improve clinical outcomes or mitigate worst (severe to critical) outcomes, while a decrease in serum 25(OH)D level in the body could worsen clinical outcomes of Covid-2019 patients. In conclusion, this study provides substantial information to clinicians and health policymakers. Vitamin D supplementation could possibly improve clinical outcomes of patients infected with Covid-19. Further research should conduct randomised controlled trials and large population studies to evaluate this recommendation."

The study has yet to be published in a peer reviewed journal.

In other research, led by Queen Mary University of London, in collaboration with the Medical Research Council Lifecourse Epidemiology Unit at the University of Southampton, researchers examined vitamin D, among other factors, and concluded that higher rates of severe Covid-19 in Black, Asian and Minority Ethnic (BAME) populations remains unexplained. The study concluded that higher rates of severe Covid-19 infections in BAME populations are not explained by socioeconomic or behavioural factors, cardiovascular disease risk, or by vitamin D status.

Commenting on the results, the researchers said: "The results demonstrate that BAME ethnicity, male sex, higher body mass index, greater material deprivation, and household overcrowding are independent risk factors for Covid-19. The higher rates of severe Covid-19 in BAME populations was not adequately explained by variations in cardiovascular disease risk, vitamin D levels, socio-economic, or behavioural factors, suggesting that other factors not included in the analysis might underlie these differences."



The British Nutrition Foundation (BNF) has found that the majority of people with unhealthy eating habits during Covid-19 lockdown have adopted them out of stress, anxiety, tiredness and boredom.

The new survey, commissioned by BNF, has revealed that 63 per cent of people in Britain attribute boredom, and 45 per cent of people attribute stress, anxiety and tiredness as being one of their main reasons for eating less healthily than usual during lockdown. Nearly half of people (48 per cent) say 'not feeling motivated enough to eat well' is one of their key reasons. Thirty per cent claim that not being able to go to the supermarket as often is making it difficult for them to eat healthily.

The survey, which has been conducted by YouGov, aimed to explore how changes to our daily lives resulting from Coronavirus have impacted our eating habits and activity levels since lockdown began on March 23. The research surveyed 2,067 adults from across Britain, and also found that 27 per cent of

respondents feel they have been eating less healthily during lockdown, 50 per cent state their habits have not changed and 22 per cent say they have been eating more healthily than usual.

The research was conducted in parallel with the launch of BNF Healthy Eating Week @ Home, a virtual event which took place in June. It also revealed that 17 per cent of people have been enjoying cooking more, 19 per cent have been getting better at using store cupboard ingredients, and 23 per cent have been trying new recipes. Just seven per cent of people claim they have been getting more takeaways, and nearly three in 10 (29 per cent) say they have been planning their food shopping in advance so they know what to buy and can waste less food.

Looking ahead, when asked about their priorities for health and wellbeing as Coronavirus restrictions are gradually lifted, 47 per cent say they want to become more active and exercise more, 43 per cent say they want to lose weight and 29 per cent say they want to eat more healthily.

Sara Stanner, Science Director at the BNF, commented: "While the Coronavirus outbreak has brought the importance of health to the forefront, the measures we've had to take as a nation to control the spread of the virus have made it challenging for many of us to eat well and keep active. With lots of us still at home more than normal, it's easy to spend a lot of time sitting and to feel less motivated to eat healthily. It's encouraging that, despite this, many people are now going for regular walks to keep active, are taking time to plan what they eat, and are trying new recipes. People are also clearly looking to improve their health as the lockdown measures ease, with getting active, losing weight and eating healthily all cited as key priorities."



Warning from charity over expanding waistlines

The British Liver Trust has cautioned over the effects of lockdown weight gain.

The charity is warning of a potential future surge in a serious form of liver disease as a new survey reveals that four out of 10 people in the UK have gained weight during lockdown.

Experts said that unhealthy eating habits developed during lockdown could lead to an increase in Non-alcohol related SteatoHepatitis (NASH), a serious form of non-alcohol related fatty liver disease (NAFLD). NASH affects approximately one in eight adults globally and over three million people across the UK. However, as the disease usually has no symptoms in the early stages, the true figure is likely to be much higher.

This follows the release of new data from a YouGov poll, which reveals that almost half of people (42 per cent) think they have put on weight since lockdown began, and a third of people also claimed that they are eating more sugary and processed foods.

Pamela Healy OBE, Chief Executive of the British Liver Trust, commented: "It is a common misconception that alcohol is the only preventable cause of liver disease, however, many people who don't drink develop liver disease. This is why to reduce your risk of liver damage, you should place as much importance on eating a healthy diet as reducing your alcohol intake. NASH is a serious disease that can lead to a transplant or even death, so it is important that we take steps to reduce the obesity epidemic that is affecting the UK and improve early detection."



IADSA issue advice on global supplement rules

An international organisation has released a new video explaining the rules around global regulation of supplements.

Steve Wearne, Vice-Chair of the Codex Alimentarius Commission, has launched the short video from IADSA, an international body comprising member associations and companies in the supplements sector. The video explains the role of Codex, a collection of internationally recognised standards and codes of practice relating to food production and safety. It has successfully built global consensus and common approaches to regulation across the food sector, including for food supplements. As a Codex 'observer', IADSA contributes expertise to the work of Codex committees on issues of importance to supplements.

The new video introduces the IADSA Guide to Codex standards, which covers the horizontal and vertical rules impacting the food supplements sector, from health

claims to additives and contaminants. The guide also highlights how, why and when consensus was reached.

Wearne commented: "I'd like to congratulate IADSA on the production of this short video and of the IADSA guide to relevant Codex texts that it references. I can think of no better example of a Codex observer organisation taking a lead in helping us to deliver our strategic goal of increasing impact through the recognition and use of Codex standards."

Simon Pettman, IADSA's Executive Director, added: "Codex Alimentarius is very important for consumers, policymakers and businesses. Our new video will help us to increase awareness of this and highlight how consideration of the wide range of Codex texts is crucial when it comes to formulating approaches to food supplement regulation."

The video is available to view at iadsa.org/resources/34

In Research

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

New data reveals students facing food insecurity amid Covid-19 pandemic

Worrying new research has revealed that four in 10 university students are worried they will run out of food as they deal with the impact of the Coronavirus pandemic.

A collaboration of universities in the UK and USA surveyed students on their levels of food insecurity during April, after universities in both nations ceased campus-based teaching.

The preliminary findings, outlined in the report, *Food Insecurity and Lived Experiences of Students*, has revealed that students have high levels of food insecurity and low levels of mental wellbeing, alongside experiencing a high level of lost jobs and income since the outbreak of the Coronavirus pandemic.

The survey was completed by more than 1,200 students and discovered that 41 per cent of respondents were worried that their food would run out and almost 35 per cent of reported high or very high levels of food insecurity. Those students who lived either alone or with other students were much more likely to face food insecurity than those students who either lived at home already or who had returned to their family home when Covid-19 lockdown began.

There is already a known correlation between



food insecurity and mental health and wellbeing, and this was confirmed further in the findings; one in five students report they are experiencing high levels of food insecurity and poor mental wellbeing, with many saying that they are eating unhealthy, ultra-processed foods, as well as skipping meals.

Northumbria University's Healthy Living Lab worked in collaboration with internationally renowned academics from City, University of London, the universities of Sheffield and Ulster, and Oklahoma State University in the USA, as well as representatives from the Students' Unions at Northumbria and Ulster universities.

Dr Michael Long, Associate Professor for Sociology at Oklahoma State University, commented: "It is clear from this study that food insecurity in university students is alarmingly high since the onset of the Covid-19 pandemic, and will likely increase the existing inequalities in the food systems in the United States and the UK.

"While food insecurity is a substantial and potentially growing problem for university students in general and within Oklahoma, we hope that this research will lead to evidence-based solutions aimed at reducing food insecurity and inequality."

The findings have been submitted to the UK Education Select Committee inquiry into the impact of Covid-19 on education and children's services.



Scientists 're-train' immune system to protect healthy cells

A new UK study has seen scientists attempt to 're-train' the immune system to prevent attack of healthy cells.

The study into autoimmune diseases, published in the journal, *Cell Reports*, has found that the body's immune system can be rewired to prevent it from recognising its own proteins which, when attacked by the body, can cause autoimmune diseases such as multiple sclerosis (MS).

Autoimmune diseases are caused when the immune system loses its normal focus on fighting infections or disease and instead begins to attack otherwise healthy cells within the body. In the case of MS, the body attacks proteins in myelin – the fatty, insulation-like tissue wrapped around nerves – which causes the nerves to lose control over muscles.

Led by a multi-disciplinary team from the University of Birmingham, scientists examined the intricate mechanisms of T-cells (or white blood cells) that control the body's immune system and found that the cells could be 're-trained' to stop them attacking the body's own cells. In the case of MS, this would prevent the body from attacking the Myelin Basic Protein (MBP) by reprogramming the immune system to recognise the protein as part of itself.

Supported by the Medical Research Council, the two-part study was a collaboration between two research groups led by Professor David Wraith, from the Institute of Immunology and Immunotherapy, and Professor Peter Cockerill, from the Institute of Cancer and Genomic Sciences.

The first stage, led by Professor Wraith, showed that the immune system can be tricked into recognising MBP by presenting it with repeated

doses of a highly soluble fragment of the protein that the white blood cells respond to. By repeatedly injecting the same fragment of MBP, the process whereby the immune system learns to distinguish between the body's own proteins and those that are foreign can be mimicked.

The process, which is a similar type of immunotherapy to that previously used to desensitise people against allergies, showed that the white blood cells that recognise MBP switched from attacking the proteins to actually protecting the body.

The second stage saw gene regulation specialists, led by Professor Cockerill, probe deep within the white blood cells that react to MBP to show how genes are rewired in response to this form of immunotherapy to fundamentally re-programme the immune system.

The repeated exposure to the same protein fragment triggered a response that turns on genes that silence the immune system, instead of activating it. These cells then had a memory of this exposure to MBP embedded in the genes to stop them setting off an immune response. When T-cells are made tolerant, other genes which function to activate the immune system remain silent.

Commenting on the findings, Professor Cockerill said: "This study has led us to finally understand the underlying basis of immunotherapies which desensitise the immune system.

"If this is successful, the study will be the first study defining the actual mechanisms of how T-cells can be made tolerant to the body's own proteins in a context that may lead to further advances in the battle to overcome autoimmunity."

Impact of diabetes on mortality studied



New research has revealed that the higher mortality associated with poorly controlled type 1 and type 2 diabetes could lead to the loss of six million life years in the UK.

A model

devised by a team at The University of Manchester, Salford Royal NHS Foundation Trust and Res Consortium also calculated the impact of the disease on life expectancy.

Using National Diabetes Audit and Office of National Statistics mortality data from 2015, the team found that 1.7m life years are lost for type 1 and 4.3m for type 2 diabetes each year. However, given the recent rapid growth in particularly type 2, and Covid-19 related diabetes deaths, the figures are now likely to be significantly higher.

In an example calculated by the team, the average age of someone with type 1 is 42.8 years old, and that person has a life expectancy of 32.6 more years. That compares with someone of the same age without type 1 who can expect to live an average additional 40.2 years. The average age of someone with type 2 diabetes is 65.4 years; that person could expect to live an additional 18.6 more years. That, they say, compares with 20.3 years in an equivalent in the general population without the condition.

Dr Adrian Heald, from The University of Manchester and a Consultant in Diabetes and Endocrinology at Salford Royal, commented: "This study highlights the importance of early effective engagement and long-term management in patients with diabetes. And it's especially important as numbers of people diagnosed with diabetes are on the rise and in light of the link between diabetes and Covid-19 deaths."

The study is published in the journal, *Cardiovascular Endocrinology and Metabolism*.

ADM supports new probiotic trial in Covid-19 patients



abnormal changes in their gut microbiome.

Following his assessment, a decision was made that an interventional trial should be conducted to evaluate the effects of providing standard medication to elderly Covid-19 patients, along with a live microbial supplement to help support gut health and immune function. Dr Cortés contacted ADM's scientific team for advice on the most

A clinical trial investigating into the effects of probiotic supplements among Covid-19 patients in hospital care has received the backing of ADM.

ADM and Hospital de Sagunto, one of the largest medical centres in the Valencia region of Spain, have announced a new partnership for a clinical trial, investigating the effects of using a food supplement containing live microbial strains to promote gut microbiome balance and, in turn, help improve health functions related to outcomes for Covid-19 patients in high-risk groups.

Launched in March, the trial now has more than 75 participants recruited and came about after Dr Xavier Cortés, Gastroenterologist at Hospital de Sagunto, communicated with medical staff in China, who has observed that many Covid-19 patients had exhibited

potentially suitable live microbial strains to use during the trial, and to invite the team to collaborate with Hospital de Sagunto in the design of the clinical trial.

Gastel Plus is a live microbial probiotic-based food supplement marketed by Laboratorios Heel España, S.A.U. and formulated using ADM probiotic strains. This, along with essential nutrients, vitamin D, selenium and zinc, was selected.

The product has been administered to patients with Covid-19 symptoms, as well as to healthcare workers at the hospital who fall into high-risk groups at Hospital de Sagunto.

The three ADM probiotic strains contained were *Bifidobacterium longum* CECT7347, *Bifidobacterium animalis* subsp. lactis CECT9950 and *Lactobacillus rhamnosus* CNCM-I4036.

Research finds mass testing safest approach to emerge from lockdown



New research from Durham University Business School has suggested that mass Covid-19 testing is the safest way to reopen the economy and society and will cost much less than a hard lockdown.

Professor Abderrahim Taamouti, Professor of Economics and Finance at Durham University, has developed an epidemic model to study the impact of two measures – lockdown and testing – on infection control.

The results show that when a soft lockdown is imposed, around a 10 per cent shut down of economic activity, then high testing capacity of as much as testing four per cent of the population each day is needed to control Covid-19 infection. When the lockdown is slightly higher, around a 30 per cent shut

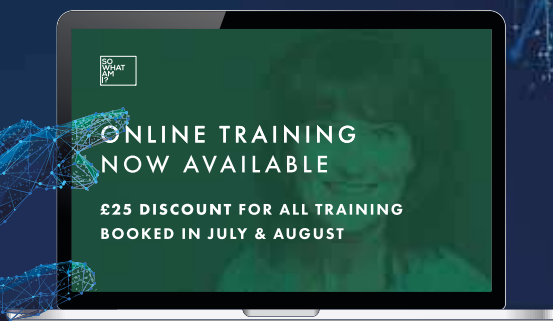
down of economic activity, then testing about 1.5 per cent of the population daily will be enough to get the infection under control.

“Hard lockdowns are likely to cause the worst recession in a century,” Professor Taamouti commented, “and most countries have only been testing on a small-scale. Yet the countries – including Iceland, Germany, and South Korea – that built a high-testing capacity (they tested a greater proportion of their population than the rest of the world) fought the pandemic well by finding those who have Covid-19 and quickly isolating or treating them. These countries that managed to keep their case counts and deaths tolls low have also reopened their economies earlier than most other countries.”

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New to market

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VIRIDIAN TURNS THE FOCUS ON CONCENTRATION



Peak Focus is the latest innovation from the experts at Viridian Nutrition.

The new supplement has been designed to support optimal concentration and features clinically studied organic lemon balm extract to help maintain good cognitive function and scientifically researched organic sage extract to help maintain optimal mental wellbeing, including concentration, attention and memory.

Peak Focus contains 100 per cent active ingredients and, is GMO free, palm oil free, never animal tested and ethically made. It is suitable for individuals following a vegan lifestyle.

Aimee Benbow, Technical Director at Viridian Nutrition, commented: "Peak Focus has been formulated from natural ingredients and is certified by the Soil Association, the highest level in organic standards. This reflects our commitment to using sustainable ingredients and to protecting the environment. This also reinforces the fact there's no need for chemical enhancers as scientific research shows the natural extracts of lemon balm and sage can help maintain good cognitive function."

VEGAN MISO RANGE EXPANDS



Clearspring has further developed its vegan range with three extensions to its miso range.

The Instant Miso Soups range now features the varieties Ginger & Turmeric, Creamy Sesame, and Hot & Spicy, designed to complement the umami-rich flavour of miso.

All three soups are organic, gluten free, vegan and made using 100 per cent natural ingredients, including kombu and wakame sea vegetables. They are produced in the UK, using authentic organic Japanese miso.

Each pack contains four easy-to-use sachets, which are simple to prepare; just add hot water. Additionally, each sachet of soup is a source of protein and can be enjoyed as they are or with your choice of ingredients, including silken tofu or vegetables.

PACKING A VEGAN PUNCH



Swisse Me has unveiled a new range of vegan protein-packed products.

Swisse Me – dubbed 'the wild little sibling' to Australia's top wellness brand, Swisse – has created the range of products that are high in fibre, plant-based and packed with friendly bacteria, which have the added benefit of being packaged in fully recyclable materials.



Swisse Me Protein Balls contain nut butter, exotic mushroom, maitake, and friendly bacteria, and comes in flavours including Cacao & Hazelnut, and Cinnamon & Almond. The protein balls are free from additives, artificial colours, added sugars and artificial sweeteners.

Swisse Me Protein Powders, in flavours including Raspberry & Strawberry, and Salted Caramel, contain magnesium to help with electrolyte balance, along with vitamins B1, B2, B3, B5, D, B6, B7, B9 and B12 to help nourish the body.

Available in 30g or 600g to meet the desire for 15-17g servings protein.



ABUNDANCE & HEALTH LAUNCHES NEW VITAMIN C POWDER

A blend of four forms of buffered vitamin C has been launched by Abundance & Health.

Neutrient Total C Powder contains four different forms of buffered vitamin C and other compounds, which has been designed to deliver intensive nutritional support and effective absorption (without stomach irritation).

The pure powder formula has no colours, sugars, sweeteners or unnecessary additives. Each small scoop of powder provides 940mg of mixed vitamin C (ascorbic acid, sodium ascorbate, magnesium ascorbate and ascorbyl palmitate), with added black pepper extract (Bio-Perine) to help the vitamin C absorb more efficiently, D-ribose and dihydroquercetin (DHQ).



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EDUCATION FOR ALL

Discover a wealth of digital education events, hosted by the organisers of the IHCAN Conference series.

With the Coronavirus pandemic affecting events across the country, there's never been a better time to enjoy the free education provided by the IHCAN Conferences.

There are a whole host of free webinars to register for – with many more planned for the coming weeks and months – so keep your eye on www.ihcanconferences.co.uk/webinars for the full schedule and to register.

ANXIETY AND STRESS: CAUSES, CONSEQUENCES AND COUNTERING NATURALLY WITH THERAPIES



Held on July 7, Rose Holmes, Registered Nutritionist, mBANT, BSc, Dip.ION, PGCE, highlights that the impact of stress and anxiety on health is an

important area of concern – whether Covid-19-related or otherwise – with repercussion on clinical outcome in protocols to address physiological health issues. This webinar will look at nutritional, lifestyle and supplement suggestions to help when anxiety and/or stress is an issue, and where it may be preventing or hindering the effectiveness of protocols addressing chronic physiological health concerns.

COVID-19: WHAT IT IS, THE DISEASE PROCESS AND NUTRITIONAL INTERVENTIONS



Hosted by Louis Soteriou, Naturopathic Nutritionist, on July 14,

Louis will talk about features of the virus, how the disease manifests in the body, our bodies reaction and how nutritional interventions can be used along various stages of the process.



NUTRITION AND THE MIND



Being held on Tuesday, September 15, Dr Marilyn Glenville PhD will present a webinar on the theme Nutrition, Mental Health and Sleep – new evidence for the direct link between food, mood and sleep.

Hosted by The Natural Health Practice, Dr Glenville will discuss how mental and physical health is fundamentally connected, and nutrition has the potential to influence the impact of mental wellbeing including anxiety, depression, stress, trauma, sleep and PTSD.

IHCAN CONFERENCES – AN UPDATE

In light of the Government's recent recovery strategy announcement, which has provided clarity and guidance on the status of gatherings in the UK until July, IHCAN Conferences has made the difficult decision to further postpone the IHCAN Summit (which was planned to incorporate the April IHCAN Conference) on June 27 and our March 28 event, which was postponed until July 4.

Further to this, with many of our speakers based internationally and the future of international travel unclear, we have unfortunately had to postpone all further events, and reschedule them to 2021. For more information, and the new schedule, visit www.ihcanconferences.co.uk



IHCAN 2020
conferences

DUE TO COVID-19 PANDEMIC

NEW DATES FOR 2021

THE LEADING EVENTS
FOR INTEGRATIVE HEALTH
PRACTITIONERS

~~28 MARCH 2020~~ - **20 MARCH 2021** - **DR DAVID UNWIN,
DR ELISABETH PHILIPPS & ANNE PEMBERTON**

~~12 SEPTEMBER 2020~~ - **10 APRIL 2021** - **DR ALLISON
SIEBECKER & BEN BROWN**

~~21 NOVEMBER 2020~~ - **15 MAY 2021** - **DR DALE BREDESEN**

~~27 JUNE 2020~~ - **26 JUNE 2021** - **IHCAN SUMMIT 2021 -
DR RICHARD FEINMAN, DR CHERYL BURDETTE,
CATALINA FERNANDEZ & DR LINDA L. ISAACS**

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BANT News

The latest developments from the leading professional body for Registered Nutritional Therapists, BANT.



Becoming a Nutritional Therapist – a day in the life

Below is an extract from an interview with Nutritional Therapist, Daniel O'Shaughnessy, describing how he manages his time as a Registered Nutritional Therapist.

There are a variety of options for those graduating with a nutritional sciences qualification and the hours of clinical practice that allow them to practice in one to one setting as Registered Nutritional Therapists. These qualifications also provide graduates an opportunity to develop a portfolio career and work outside the one to one clinical practice as a BANT Registered Nutritionist. This may include running retreats, workshops, online courses, working for a supplement company or lab, or in retail, teaching, amongst many more options.

BANT members have multiple resources to access information and webinars on how to set up in practice, run online consultations and courses if you wish to become a self-employed practitioner.

"Before becoming a Registered Nutritional Therapist, I was far removed from the health and wellbeing sector. I was in a busy office job that had some element in helping people but did not give me the satisfaction I wanted out of a job. I spent a few months looking around at what I was interested in and spoke with a friend about it. She said to me 'If I gave you a book voucher and you went to a book store, what section would you go to?' It immediately dawned on me that the nutrition path was calling. I had a look around online and contacted someone at BANT to see what courses were available. I then found a course that was suited to my working hours and life at home.

"There isn't a typical day as a Registered Nutritional Therapist, as each day presents new challenges and I love every second of it. One example of a clinical day would begin with checking emails and seeing what is

urgent, then seeing which clients I need to prepare for and collating the clinic paperwork. I may then spend four hours in clinic, then back home to finish the clinic notes. If I have time, I will spend time on an article for my website or send out a tweet or two on social media.

"It can be very rewarding, especially when you see a client come back to the follow-up session feeling much better than the previous session. Most are just so pleased that you have managed to get to the root cause of their symptoms. I guess the only negative is the necessary paperwork after seeing a client but that speeds up with more and more consultations you do. Good written and communication skills are important so you can really relate to the client.

"The training is intense but when I left my institution, I really felt I was ready for the outside clinical world. The lectures are so interesting, and the fellow students really help guide the process. I found myself forming a mini network to be able to bounce ideas off my peers and have guidance with clinical conundrums in college and post-graduation. It's

also important not to forget to market your practice. This takes time but it is really worth it and also you learn a whole new skill, but the toolkits provided by BANT help a lot with this.

"Being a Registered Nutritional Therapist is such a unique career. Don't expect to jump from college into a full-time position. It can take time to build up your business. However, the work is extremely rewarding and there isn't a day where you don't learn something new. There is never a better time to join the profession as it is growing so fast and I'm sure it will become a primary healthcare option in the near future. The decision to become a Registered Nutritional Therapist is probably the best I have ever made."

If you are not already a member, Nutritional Therapy students can join the BANT community of over 3,000 members as a student member.

Click here for further information: <https://bant.org.uk/nutritional-therapy-careers/join-bant/apply-for-membership/>



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Mental health in focus



The spotlight is shining brightly on mental health, more so than ever before as we deal with Covid-19. With a focus on nutritional interventions, experts discuss the role practitioners can play in supporting healthy minds.

Even prior to the nation going into lockdown amid the Coronavirus crisis, mental health was firmly on the agenda as a discussion point. This has only further been heightened during lockdown as concern continues to be expressed at the widespread damage that Covid-19 and its knock-on effects could be having on our collective mind health.

Much research is being conducted to back this up; according to the mental health charity, Mind, nearly two thirds (60 per cent) of people in England say that their mental health has got worse during lockdown, however, around one third (31 per cent) did not seek help as they thought their problem wasn't serious enough. Furthermore, in other research, Mind found that nearly a quarter of people were not able to access mental health services during a two-week period during April.

Responding to the findings, Paul Farmer, Chief Executive of Mind, commented: "As a nation, a vast number of us have seen our mental

health deteriorate during the Coronavirus crisis. It is therefore deeply concerning that people are struggling to get the help that they urgently need. Evidence shows that when people do not get support early enough, they end up in crisis.

"People with mental health problems have been hit hard by the current situation. We are particularly worried that some people are being discharged too early from hospital, while others have been left languishing on mental health wards, because of the current limited availability of community support. Being sent home at the wrong time can delay recovery and, at worst, puts people at high risk of suicide. A drop in the number of referrals to NHS mental health services, including those for children, is worrying when we know the need is high. It has never been more important that people are encouraged to access mental healthcare that is timely, appropriate and available at the point of

need. If not, we are storing up more complex problems for the future."

And it is this idea that we could be storing up greater problems for the future – with far greater numbers of people needing help – that is important to note. Of course, responsible advice and directing a client to their GP if they are experiencing mental health problems remains the absolute first course of action, but we know there is a huge role nutritional and lifestyle interventions play in supporting mental health.

THE SCALE OF THE PROBLEM

According to the Time to Change campaign, run by Mind and Rethink Mental Illness, around one in four people will experience a mental health problem this year.

Dr Marilyn Glenville PhD is one of the UK's leading Nutritionists, author of 16 internationally bestselling books and runs clinics in Harley Street, London, Kent and Ireland. She pointed out: "Mental health problems are a big concern in general and the World Health Organization states that mental disease including stress will be the second leading cause of disabilities by the end of 2020.

"The mental health charity, Mind, says that approximately one in four people in the UK will experience a mental health problem each year. It is thought that people's ability to cope with issues in life such as jobs and relationships has decreased. There has been an increase in the number of young people with mental health issues and it is thought that this change may have occurred because of cultural trends. The increased use of electronic communication and digital media has changed social interaction, and this can affect mood."

Kim Plaza, Nutritional Therapist and Technical Advisor at ADM Protexin, which has launched Bio-Kult Mind, added: "The Mental Health Foundation (2016), stated that 19.7 per cent of people in the UK over the age of 16 showed symptoms of anxiety or depression, with higher rates among women compared to men.² Some of the more common types of mental health issues are depression, general anxiety, social anxiety and panic disorders, with all but panic disorders shown to be on the rise².

"The social factors which are implicated with mental health problems are concerning. This is because they can potentially persist and cumulate across generations, therefore, becoming a greater public health issue. Throughout our adult life, the majority of people will be working and will experience a range of mental health states, from poor to good mental health across our working life. Evidence suggests that 12.7 per cent of all absent days from work in the UK can be attributed to mental health problems,² with one in five employees who had disclosed they had a mental health problem feeling that that were unfairly treated as a result.² These numbers indicate that poor mental health may affect anyone and must be taken seriously. Early interventions for mental health problems can reduce hospital admissions, with shorter hospital stays and require fewer high-cost interventions,² therefore, preventative measures may be a valuable approach."

And Catherine Gorman, Nutritional Therapist at Good Health Naturally, pointed out: "One in four people in the UK will experience mental illness

each year, including anxiety, depression and post-traumatic stress disorder. The latest figures show mental health-related issues led to 17.6m days of sick leave a year, that is 12.7 per cent of all work absences in the UK. Depression is one of the leading causes of disability worldwide and a major contributor to suicide and coronary heart disease.

"Anxiety and depression are the most common mental disorders in Britain. In England, 24 per cent of women and 13 per cent of men in England will report experiencing depression in their lifetime. Women are also twice as likely to be diagnosed with anxiety compared to men.



This gap between men and women may change in the next few years, following all the recent campaigning to get men to open up about mental health. While the overall number of people with mental health problems has not changed significantly in recent years, there has been an

increase in people self-harming and having suicidal thoughts."

But why is it that mental is finally under the spotlight?

Joe Welstead, Co-founder of Motion Nutrition, commented: "I think a bunch of factors have come together to accelerate the growth in mental health awareness. At grassroots level, many of us live a high-anxiety life, with fewer people around us to talk to about our stresses and anxieties. Until a few decades ago, it would be normal to have your entire extended family living on your street. Today, that's gone so it's easy to bottle up our emotions for far too long.

"Meanwhile, hugely successful influencers – former athletes, businesspeople, artists – have opened up and made it OK to discuss mental health and particularly how this can affect sleep. In fact, we no longer count our steps, but instead measure our sleep. On top of this, today, we've been rapidly exposed to shifts in lifestyle that are completely out of control – and dealing with uncontrollables is a big part of mental health."

He added: "Fear of the unknown is usually associated with anxiety. We're currently experiencing once-in-a-lifetime levels of uncertainty around future events. For most of us, we're also entering a supposedly once-in-a-lifetime financial crisis for the second time in a dozen years. Any underlying factors that have been leading to a rise in mental health issues will be exacerbated by such uncertainty."

Gorman continued: "Life is getting busier and, for many people, lonelier. On top of all the traditional stressors, such as worries about money, jobs, benefits and difficult relationships, we have the additional burden of modern technology and perpetual social media. Plus, we now have the added pressures of Covid-19 and lockdown, the full impact is still yet to be realised."

Plaza believes change is occurring as it's now been made more acceptable to talk about it.

"Fortunately, in recent years we have been encouraged through the media, the workplace, medical practices and through holistic health to open up about mental health and discuss the health of our minds as we would the health of our bodies," she commented.

"There is a greater understanding today that the health of our minds not only affects our work performance and general quality of life but is also more likely to increase the risk of further health conditions in the body. A study in 2014 found that the presence of depression and/or anxiety conferred an independent risk for having chronic physical conditions, such as arthritis, heart disease and diabetes!¹"

FACTORS TO CONSIDER

As already discussed, there are a number of factors that must be considered when it comes to mental health, and this differs from condition to condition – it is certainly not the case that there is one single reason a person suffers from mental health problems.

Paul Hembery, Founder of ULU, which specialises in CBD products, commented: “There are all sorts of factors, but essentially there are more and more professional demands on people these days and increased financial pressure, as well as more fragmented communities. That’s far from an exhaustive list, but these are just some of the key factors influencing mental health.”

He pinpointed stress, anxiety, and depression as the most common issues we’re seeing, adding: “These affect different people in different ways and to varying extents, but these are the most common mental health conditions that we are seeing. I think it’s something that everyone can relate to, and everyone has experienced at some point.”

What we do know is the diet and the lifestyle choices we make play a big role in being able to manage a condition, alongside medication and other supportive therapies.

“For far too long, the role of nutrition in our mental health has been ignored. This is a huge shame. There is so much evidence showing different foods affect different hormone and neurotransmitter levels. Equally, there is more to it than the nutrients in the food. Mediterranean diets have been praised not just for their depth of nutrition, but also for their social element, bringing people together,” Welstead advised.

“As much as nutrition has been ignored for too long, it would be equally irresponsible to reverse this approach and take a black or white view on which diet is beneficial and which is not. Some elements are clear, though. Starting your day with a high-sugar breakfast and caffeine will increase your stress levels and send you off on a mood-swing rollercoaster for the day.”

Dr Glenville went on: “A very exciting area of research suggests that diet is an important modifiable risk factor for mental health. There is a very clear link between the mind and body and it has been shown that nutrition can have a powerful role to play in the health of the mind.

“A diet that is high in processed, junk food will be detrimental to mental wellbeing. Evidence has shown that eating junk food has a negative effect on mental health, increasing the risk of depression. Research has shown that those who ate the most fast food over a six year period were 37 per cent more likely to become depressed compared to those with the lowest consumption.”



And Gorman continued: “The brain needs a constant supply of nutrients to operate optimally. If we are not eating nourishing food, it will affect the structure and function of the brain, then ultimately, our mood. Studies have found a correlation between diets high in refined, processed carbohydrates

and a worsening of symptoms of mood disorders, such as depression. Not only do starchy, sugary foods impair the body’s regulation of insulin, they can cause further harm to the brain by promoting inflammation and oxidative stress.”

A RECOMMENDED PROTOCOL

Caution must always be taken when handling mental health issues in clinic, but there is a role to play for Nutritional Therapists to recommend a beneficial dietary protocol – with a number of elements to consider.

The general consensus is that a Mediterranean-focused diet is a good place to start.

Dr Glenville advised: “The emphasis should be on eating a Mediterranean diet as research has shown those people who were clinically depressed displayed significant improvements after 12 weeks of eating a Mediterranean diet. A meta-analysis of nine prospective cohort studies showed that both high and moderate adherence to Mediterranean diet was consistently associated with reduced risk for depression and cognitive impairment.

“The aim is to eliminate or reduce added sugar and refined carbohydrates as the higher consumption of sugar, the more likely someone is to develop depression or anxiety.”

Gorman agreed, adding: “Ensure the brain is getting all the nourishing nutrients it needs by eating a diet rich in vegetables, low sugar fruit, such as apples and berries, and healthy fats, including olive oil, coconut oil, avocados, nuts, seeds, fish and seafood. Avoid unhealthy refined sugars, trans fats and processed foods. The Mediterranean diet is perfect for supporting good mental wellbeing. In fact, research shows the risk of depression was up to 35 per cent lower in people eating the Mediterranean diet compared to the traditional ‘Western’ diet.

“More and more studies are highlighting the importance of digestive health and the role it plays in mental wellbeing. An unhealthy gut can affect our resilience to stress. Keep the microbiome happy with fermented foods such as kefir, sauerkraut, or kimchi, fibre, and prebiotic vegetables, including artichoke, leek, apple, garlic, and onion.”

Plaza suggested: “When we are stressed or anxious, our bodies have an increased requirement for micro-nutrients, in particular the B vitamins, vitamin C, magnesium and potassium.¹¹ It’s therefore important that you also get plenty of these through your diet.

“Eating a rainbow of brightly coloured fruit and vegetables and switching to whole grains will help achieve this. Especially important are leafy green vegetables, so make sure you include at least one to two portions every day.

“Other elements that may support good mind health include reducing highly processed foods, obtaining adequate omega 3 fatty acid, limiting alcohol consumption and sufficient vitamin and mineral intake.⁹ Vegetable

consumption has been associated with higher levels of mental wellbeing,² therefore, supporting good nutrition is supporting good mind health.”

There is no question that lifestyle is a critical component of any protocol, given the known effect a sedentary lifestyle can have on those with mental health conditions.

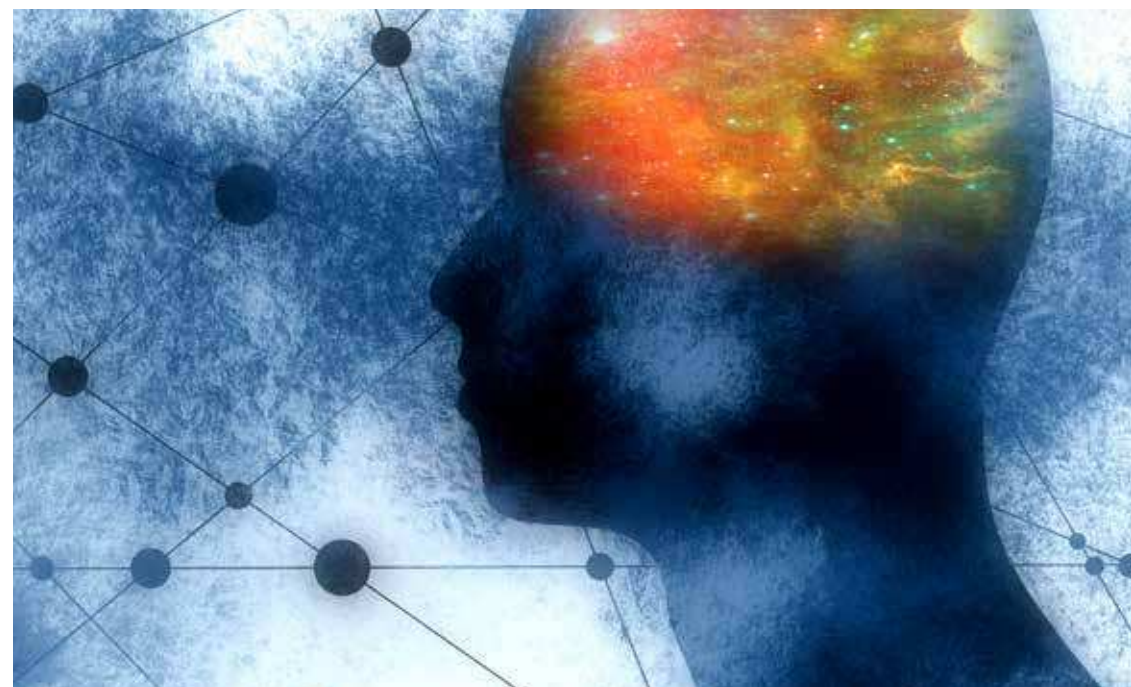
“Regular physical activity can help improve mood, alleviating depression and anxiety. Exercise daily but aim for three rigorous 45-minute sessions a week,” Gorman suggested, adding: “Relax, learn to practice mindfulness or meditation. Join a yoga, tai chi or Pilates class. This will help promote calmness, easing anxiety and negative emotions.

“Aim for seven to nine hours sleep a night. It is an important time for processing the events of the day. Good sleep will help improve mood and emotional resilience. Make sure you have a sense of purpose in life, join societies, socialise, keep in touch with friends. Keep well hydrated, aim for six to eight glasses of water a day.”

And Welstead suggested: “Despite the huge progress we’ve made in understanding the mind, we are still too quick to separate mind from body. Learning new complex physical movement is perhaps the most powerful way to create new neurone connections. So, don’t stick to your routines, but learn something new. Dust off your old skateboard or try a new dance class.”

As part of this, addressing stress levels, and adopting measures that can promote relaxation, is critical.

“Managing and coping with stress is important as it is well known that food selection will change under stress, pushing people to go more for the comfort and junk food, which is then exacerbating the problem,” Dr Glenville commented.

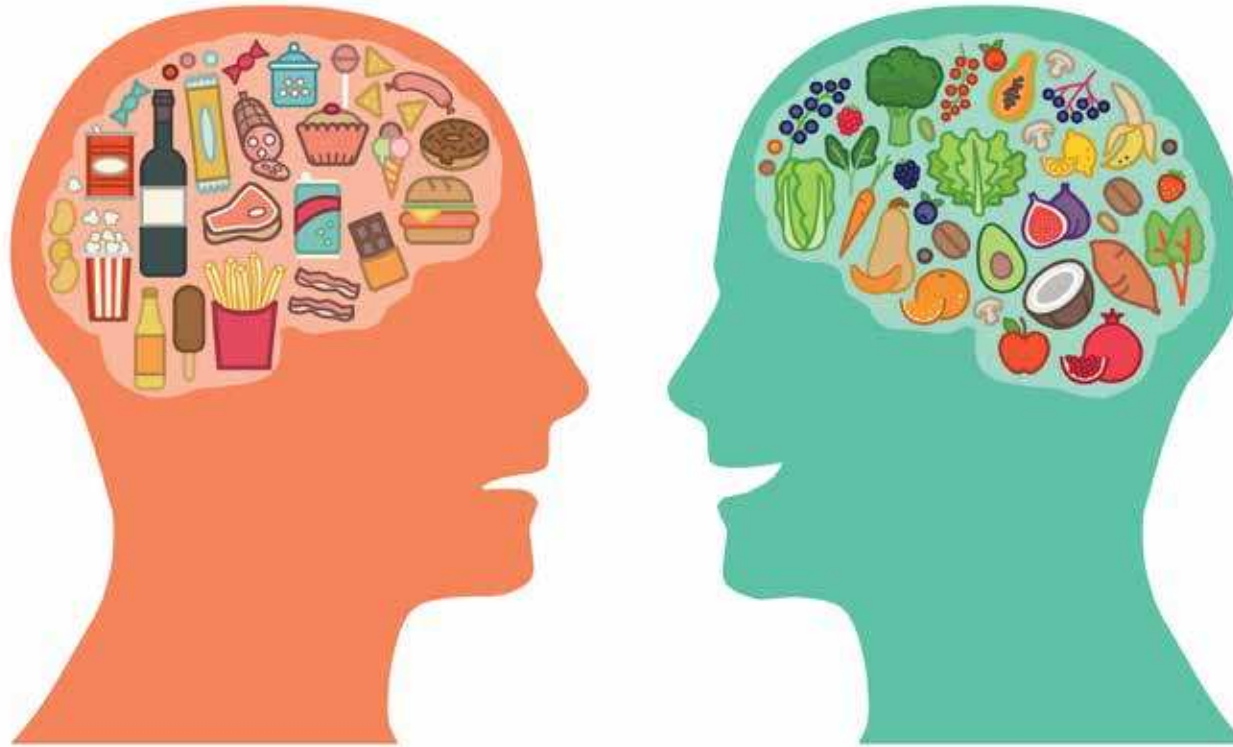


“Exercise is also important as it has been shown to reduce anxiety and depression. Exercise also benefits mental health by improving self-esteem and confidence and improving other factors which may impinge on mental illness, such as sleep, stress, energy and general lethargy.”

Plaza added: “Physiologically, we are more able to adapt to acute stressors, such as immediate danger and taking action to correct it (for example, touching a hot pan). As modernity has altered the way we live, there are now multiple levels and types of stress, including daily stressors, life event stressors and chronic stressors.³

“Chronic stress, or the combination of both chronic and acute stress, is said to be causally related to the onset of poor mental health, compared to acute stress alone.⁴ Keeping a regular routine each day is beneficial for our natural circadian rhythm.

“Part of this routine includes eating at regular intervals through the day and avoiding eating too late at night. Eating foods rich in protein, especially those containing the amino acid tryptophan, can help to increase melatonin in the brain¹².”



ADDRESSING NUTRIENT GAPS

In addition to advocating a generally healthy diet, specific nutrients are considered crucial in the maintenance of healthy mind.

“A paper published in the *World Journal of Psychiatry* in 2018 listed 12 important ‘antidepressant nutrients’ for the prevention and treatment of depressive disorders: folate, iron, omega 3 fatty acids, magnesium, potassium, selenium, vitamins A, B1, B6, B12 and C, and zinc. It identified the following foods as the best sources: leafy greens, lettuces, peppers, cruciferous vegetables, seafoods, and organ meats,” Gorman commented.

“Don’t forget the brain itself is 60 per cent fat, so the omega 3 fatty acids DHA and EPA, are crucial for cognitive health.”

“Antioxidants are also vital, as the brain’s high metabolic rate makes it particularly susceptible to oxidative stress. Other research suggests the amino acid, tryptophan, is important for some people. It is a precursor to the ‘feel good’ neurotransmitter, serotonin, helping calm the mind, improve mood and sleep.”

Dr Glenville continued: “Certain nutrients are important when talking

about mental health, including the B vitamins, which are needed for the crucial role in the synthesis of neurotransmitters including serotonin – our ‘feel good’ brain hormone. Magnesium has also been found to be effective for depression and that deficiencies of magnesium may cause agitation, anxiety, irritability, confusion and sleeplessness. The amino acids, tyrosine and L-theanine, can be helpful in improving mood and mental relaxation.

“Research on omega 3 fats, which are classed as essential because we can’t make them in our body, are important for decreasing psychological distress and too much of omega 6s could increase the risk of major depression. Low DHA plasma level has been shown to be a strong predictor of future suicide risk and people who had been involved in an automobile accident, only one of 15 of those treated with omega 3s developed significant PTSD symptoms in contrast to the historically expected rate of 25 per cent.

“An increasing number of studies have shown that individuals with PTSD exhibit significantly elevated blood levels of inflammatory markers

so omega 3 and their anti-inflammatory effects are crucial.”

And focus must also be placed on vitamin D, a crucial mind health nutrient.

“We know that those with the lowest levels of vitamin D, our ‘sunshine’ vitamin, are 31 per cent more likely to have depression than those with the highest levels,” Dr Glenville added.

Welstead continued: “Certain nutrient deficiencies are highly associated with degenerative diseases. If we want to age gracefully and with a healthy mind, it would be wise to consider mineral supplementation, in particular, magnesium, B vitamin supplementation, and the addition of adaptogenic botanicals.”

CBD may also be a useful consideration, with Hembery suggesting: “We’re working closely with some nutritionists to see how CBD can be integrated into diet to combat mental health issues, so we’ll be studying their recommendations carefully. We need to follow the specialist advice of the nutritionists. The chemistry of the brain, and how it interacts with nutrition, is an extremely complex area.”



THE GUT/BRAIN AXIS

An area expanding in terms of the evidence base, the link between the gut and the mind must be considered.

“The gut is classed as a second brain and we have the same neurotransmitters in there as we do in our brain. In fact, 95 per cent of our serotonin is in the gut, compared to five per cent in the central nervous system. Research has suggested that ‘the microbiome may yield a new class of psychobiotics for the treatment of anxiety, depression and other mood disorders,’” Dr Glenville reported.

Plaza reiterated the connection between the gut and the brain, emphasising the need to focus on the digestive system.

“There is a strong association between depression and our digestive system.⁵ Often when we are feeling low, we lose our appetite and instead of eating regular meals, satisfy ourselves by reaching for quick and often sugary foods, which are also low in fibre. This type of diet can lead to an altered gut flora, which research suggests may affect our mood⁶,” she explained.

“This is because refined carbohydrates and simple sugars tend to favour less helpful strains of bacteria. These strains produce toxins which may be able to cross both the intestinal barrier and the blood brain barrier, therefore, affecting our wellbeing.⁷ Meanwhile, beneficial bacteria can produce serotonin in the gut,⁸ which is often referred to as our ‘happy hormone’. Beneficial bacteria prefer high fibre foods such as prebiotics, these are non-digestible fibres that are fermented in the gut. Improving our diet can therefore have health benefits for digestive function and mood².”

Eating for the gut is a critical component here.

“Increasing fermentable fibres to encourage the growth of beneficial bacteria, such as onions, garlic, oats and slightly green bananas, might help support a diverse microflora. Traditionally fermented foods such as sauerkraut, kimchi, live plain yogurts and kefir are also often used to help rebalance gut flora and research is indicating these foods could have a positive impact on mood and mental health¹⁰,” she advised.

And then probiotics can also form part of your recommendations.

Plaza explained: “Melatonin is our important ‘relaxation’ hormone, necessary for us to get a good night’s sleep. It is produced in the body in increasing quantities during the evening. Live bacteria supplements may help to improve nutrient absorption, so could improve the absorption of tryptophan in the diet and therefore increasing our melatonin levels. If you’re considering a supplement form of beneficial bacteria, consider a multi-strain formulation, with added magnesium and vitamin B6. Both these nutrients contribute to the normal function of the nervous system and studies suggest they may be beneficial in the prevention and treatment of depression¹¹.”

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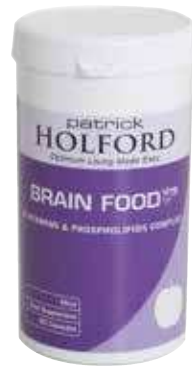
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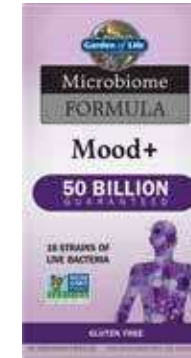
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Advances in probiotics



An in-depth focus on the critical role of probiotics, and what the latest research around beneficial bacteria is telling us.

There are many factors that affect the delicate balance of our gut microbiome, and unfortunately, many of these are likely to currently be affecting parts of the population amid the ongoing Covid-19 pandemic. For example, we know that stress, an overly processed diet, and a sedentary lifestyle can directly affect the function of our gut, and lead to an imbalance in beneficial and pathogenic bacteria.

What this means is that many clients seeking support from a Nutritional Therapist are likely to be experiencing dysbiosis, which, in turn, can lead to a range of health concerns. The focus should, therefore, be placed on advising of the correct protocol when it comes to probiotic supplementation. And, as the research continues to expand in terms of the importance of probiotics, what does the future look like in terms of uses?

Nutritional Therapist, Kim Plaza, Technical Advisor at ADM Protexin, which specialises in probiotics with its Bio-Kult brand, commented: "Unfortunately, modern lifestyles that are high in stress, processed foods, alcohol, antibiotics, environmental toxins and low in fibre (the food source for beneficial strains), mean that many people suffer with dysbiosis¹¹."

Sarah Oboh, Nutritionist at OptiBac Probiotics, continued: "An imbalance of beneficial and pathogenic bacteria in the body is described as dysbiosis. There are numerous dietary and lifestyle factors that have been shown to have a negative impact on the gut and result in a reduction of beneficial bacteria. One of the most well-known and powerful factors

to lower beneficial bacteria in the gut is antibiotics. Research suggests that negative alterations in microbial communities and a reduction in the diversity of bacteria will still be present for several months after the cessation of antibiotic use.

"A diet that is high in processed foods, added sugars and/or low in fibre may also decrease beneficial bacteria in the gut. These beneficial bacteria thrive on fibre from the diet, helping to maintain a healthy level in the gut and consequently, an increase in number and diversity. The more beneficial bacteria we have in our gut, the better the barrier of protection against pathogenic microbes."

Karen Jones, BSc, BA, DipCNM, CNHC, BANT, Education and Practitioner Support for TMC Ventures Europe, UK distributor for Microbiome Labs and Enzyme Science, added: "During stress, an altered gut microbial population affects the regulation of neurotransmitters mediated by the microbiome and gut barrier function, leading to dysbiosis. Stress also affects the production and release of digestive juices, which means that more undigested food reaches the microbiome, leading to a different microbial environment."

It is important when considering an imbalance in bacteria to examine how the microbiome works.

Jones explained: "Instead of talking about being low in healthy bacteria, it is better to think of the microbiome as an ecosystem in its own right, like a rainforest. It is balance that is important, as well as diversity, and

these are what maintain its health, as well as that of its host. Any bacteria can become unhealthy if they become too prevalent – it's all about maintaining a good balance between the many phyla, geni and strains that make up the microbiome, which, together, ensure that pathogenic bacteria cannot take over. Once balance is lost, this is referred to as dysbiosis and can present in many different forms, depending on which bacteria have overgrown. Diversity is another hallmark of a healthy microbiome, and a lack of diversity leaves a microbiome more likely to allow pathogenic bacteria to overgrow if, and when, it comes under attack or strain."

Adrienne Benjamin, Nutritionist at ProVen Probiotics, questioned if there is adequate awareness around probiotics.

"As a health practitioner and somebody who works for a probiotics manufacturer, I would like to say yes, but unfortunately, I think there is still a large portion of the population who are unfamiliar with probiotics and what they do. Unlike some European countries, most doctors in the UK still do not recommend probiotics when they prescribe antibiotics, despite the vast amount of research now supporting the efficacy of replenishing the gut bacteria both alongside and following a course of antibiotics.³ Communicating the physiology and function of the microbiome in ways that reach large numbers of people in language they understand could help to underline the importance of gut bacteria and probiotic foods and supplements to health⁴."



THE HEALTH EFFECT

What is increasingly clear is the far-reaching effect that dysbiosis has.

Oboh advised: "An imbalance of beneficial and pathogenic bacteria is associated with numerous health conditions. All microbes have a role to play in the gut, but potentially pathogenic microbes need to be kept in check. If a healthy balance of beneficial and pathogenic microbes is not maintained, the gut cells and immune system may be exposed to attack, which could result in skin disorders, intimate health conditions and candida overgrowth, to name a few. The growing body of research suggests that probiotics have a far-reaching effect on overall health and links have been made between dysbiosis in the gut and diseases such as obesity, liver disease, metabolic syndrome, autoimmune conditions, heart disease, Parkinson's and autism."

Plaza continued: "Our gut bacteria exert important metabolic functions, and regulate the inflammatory response via the immune system.¹¹ Dysbiosis has been linked to many human diseases, such as allergies, metabolic diseases including obesity and diabetes, cardiovascular diseases, inflammatory bowel disease (IBD), irritable bowel syndrome (IBS), neurodegenerative disorders and mental health issues¹⁸⁻²¹."

And Anna Sawkins, founder of Sweetcures, which has a range of gut related products, including Probiotic Blend, went on: "Microbes which include bacteria, viruses and fungi are not an enemy of human and the truth is that we should foster a healthy relationship with microbes. In fact, the scientific community in one piece of research after another confirms that a diverse microbiome is essential for optimum physical and mental health. While we may begin early life with a highly diverse microbiome, a processed diet, overuse of antibiotics in farming and medicine, and a too zealous attitude to cleanliness seriously deplete the diversity of microbes in the human body and the disruption of the microbiome is now generally accepted as a contributing factor to many chronic illnesses, including depression, fibromyalgia, multiple sclerosis, obesity and arthritis.

"More importantly, our immune system – the shield we have against all bacterial and viral attack – is almost

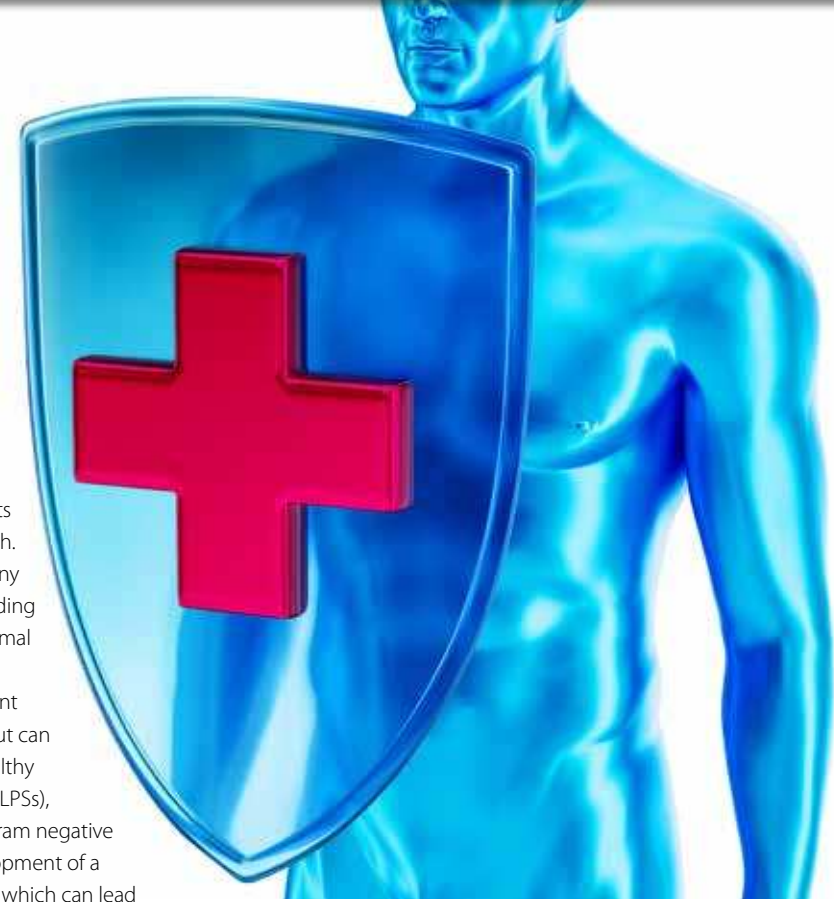
exclusively dependent on a healthy microbiome, whilst friendly bacteria also facilitate just about every bodily process, such as digestion, thoughts and even weight. The bottom line is that if our microbes are unhealthy (not plentiful and diverse), research suggests, so are we."

Jones pointed towards the effect of short chain fatty acids (SCFAs) and our bacteria levels.

"The bacteria in our guts produce both healthy and unhealthy metabolic products that have a profound impact on our health. SCFAs, such as butyrate, contribute to many essential functions within the body, including colonic cell health, energy levels and optimal brain function," she explained.

"The gut also produces up to 80 per cent of our neurotransmitters, so a dysbiotic gut can lead to a lack of neurotransmitters. Unhealthy metabolites include lipopolysaccharides (LPSs), which are part of the cell membrane of gram negative bacteria and can contribute to the development of a permeable intestinal barrier, or 'leaky gut', which can lead to metabolic endotoxemia and systemic inflammation. Inflammation is the central driver of many of the Western diseases so commonly seen today, much of which commences in the gut."

She added: "The microbiome is also linked to every other organ in our body, affecting our digestion, our liver, our heart, our brains, our lungs etc. You may have heard of the gut-brain axis, well, there is also a gut-lung axis, a gut-heart axis etc. And on top of that, sitting just outside our gut wall barrier, are 70-80 per cent of our immune cells, who are in constant communication with the microbiome. In fact, research has shown that the immune system cannot develop properly without a microbiome (as found in 'germ free' mice who have no microbiomes). Dysbiosis, therefore, drives many of the inappropriate immune and inflammatory responses seen in so many conditions, including autoimmunity.



"So, a client with dysbiosis can present with a vast array of both intestinal and extra-intestinal disorders. Intestinal disorders could include IBD, IBS and coeliac disease, and even colon cancer, while extra-intestinal disorders may show up as allergy, asthma, metabolic syndrome, cardiovascular disease, and obesity. Depression and anxiety are also very much part of the picture, as are many autoimmune conditions, such as type 1 diabetes."

Kirsty Gillmore, Nutritional Therapist at G&G Vitamins, added that IBS, small intestinal bacterial overgrowth (SIBO), gastrointestinal reflux disease (GERD), obesity, weakened immunity and anaemia can all be linked to low levels of beneficial bacteria.

She added: "Long-term intestinal inflammation can lead to health concerns such as anaemia, gastrointestinal infections, and the development of autoimmune diseases."

SYMPTOM LIST

So, what symptoms can a client present with if they are low in healthy bacteria?

“Common symptoms of an imbalanced bacterial profile (dysbiosis) include bloating, indigestion, low mood and energy. Beneficial species such as *Bifidobacteria* and *Lactobacilli* produce little gas as they ferment fibre in the gut, whereas many unbeneficial pathogenic species do produce gas.¹ This can provide symptoms of bloating, with a reduction being one of the noticeable differences when taking live bacteria²” Plaza reported.

“Studies show that those with indigestion (also known as dyspepsia) have alterations in the composition of their gastric fluids, potentially due to reflux of small intestinal contents into the stomach, which is thought to change bacteria levels.³ Live bacteria may facilitate in gastric emptying and may support stomach acidity and barrier function.⁴ Low energy and lethargy could be exacerbated by inflammation, potentially due to toxins and disruption of the immune system via dysbiosis.⁵ Beneficial bacteria are useful for digestive efficiency, by providing the body with extra nutrition and clearance of toxins^{6,7}.”

Dr Marilyn Glenville PhD, one of the UK’s leading Nutritionists, continued: “Nutritional deficiencies can be present when they are low in healthy bacteria because they are not absorbing the nutrients from their food properly or because the beneficial bacteria would normally be helping to manufacture certain nutrients, such as B vitamins and vitamin K. Research has shown that gut dysbiosis can be linked to many chronic diseases, including inflammatory bowel disease, rheumatoid arthritis, heart disease, mental health, obesity, type 2 diabetes and cancer.”

But Benjamin pointed out the need for clarity, commenting that there is no clear list of symptoms that show we are low in healthy bacteria.

“Identifying the cause and effect of microbiota changes is inherently difficult, as it is often unclear if the disease leads to the change in the microbiome or the change leads to the disease²,” she commented, adding that if symptoms including digestive issues such as IBS, IBD, fatigue, allergies, mood disorders, and weight issues, are experienced, “it is incumbent on the practitioner to work with them to support the gut as one of the main pillars of their nutrition protocol”.

THE ROLE OF OUR DIET

Food has a huge impact on bacteria balance, with processed foods and excess sugar being among known factors that cause imbalance.

“Variations in diet have a large impact on the microbiome, even within a 24-hour period. Any food components that escape digestion in the small intestine become available for fermentation by the colonic microbiota. A diverse diet including fibre and polyphenols help to encourage a healthy balance and diversity and help in the production in healthy SCFAs, whereas a low fibre, high fat, high sugar diet (Standard American Diet (SAD)) can encourage the growth of pathogenic bacteria and lead to dysbiosis, leaky gut and metabolic endotoxemia,” Jones reported.

Corin Sadler, Nutritional Therapist at Higher Nature, added: “The most common factors are poor diet (low fibre, especially prebiotic fibre which gut bacteria need to thrive), high meat, fat, sugar and alcohol intake, as well as lifestyle ones such as having recently taken antibiotic medication, pollution, disrupted circadian rhythm, poor sleep and high stress levels. Having a very limited number of foods in the diet is also a factor – diversity of the diet is linked to increased diversity of the gut microbiome.”

Let’s look at the positive side, in terms of the recommendations to clients to restore levels of healthy bacteria via food.

Sawkins suggested foods to introduce to include quality protein, vegetables and fruit, probiotic wholefoods such as kimchi, sauerkraut, miso, kefir and non-starchy vegetables (good bacteria feed off fibre).

She continued: “Drink plenty of water (to help flush out bacteria and waste),

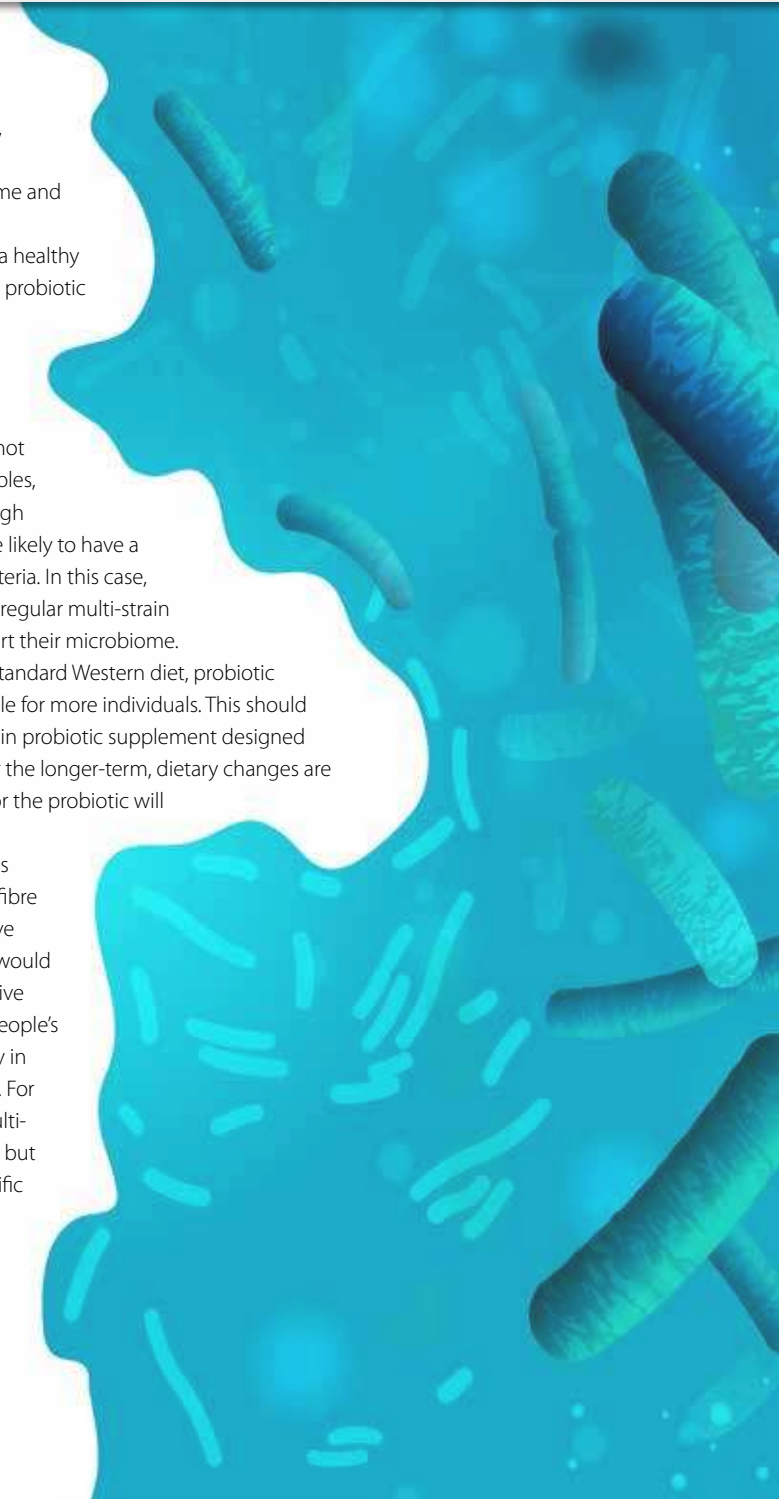
consume prebiotics (raw onion, cooked onion, wheat bran, raw banana etc), and avoid aspartame and high gluten foods.”

And so, if someone is eating a healthy diet, would it be the case that a probiotic supplement isn’t needed?

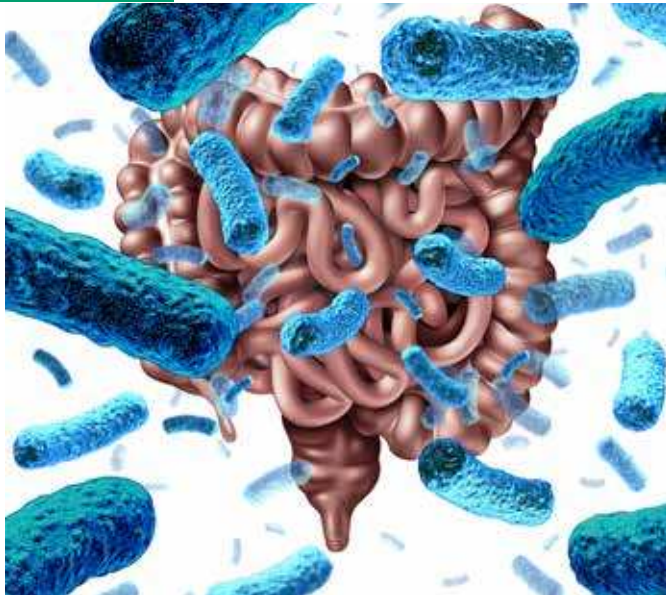
Benjamin commented: “There are conflicting views on this subject. If somebody eats a restricted diet that does not include a wide range of vegetables, drinks a lot of alcohol, or eats high amounts of sugar, then they are likely to have a lack of diversity in their gut bacteria. In this case, they may benefit from taking a regular multi-strain probiotic supplement to support their microbiome.

“As more people move to a standard Western diet, probiotic supplements may be worthwhile for more individuals. This should be a research-backed multi-strain probiotic supplement designed for everyday use, although over the longer-term, dietary changes are recommended and the need for the probiotic will then diminish.”

Sadler agreed, adding: “Unless you regularly include plenty of fibre and fermented foods such as live yoghurt, kefir and sauerkraut, I would definitely consider including a live bacteria supplement to most people’s supplement protocol, especially in the current climate of Covid-19. For many, a good high strength multi-strain product will be sufficient, but for others who have more specific health issues, such as digestive problems or recurrent urinary tract infections, then a more targeted product utilising specific strains and perhaps including extra nutrients is a good idea.”



SPECIES SPECIFIC



Research is expanding our knowledge on beneficial species and supplementation and it's important to highlight what the evidence is telling us.

"Given that the microbes living in our gut are fragile and thus susceptible to damage, it is vitally important to actively encourage their growth and proliferation, as well as preventing their loss. This can be supported with the use of high quality, well-researched probiotic supplements," Oboh advised.

"A daily probiotic supplement is certainly recommended for those who are generally healthy and are not suffering from a specific health condition, but who would like to maintain a healthy balance of microbes in the gut. A supplement containing *Lactobacillus acidophilus* Rosell-52 and *Bifidobacterium longum* Rosell-175 is great for daily use and is suitable from the age of one. These strains will reach different parts of the small and large intestine to exert their therapeutic benefits. They have been shown to inhibit the growth of numerous pathogens and encourage the growth of indigenous beneficial bacteria in the gut."

Plaza added: "Altering the diversity of the gut bacteria by introducing live bacteria and/or prebiotics have shown promising results. For example, lactic acid producing bacteria have positive cholesterol lowering effects, as well as modulating inflammation within airway

allergy.^{22,23} *Lactobacillus* and *Bifidobacteria* are genera that have been found to have psychobiotic effects and reduce depressive symptoms,^{24,25} however, not all strains within these genera possess the same attributes, therefore, further research is required."

Plaza reiterated the benefits of a multi-strain probiotic, explaining: "Taking new strain specific research into account is useful, however, this should not negate the efficacious study results of multi-strain supplements. For example, in 2016, a systematic review concluded that the use of a multi-strain live bacteria is of greater potential effect for IBS compared to a single strain.³¹ These findings were confirmed in the largest clinical trial conducted using live bacteria supplements in IBS to date, in which a 14 strain live bacteria supplement (Bio-Kult Advanced) was used as the only intervention in a study of 400 adult patients with diarrhoea type IBS. It was found that the live bacteria supplement significantly reduced bowel movements compared to placebo and also improved the severity of abdominal pain.³² In fact, a third of participants were symptom free by the end of the trial."

Jones highlighted 'sporebiotics', explaining: "Our ancestors were hunters and gatherers and ate a diet along with a good dose of environmental bacteria. Those strains that were able to survive outside and were able to pass through the gastric system and would end up in the intestines. Sporebiotics fit this description. It is likely that humans actually require these specialised strains for the proper functioning of many of our biological systems. The most well-known, well-studied and widely used are from the *bacillus* species of spores; *Bacillus indicus* HU36, *Bacillus licheniformis*, *Bacillus subtilis* HU58, *Bacillus clausii* and *Bacillus coagulans*. They work together in concert, balancing the microbiome, encouraging diversity, reducing pathogenic growth and positively modulating the immune response."

And Benjamin added: "It is important that clients understand that probiotic supplements are not a simple 'cure' for all their gut problems and addressing any underlying issues is key to long-term health. For example, whilst *Lactobacillus* and *Bifidus* bacteria species are generally recognised as safe (GRAS), somebody with very low diversity in the microbiome may struggle with taking a high-dose probiotic due to the initial side effects they experience, which may include bloating, flatulence and brain fog amongst other symptoms. In this instance, we would recommend starting with a low dose and slowly increasing over time."

In terms of the choices available to you, we detail opposite and over the page what you could keep in mind.

LACTOBACILLUS

Perhaps one of the most used species, *Lactobacillus* offers a range of benefits.

"Over 70 per cent of our immune system resides in the gut and there are specific probiotic strains that have been clinically shown to boost the immune system by working within the gut. One such strain is *Lactobacillus paracasei* CASEI 431, which has been extensively researched in thousands of people in over 20 clinical trials. This strain has been shown to reduce the duration of colds and flu, raise levels of IgG, IgA and IgM antibodies and modulate cytokine secretion to encourage better immune responses to infection," Oboh pointed out.

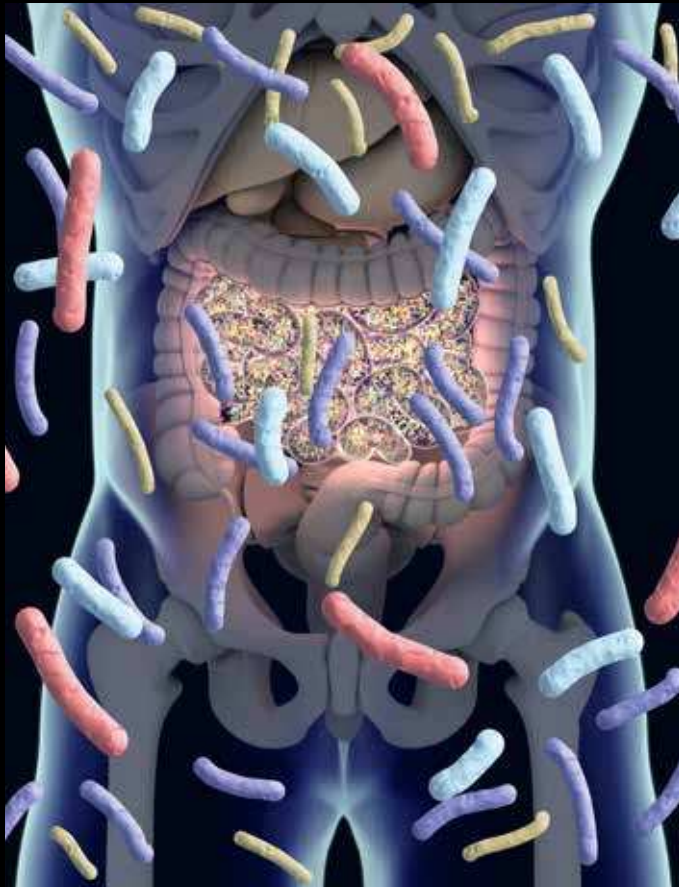
"A powerful probiotic combination that all practitioners should be aware of is *Lactobacillus reuteri* RC-14 and *Lactobacillus rhamnosus* GR-1. These two strains have been clinically trialled in over 2,500 women worldwide and have been shown to reach the vagina alive, offering support to those suffering from cystitis, thrush or bacterial vaginosis. This unique combination is well researched for women's intimate health conditions and the research suggests it helps both manage and prevent infections of pathogenic bacteria or yeast in the female urogenital area. Additionally, in a clinical trial involving women suffering from bacterial vaginosis, this specific combination was shown to be almost as effective as conventional treatment."

Plaza continued: "More research is now being conducted using specific strains, these are useful for targeting specific symptoms. For example, *Lactiplantibacillus plantarum* and *Lactobacillus acidophilus* were found in vitro to have the most effective inhibition against *E.coli*. This pathogen has been identified as one of the most common causes of urinary tract infections (UTI).²⁶ More recently, a double-blind placebo-controlled study concluded that Bio-Kult Pro-Cyan reduced the number of UTIs experienced by recurrent sufferers, as well as shorter duration of active infections for those that did suffer. A reduced number of required antibiotics was also observed²⁷."

Sadler added: "In terms of female health, *Lactobacillus reuteri* and *gasseri* are particularly useful as these are strains normally resident in healthy vaginal flora. *Bacillus coagulans* is another often overlooked strain, which, whilst doesn't take up residence permanently in the gut, produces short chain fatty acids, including butyric acid, by fermenting plant fibres in the gut. This helps to lower intestinal pH, allowing other resident bacteria to thrive, whilst nourishing colonic cells and enhancing mucosal integrity."

Gillmore continued: "Most people can tolerate supplements well, however, some people can experience side effects to certain bacterial strains that produce histamines. It would, therefore, be advisable for people with histamine intolerance to avoid the strains associated with histamine release, including *Lactobacillus buchneri*, *Lactobacillus helveticus*, *Lactobacillus hilgardii* and *Streptococcus thermophilus*."

SACCHAROMYCES BOULARDII



Plaza advised: “*Saccharomyces boulardii* has shown to significantly reduce the incidence of traveller’s diarrhoea, in a recent systematic review.²⁸ *S. boulardii* mediates outcomes that resemble the protective effects of the normal healthy gut flora.²⁹ It has proven particularly efficacious in a number of acute diarrhoeal diseases, and may offer promise in a number of other chronic gastrointestinal conditions, especially those with an inflammatory component²⁹.”

Dr Glenville added: “*Saccharomyces boulardii* is a probiotic yeast rather than a bacterium and has good evidence in reducing antibiotic associated diarrhoea.”



RECOMMENDING A SUPPLEMENT

In terms of a checklist when recommending a particular probiotic, there are specific factors the experts suggest paying attention to.

Benjamin advised: “There is a huge number of different probiotics products on the market and continued discussions around the efficacy of single strain versus multi-strain products. Our view at ProVen Probiotics is that you need to look out for the following six key factors when selecting a product to recommend to your clients:

- Clearly defined human strains of bacteria, with specifically identified strain numbers.
- Clinical (human) study evidence for the specific product at the stated dose, published in peer reviewed journals demonstrating significant benefit for the condition you are looking to treat.
- Evidence of safety.
- Shown to survive at room temperature and to survive stomach and bile acids.
- Guaranteed bacteria count to the end of expiry.
- Manufactured to current Good Manufacturing Practice (cGMP) standards.”

Dr Glenville highlighted the importance of checking what a probiotic supplement contains.

She explained: “With probiotics, don’t go for the probiotic drinks, as they can contain sugar, other sweeteners or a preservative. Choose one that does not contain maltodextrin but also contains a prebiotic, which means that the beneficial bacteria use it as a ‘food’ to support their growth. I would suggest avoiding any probiotics containing

maltodextrin as it is a very easily digested form of carbohydrate and is digested as rapidly as glucose. Maltodextrin has also been shown to suppress intestinal anti-microbial defence mechanisms and may be a factor in the development of chronic inflammatory disease.”

Plaza highlighted the need for a diverse balance of beneficial bacteria.

“For general support, look for a multi-strain that contains not only different strains but also from different species and genera. The genera or genus is generally the first name given when listing a probiotic strain, for example, *Lactobacillus*, *Bifidobacterium* or *Streptococcus*. Secondly, it should state the species level, such as *acidophilus* or *bifidum* and thirdly the strain, such as PXN 35. Ensure the CFU (colony forming units) count is viable throughout the shelf-life of the product rather than simply at ‘time of manufacture’ as this provides a better estimation of how much bacteria is still viable when consuming the product.

“Reputable brands of probiotics are usually manufactured to pharmaceutical level, meaning they are audited by the Medicines and Healthcare products Regulatory Agency (MHRA). Importantly, brands of live bacteria which have clinical studies based on their particular supplement should provide reassuring evidence to the client that the supplement is effective and safe. Probiotic supplements should be developed specifically for those with sensitive digestive systems, therefore, choose a brand with fewer excipients in the ingredients list.”

Jones highlighted areas of misunderstanding, including that probiotics put good bacteria back into the microbiome.

“In fact, most probiotics only act as they pass through the microbiome and do not have a permanent effect,” she commented.



FOCUS ON THE MIND

One area subject to much research regards the gut/brain connection.

Plaza advised: "Dysbiosis has been observed in cases of low mood and poor mental health, therefore, this may provide a rationale to evaluate the microbiome.⁹ Beneficial bacteria help to regulate the production of numerous neurotransmitters, such as serotonin, within the gut and the signals that are sent from the gut to the brain via the vagus nerve. The gut is increasingly being seen as the second brain, so it's perhaps unsurprising that studies are showing promising results in mood disorders from interventions designed to improve gut microbial balance.¹⁰

"Psychobiotic is a term used in research to describe the potential mental health benefit obtained by manipulating the microflora of the host via the microbiome-gut-brain axis."

Dr Glenville added: "Where I have seen some excellent recent research is the area of mental health. It is known that the gut microbiota can help regulate brain function. In 2019, a systematic review in *BMJ General Psychiatry* showed that 14 studies have used probiotics as the intervention, with more than one third finding them to be

effective in reducing anxiety symptoms.

"Species of *Bifidobacterium* have generated the best results so far and in one study *Bifidobacterium* was more effective than escitalopram (Lexapro) at treating anxious and depressive behaviour in a lab mouse strain known for pathological anxiety. Another study, which was an RCT trial with 44 patients with mild to moderate depression over six weeks, showed a significant reduction in depression in the probiotic group. A quote in 2019 in the journal, *Gastroenterology Clinics of North America*, stated, 'The integration of the gut microbiota, as a mediator, in the complex trajectory of depression, may enhance the possibility of personalised precision psychiatry'."

Sawkins continued: "The gut is full of neurons that form their own nervous system called the Enteric Nervous System. The brain and the Enteric Nervous system communicate all the time sending signals to each other. The gut can also affect how your brain works in terms of mood and emotions, for example, it produces most of your serotonin (the chemical that regulates sleep, and keeps you feeling happy)."

EXPANDING RESEARCH

New studies are being published all the time examining different species and health conditions. So, what do the experts in the field pinpoint as the most encouraging?

Benjamin commented: "As we all aware, new research into the microbiome, gut health and probiotics is published almost weekly, including both primary research and systematic reviews. Recent papers that I am aware of have shown positive results in relation to oral health,⁸ depression⁹ and surgical site infections.¹⁰ The research team at ProVen has recently published research showing the positive effect of six-months daily supplementation of 50bn bacteria (a combination of Lab4 with our own strain of *Lactobacillus plantarum*) on weight, waist circumference and BMI.¹¹

"For the above study, we investigated the effects of the probiotics on upper respiratory tract infections and general quality of life, alongside the primary weight loss factors. This first weight loss study has been followed up by a nine-month trial with a sub-cohort of overweight adults aged 50-plus and the results have reflected those found in the first study and are currently being analysed and written up.

"Separately, there is increasing evidence of the effectiveness of probiotics in supporting immunity and particularly in the prevention of upper respiratory tract infections.^{12,13} Again, the link between probiotics

and immunity is something we have been focused on for the past 20 years and our ProChild study¹⁴ showed a clear link between our Lab4 probiotics and a 30 per cent reduction in upper respiratory tract infections in children."

Plaza added: "Animal studies have for some time been indicating the ability of live bacteria supplements to modulate cognitive behaviours including learning and memory,^{9,33} and initial findings from human clinical trials are looking promising.³⁴ In an animal model (*Caenorhabditis elegans* – worm species), the probiotic strain, *Bacillus subtilis* PXN 21 (ADM Protexin) was found to inhibit, delay, and reverse α -synuclein aggregation. α -synuclein is a protein which is abundant in the human brain.³⁵ In Parkinson's disease (PD), α -synuclein proteins misfold and form clumps or 'aggregates' (also known as Lewy bodies), which are toxic to cells.

"The protective effect of *Bacillus subtilis* PXN 21 against α -syn aggregation in this study seems to involve its ability to alter the metabolism of a special class of fats known as 'sphingolipids', found in the coating (membrane) of both plant and animal cells.³⁰ In fact, human research has identified abnormalities in the regulation of sphingolipids in Parkinson's disease³⁶."

Sadler went on: "A fascinating piece of research recently showed links between neurodevelopment and gut flora. The research looked at the

diversity of gut microbes in infants who were two months old and their temperament traits just a few months later at six months. Those who had a lower diversity of flora, or less different strains, were found to display more reactivity to negative emotions and fear, traits thought to be a predictor of anxiety in later life. Another finding was that those who had higher levels of *Bifidobacterium* were linked to positive emotionality or, how smiley and happy they appeared."

Jones went on: "A double blind placebo based study on 75 adults showed a 60 per cent reduction in serum LPS levels compared to placebo, 24 per cent reduction in serum triglycerides, and significantly lower levels of IL-12, IL-1 β , and ghrelin after 30 days of supplementation with MegaSporeBiotic (McFarlin BK, et al.).

"A study evaluated the effects of three treatment regimes in patients with irritable bowel syndrome (IBS): a) A short-term rifaximin treatment followed by the low FODMAP diet for 24 days; b) A short-term rifaximin treatment followed by a nutraceutical agent; c) A course of MegaSporeBiotic for 34 days. The results showed that MegaSporeBiotic patients had similar severity scores and rectal volume sensation results for all parameters tested as those who received rifaximin and also had a statistically significant improvement in measurements of quality of life (Catinean A et al)."

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The science of mycology

Medicinal mushrooms are nutrient powerhouses that are increasingly being recommended by Nutritional Therapists thanks to their multitude of benefits. Here, experts discuss the best application of mycotherapy in clinic.



With hundreds of bioactive substances in one mushroom, the use of mycotherapy among Nutritional Therapists is becoming more widespread and for good reason, given the multitude of uses these special compounds have.

But given there are a great many different medicinal mushrooms that can be recommended, all containing their own complex make-up of various nutrients and other substances for good health, what recommendations could you be making as part of your client protocols?

Hifas da Terra specialises in mycotherapy products, recognising

how beneficial they are to health. Colette Healy BSc, UK Mycotherapy Education Practitioner Health Advisor at the company, commented: "Medicinal mushrooms are fungi which are used in the form of extracts or powder for prevention, alleviation, or healing of diseases and/or for nutritional reasons.

"Mushrooms are fascinating powerhouses of nutrients and compounds that provide many positive health benefits for humans. A single type of mushroom can contain hundreds of beneficial bioactive substances."

Tanya Borowski Dip CNM, mANP, IFMCP, Certified Functional Medicine

Practitioner and Consultant Nutritionist for Time Health, continued: "Nature has long since been an important source of inspiration for medicine. Nature produces a vast diversity of biologically active substances, which possess enormous therapeutic potential, as such, medicinal mushrooms are mushrooms that are used as medicine.

"They have been used to treat infection for hundreds of years, mostly in Asia. Today, medicinal mushrooms are also used to treat lung diseases, support and modulate the immune system and for more than 30 years, medicinal mushrooms have been approved as an addition to standard cancer treatments in Japan and China."



SPECIAL SUBSTANCES

If we look in greater detail at mushrooms generally, and why they are considered so beneficial, experts in the field point towards their very varied benefits.

“Mushrooms have a number of biologically active compounds that make medicinal mushrooms (MM) therapeutic for our health. The most studied are biologically active polysaccharides that mainly belong to a group called alpha and beta glucans. Lentinan and schizophyllan are well-known beta glucans in shiitake mushrooms, active hexose correlated compound (catchy name!) is the major mushroom-derived alpha glucan in shiitake,” Borowski explained.

“In addition to polysaccharides, some MM have other bioactive compounds; for example, reishi mushrooms contain ganoderic acid, the biological action of which is to increase a type of immune cell (macrophage) that respond to pathogen invaders: bacterial and viral. Ganoderic acid can also promote liver protection and inhibit an enzyme called 5-alpha-reductase, which converts testosterone to its more potent form, dihydrotestosterone (DHT) and is strongly implicated in the progression of benign prostatic hypertrophy, hirsutism and PCOS. The use then of reishi has been shown to reduce levels 5-alpha-reductase, the enzyme that facilitates conversion of testosterone to dihydrotestosterone (DHT), and can be termed an anti-androgenic.

“The chaga mushroom produces a diverse range of metabolites including lignins, phenolic compounds and melanins. These substances increase the host’s immune defence by activating the complement system, enhancing macrophages and natural killer cell function. The Polysaccharide K (PSK) is the best-known active compound in turkey tail mushrooms. In Japan, PSK is an approved mushroom product used to treat cancer.”

Healy continued: “Medicinal mushrooms have so many benefits. Almost all of them are excellent for supporting the immune system. This is, in a sophisticated balancing way that can upregulate or downregulate activity. Compounds such as beta-glucans and triterpenoids, including sterols, contribute to our health. And mushrooms are a source of vitamin D as

ergosterol, B vitamins, prebiotics, minerals such as selenium and zinc, essential amino acids and other nutrients that help homeostasis.

“The main health-promoting actions include lipid-lowering, immunomodulatory, anti-tumour, antioxidant, anti-viral, antibacterial, anti-parasitic, hepatoprotective, anti-diabetic and more. Beta-glucans, which are polysaccharides in the mushrooms, have been shown to interact with macrophages in the spleen, lymph and bone marrow to activate immune function.”

She continued: “Our key mushrooms include reishi, cordyceps, royal sun mushroom and lion’s mane, with reishi being the most in demand.”

Alice Bradshaw, Head of Nutrition Education and Information at Terranova Nutrition, went on: “Medicinal mushrooms contain some of nature’s most potent health-promoting compounds and as such, have been the subject of a huge amount of research into their potential benefits and protective properties. Much of the research centres around the properties of compounds such as polysaccharides, triterpenes, lignins and phytosterols, which are found abundantly in mushrooms. These compounds are associated with a vast array of important health benefits, including enhancing immune function, reducing microbes, supporting respiratory health, adaptogenic potential and much more.”

Although they can be found as single mushroom supplements, there are also those that combine the benefits.

“Blends of a few key mushrooms offer synergistic benefits to the customer. Also, different strengths make the supplements suitable for ages and conditions,” Healy advised.

Bradshaw added: “There are various mushrooms that are researched for their medicinal properties. Some people may choose a combination product for general immune support or health enhancement. Each mushroom has its specific health benefits.”

Here, we look in greater detail at the specific medicinal mushrooms you could recommend, and how they can support your clients.

REISHI

One of the most popular mushrooms in terms of use, reishi boasts many different benefits.

“Reishi is perhaps the best known and sought after with the wonderful title of ‘mushroom of immortality’. This is taken to calm body and mind, for its strong antiviral action, hormone regulation and hypoglycaemic action,” Healy explained.

Borowski added: “While MM have the amazing ability to modulate the immune system, they also have activities that can act directly on harmful organisms. Reishi have been shown to inhibit *Staphylococcus aureus*, a bacteria that can cause varying degrees of skin conditions from folliculitis, impetigo to osteomyelitis, when the skin and soft tissues over the infected bone become red and swollen, and fluid may accumulate in nearby joints. Triterpenes from reishi act as antiviral agents and likewise, the lignins from chaga and shiitake, as well as the polysaccharide in turkey tail, has antiviral effects in cytomegalovirus in vitro.”

Bradshaw turned her attention to the increasing research around reishi, commenting: “Studies have analysed the bioactive compounds within reishi mushroom and have found over 400 compounds within the fruiting body, mycelia and spores. The primary active compounds include triterpenoids, polysaccharides, nucleotides, sterols, steroids, fatty acids, proteins, trace mineral elements, vitamins and amino acids.

“The polysaccharides, ganoderma A, B, C found in reishi, have been shown in studies to have blood sugar regulating properties. Triterpenes are also present in reishi and ganoderic acid has been shown in studies to manage the symptoms of allergies by inhibiting the release of histamine.”



CORDYCEPS

"Cordyceps mushrooms have long been esteemed for their potent health-promoting qualities. The studied health benefits of cordyceps include supporting immune health, slowing the ageing process, improving athletic performance, blood sugar regulation and supporting the cardiovascular system," Bradshaw commented.

Healy continued: "Cordyceps is used for fatigue, as a renal protector, to enhance respiratory function and to enhance general vitality."



MAITAKE

A powerful recommendation to make, maitake possess numerous positive health benefits.

"Numerous research studies have highlighted several significant health benefits associated with compounds in maitake mushroom. Like other medicinal mushrooms, maitake contains many potent elements and is especially rich in β -Glucans (beta-glucans), a group of β -D-glucose polysaccharides, which have been scientifically shown to support immune function," Bradshaw advised.

"Maitake mushrooms are especially rich in the sulphur-containing antioxidant, ergothioneine. This unique compound produced by fungi has been shown to have strong antioxidant properties. There is also research to suggest that ergothioneine can support a healthy inflammatory response within the body, while also helping to normalise several markers related to cardiovascular health. Maitake is also considered an adaptogenic agent, helping the body to adapt to physical, emotional and environmental stressors."

OTHER RECOMMENDATIONS

Also worth bearing in mind are:

- **Lion's mane:** "Lion's mane, with its ability to stimulate nerve growth factor, is used for a range of cognitive, as well as gut conditions," Healy suggested.
- **Shiitake:** "Shiitake mushroom is native to East Asia and cultivated worldwide for its purported health benefits. The medicinal properties of shiitake mushroom are attributed to an extensively researched polysaccharide (sugar molecule) named lentinan. Lentinan (also known as beta 1,3 glucan) has been shown to destroy viruses and microbes that compromise good health, while offering potent cell-protective capabilities," Bradshaw explained.
- **Chaga:** Bradshaw advised: "Chaga has one of the highest Oxygen Radical Absorbent Capacity (ORAC) scores of any food. As such, their high antioxidant potential means they may effectively protect the body from harmful free radicals. The active constituents within chaga include a combination of triterpenes, such as betulinic acid, sterols, and polysaccharides. Chaga has been the subject of numerous scientific studies which support its actions as cell-protective and immune supportive, while also acting against viruses and enhancing endurance."
- **Royal sun agaricus:** "This is hugely useful in auto-immune conditions, for allergies and asthma," Healy explained.

CAUTION ON QUALITY

There are many different mushroom products on the market today, but with such varying quality, it's advised to follow certain standards when making any recommendations.

"Mushrooms have various stages of development and there is much debate as to which stage offers the most health benefits. It's best to look for products that harness all the health benefits naturally found within the whole organism. The biologically active compounds found with whole mushroom include the primordia, mycelium, fruiting bodies, as well as extra-cellular compounds that are responsible for the known medicinal properties found in fungi," Bradshaw advised

Considering what is in the product is critical, with Borowski pointing out: "When I recommend a supplement, it's highly important to me that it's free of fillers, additives and binders. Many of the clients that work with me are hypersensitive, and cheap fillers (used by many supplement companies) aggravate their sensitivities."

Healy pointed towards the importance of a mushroom supplement being organic and made to GMP standards, as is the case of Hifas da Terra.

She continued: "The whole process from growing to packaging is important. The supplements are made with the fruiting body of the mushroom, as opposed to mycelium only, to avoid contamination with the growing substrate. They are produced to EU Pharmaceutical standards and tested in the lab. Also, the extraction uses sun drying to maintain their quality."

Mushroom extracts: Discover how mushroom nutrition improves the gut microbiota

Hifas da Terra explains the power of mushroom nutrition to support a healthy gut.

Our bodies are colonised by an enormous number of microorganisms, both externally on the skin, and internally. The majority of these live in the gut microbiota. In fact, the intestines are considered one of the most densely populated microbial habitats on earth, containing approximately 100 trillion microorganisms, most of which are bacteria, but also include viruses, fungi and protozoa.

WHAT DOES THE GUT MICROBIOTA DO FOR US?

The gut microbiota performs the essential function of fermentation of indigestible carbohydrates. This process releases short chain fatty acids, mainly acetate, propionate and butyrate, all of which have an important role in host health. Butyrate is the main energy source for human colonocytes, which supports both glucose and energy homeostasis. Propionate is transferred to the liver, where it regulates metabolism of glucose and gut hormones. Finally, acetate plays an important role in lipid metabolism.

Moreover, gut microbiota is key to many aspects of human health, including immune, neurobehavioural and metabolic functions.

A HEALTHY DIET EQUALS HEALTHY MICROBIOTA

All humans share a common 'core' of bacterial groups in the gut, which is influenced by multiple factors. Those we cannot change, such as our genetics, if we had a natural or caesarean birth, if we breastfeed or not, and our age. However, there are modifiable factors, such as



lifestyle or dietary habits.

Diet is the most widely studied modifiable factor of gut microbiota composition and function. An inappropriate diet can lead to a reduction in microbial diversity, which can trigger development of functional disorders or even disease states.

MUSHROOMS: POWERFUL PREBIOTICS

Edible fungi, or mushrooms, are widely consumed as either a healthy food, or as nutraceutical products due to their high nutritive and medicinal value.

The carbohydrate profile of mushrooms makes them a great choice as prebiotics. Numerous studies indicate that the indigestible polysaccharides present in mushrooms regulate intestinal mucosal immunity and alter microbial diversity and composition. Mushrooms contain a variety of complex carbohydrates, including β -glucans, α -glucans, mannans, xylans, chitin, hemicellulose and galactans. Most of these polysaccharides are non-starchy and indigestible by human digestive enzymes and can, therefore, be used as a food source by the

gut microbiota.

Furthermore, mushrooms induce direct stimulation of the innate immune system that regulates localised inflammation in the gut, and thus affects the composition of the gut microbiota. This improves gastrointestinal health by limiting the damage that occurs following injury or infection.

Lion's mane (*Hericium erinaceus*) is the mushroom most clinically used for gut healing. Several compounds present in lion's mane can trigger repair and regeneration of the enteric mucosa and block anti-inflammatory responses. It is an excellent source of insoluble fibre that promote the growth of beneficial gut microbiota, such as *Lactobacillus* and *Bifidobacterium*, which improve nutrient absorption, leading to efficient tolerance against antigens, and prevention of future immune disorders.

Numerous studies also demonstrate that ingestion of other important medicinal mushrooms such as *Lentinus edodes* (shiitake), *Ganoderma lucidum* (reishi), and *Pleurotus ostreatus* (oyster), amongst others, can contribute to a healthy gut microbiota due to their prebiotic fibre content.

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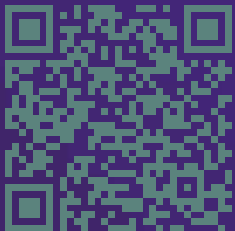
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Getting smarter – the benefits of phosphatidylcholine



Christine Bailey, Nutritional Therapist, Functional Nutrition Practitioner MSc BSc MBANT MIFM MCNHC, explains the role that phosphatidylcholine can play in our cognitive function.

Over the past few years, the topic of mental health has been increasingly in the spotlight; an estimated one in six people in the UK suffer from mental health issues such as anxiety or depression. And with research highlighting the role diet and nutrition plays for our mental health, there is increasing focus on the importance of key nutrients, particularly phosphatidylcholine.

WHAT IS PHOSPHATIDYLCHOLINE?

Phosphatidylcholine (PC) is found in every single cell of your body, being a key component of the cell membrane. PC is a phospholipid attached to a choline particle. Phospholipids contain fatty acids, glycerol, and phosphorous.

PC supports the integrity of the lining in our lungs, is one of the main components of mucus that lines and protects our gut and is particularly beneficial for liver health. More recently, research has focused on its importance for mental wellness.

DECLINING LEVELS

Phosphatidylcholine levels appear to decrease as we age. For example, in the brain, research indicates there is a 10 per cent reduction between the ages of 40 and 100. Supporting levels as we age is essential when it comes to cognitive function.

THE ROLE IN BRAIN DEVELOPMENT

Multiple reviews of human and animal trials have demonstrated the vital role of choline in foetal brain development. Ensuring optimal levels has been shown to enhance memory, cognitive function and may prevent birth



defects and mental illnesses later in life.

In a study of 49 mothers, those who received prenatal PC supplements reported 'fewer attention problems and less social withdrawal' in their 40-month-old children.

MEMORY – SUPPORT FOR THE AGEING BRAIN

One of phosphatidylcholine's biggest impacts is on memory and learning. PC provides extra choline and acetylcholine, which are critical for encoding and storing new information. PC is also critical for membrane plasticity.

Low levels of phosphatidylcholine have been associated with memory loss. A recent study published in the *Journal Neurobiology of Aging* found levels of phosphatidylcholine are directly related to Alzheimer's disease. Studies have also found supplementation can improve memory in healthy young adults through increasing levels of acetylcholine in the brain.

TACKLING DEPRESSION AND ANXIETY

Another area of research has involved the role PC may play in alleviating stress, depression and anxiety.

One large population study of 5,918 Norwegian subjects found that blood concentrations of choline were inversely related to anxiety. There is also some evidence that phosphatidylcholine may be helpful in treating depression and boosting mood. It has been postulated that abnormal low brain levels of acetylcholine may be linked to some cases of mania. Findings of a small placebo controlled trial suggest that phosphatidylcholine (15g to 30g/day) may reduce the severity of mania and depressed mood in bipolar patients.

SCHIZOPHRENIA

Low phosphatidylcholine levels in certain brain areas may be associated with schizophrenia. Preliminary evidence suggests supplementing with PC during pregnancy may prevent the development of schizophrenia later in life.

SUPPLEMENTATION – CHOOSING PURE PC

While phosphatidylcholine and lecithin are often used interchangeably, they are very different. Lecithin only actually contains 10-20 per cent phosphatidylcholine. The remaining fraction includes ancillary fats and impedimentary nutrients that stop the authentic phospholipid from traveling past the digestive system.

True liposomal PC, as found in BodyBio PC, is a much more efficient way to provide sufficient levels in our cells and thereby support brain health and memory.

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EXPERT ADVICE

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



Can you explain the role nucleotides play in facilitating a strong immune response?

RACHEL HOYLE ADVISED: A strong and fully functioning immune system is of the utmost importance, as the recent Coronavirus pandemic has helped to underline. Strengthening the immune system can provide effective protection against viral infections. But how can one specifically strengthen one's own immunity to build up effective protection against infections?

During infection, certain cells of the immune system recognise the foreign body, for example, a virus. The number of defence cells must be drastically increased in a short time in order to fight the virus quickly and efficiently. In order for cells to multiply quickly, all basic building blocks must be available in sufficient quantities. For the most effective proliferation of immune cells, the sufficient availability of all the nucleotides forms, the building blocks of our genetic material is key. It is well known the availability of certain minerals and trace elements (zinc, iron, selenium, and manganese) as well as vitamins (C, E, D and B vitamins) are important to strengthen immunity.

Nucleotides, the basic building blocks of DNA and RNA, are fundamental to all life. They are an important, but often neglected, group of ingredients that have great potential for improving modulation of our very complex immune systems.

As our modern diets have changed over recent years the topic of nucleotide supplementation is starting to be recognised as important, perhaps essential, especially the pyrimidine forms. We no longer eat nucleotide dense foods, such as offal meats. The nucleotide content, especially the

pyrimidine-type, is particularly low in vegetarian type foods. These amazing nutrients play essential roles in many areas of the body, including their impact on rapid cellular turnover rates of the gut mucosa microbiome and immune system.

The positive effect of nucleotides on the immune system and their potential in viral infections have been reviewed¹. Supplementary nucleotides are considered necessary for various physiological stresses, including growth and development, recovery from injuries, infections and certain disease states². Further experiments have also shown that supplementation with nucleotides increases lymphocyte proliferation, macrophage activity and



antibody production³. In a clinical study⁴, the effectiveness of a proprietary nucleotide formula was investigated in colds and influenza. Participants expressing viral infection symptoms were placed blindly in the nucleotide treatment or placebo group. Each day, for 30 days, they completed symptom reports. The results suggest nucleotide supplementation for treatment of cold-related symptoms can reduce severity of certain symptoms, especially in the early phase of infection.

- Sinus pain.
- Earache.
- Dimished taste.

ABOUT THE EXPERT

Rachel Hoyle BSc, a science graduate, has been involved in the development of special nucleotide-based products in collaboration with Dr Peter Köppel since the 1990s. Her



initial responsibility was to develop natural products that reduce the dependency on antibiotics in animal nutrition. More recently, Rachel has devoted her time to the research and development of nucleotide supplements for human health. Her company, Nucleotide Nutrition, now markets these products, which are all based on the Nutri-tide formula.



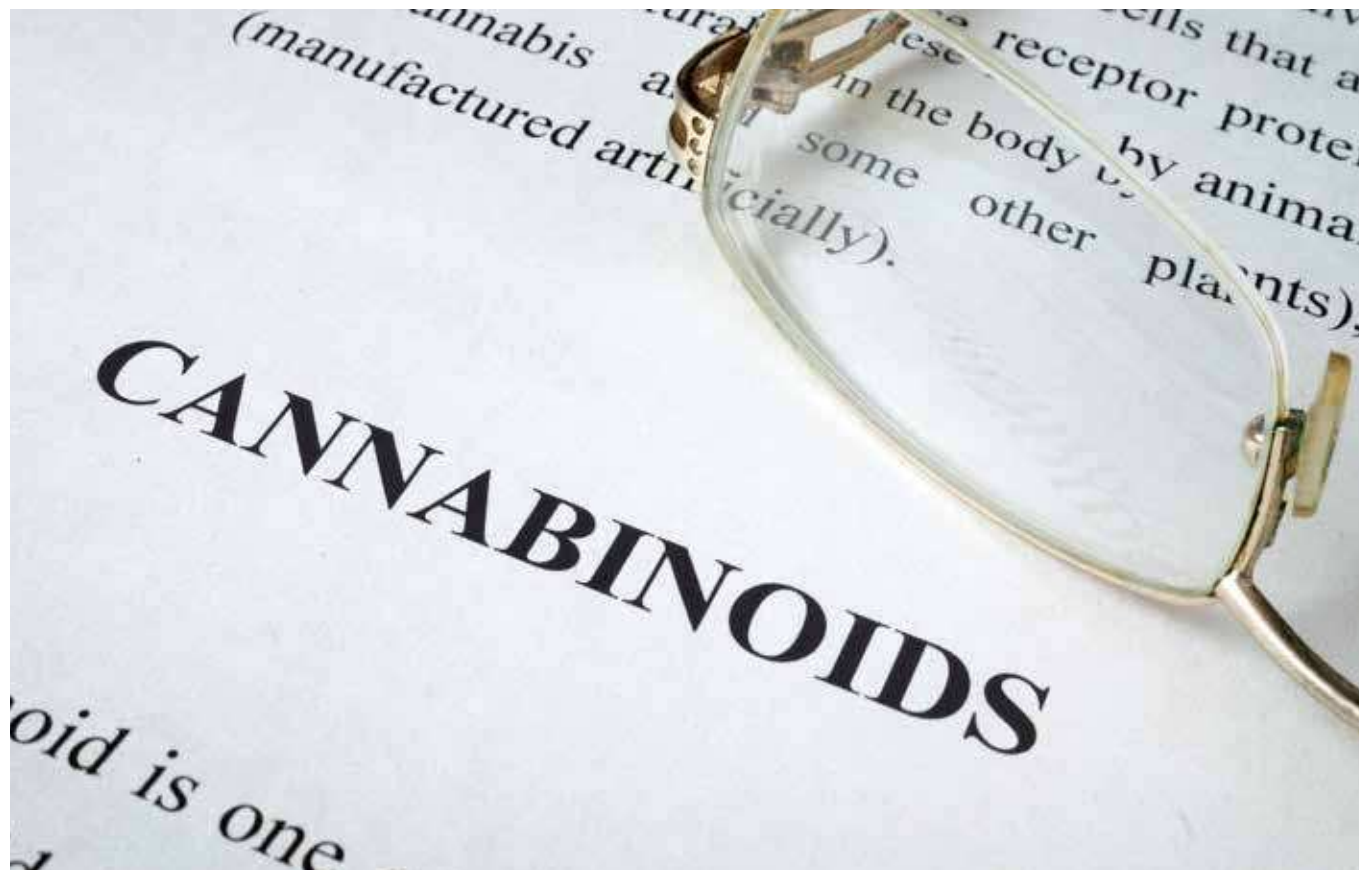
Are there other 'minor' cannabinoids in hemp that can be beneficial to recommend in clinic?

CHRISTIAN GRAVERSEN ADVISED: Cannabidiol or CBD has hit many a headline in recent months, with numerous claims about how it can help with various ailments. Whilst anecdotal evidence is overwhelming, the science is still in its relative infancy. Whatever your take on it all, and whether consumers who religiously spend millions on hemp-based products because they find it helps their quality of life, really care, early scientific studies do corroborate the anecdotal evidence, even if the mechanisms of how CBD interacts with the human endocannabinoid system and how that, in turn, influences other molecular pathways is still relatively poorly understood.

Given the focus on CBD, it's easy to forget that it's only one of 150-plus cannabinoids from the *Cannabis sativa* L. plant. Probably the most promising and next most abundant cannabinoid behind CBD is Cannabigerol or CBG and that too has been shown to regulate endocannabinoid signalling (Gemma Navarro, 2018).

It has been widely recognised that broad spectrum, whole plant extracts are the most effective and beneficial. This is likely to be down to what's called the 'entourage effect' or to the effect these minor cannabinoids have on the body. One particular area of interest is its anti-inflammatory properties, with one study looking at whether CBG had any beneficial impact on inflammatory bowel disease. They concluded that CBG attenuated murine colitis, reduced nitric oxide production in macrophages (effect being modulated by the CB2 receptor) and reduced ROS formation in intestinal epithelial cells (Francesca Borrelli 1, 2013). Another study looked at the role of CBG in exerting neuroprotective actions against inflammation and oxidative stress, protecting from neurodegeneration (Agnese Gugliandolo, 2018). This study concluded that immunocytochemistry showed CBG pre-treatment reduced nitrotyrosine, SOD1 and iNOS protein levels and restored Nrf-2 levels. All together, these results indicated the neuroprotective effects of CBG, which may be of potential use against neuroinflammation and oxidative stress.

The final study I want to touch on looked at CBG's potential to inhibit colon carcinogenesis (Francesca Borrelli, 2014). In vivo, CBG inhibited the growth of xenograft tumours, as well as chemically induced colon carcinogenesis. CBG hampered colon cancer progression in vivo and



selectively inhibited the growth of CRC cells, an effect shared by other TRPM8 antagonists.

Whilst none of these studies should lead to the wild health claims being used by unscrupulous hemp/CBD brands, they give significant reason for encouragement and further research. At the very least, they open up the possibility of using of high quality hemp extracts from trusted sourced as part of a health regimen to drive positive change within your patients.



ABOUT THE EXPERT

Christian Graversen is Vice President Strategy & Innovation at the CBD brand, CBDFx. Christian is the driving force behind CBDFx's product innovation, always striving to create the most functionally beneficial products possible.

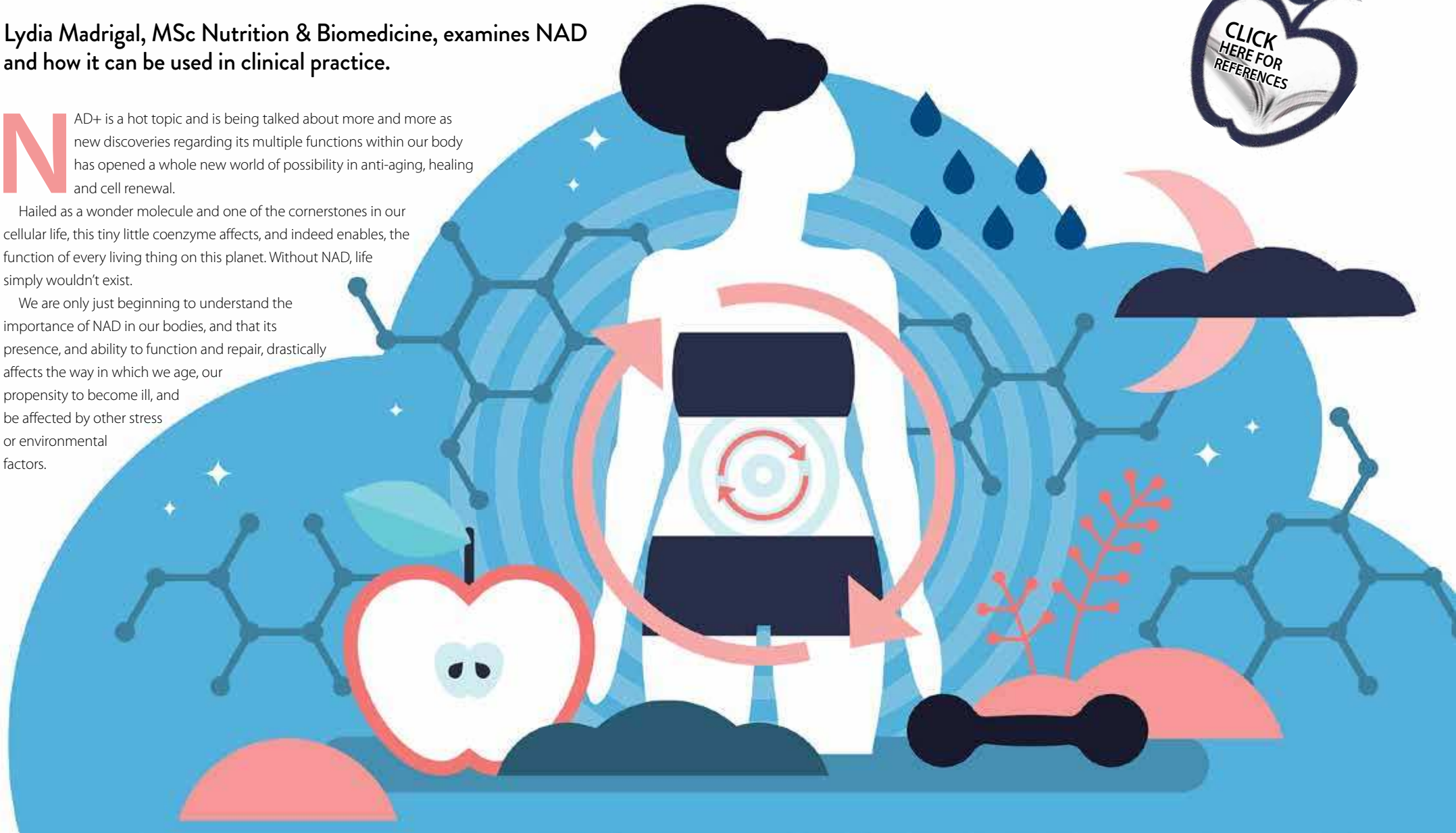
New discoveries for NAD

Lydia Madrigal, MSc Nutrition & Biomedicine, examines NAD and how it can be used in clinical practice.

NAD+ is a hot topic and is being talked about more and more as new discoveries regarding its multiple functions within our body has opened a whole new world of possibility in anti-aging, healing and cell renewal.

Hailed as a wonder molecule and one of the cornerstones in our cellular life, this tiny little coenzyme affects, and indeed enables, the function of every living thing on this planet. Without NAD, life simply wouldn't exist.

We are only just beginning to understand the importance of NAD in our bodies, and that its presence, and ability to function and repair, drastically affects the way in which we age, our propensity to become ill, and be affected by other stress or environmental factors.



The history of NAD

The story behind NAD dates back to 1906, when British biochemists, Arthur Harden and William John Young¹, discovered NAD whilst researching the fermentation process. In the years since, Nicotinamide Adenine Dinucleotide, or NAD as it is known, has been investigated and researched with varying levels of interest, but it is only recently, due to some ground-breaking new discoveries about this coenzyme and what it can do, that it has risen to prominence once again.

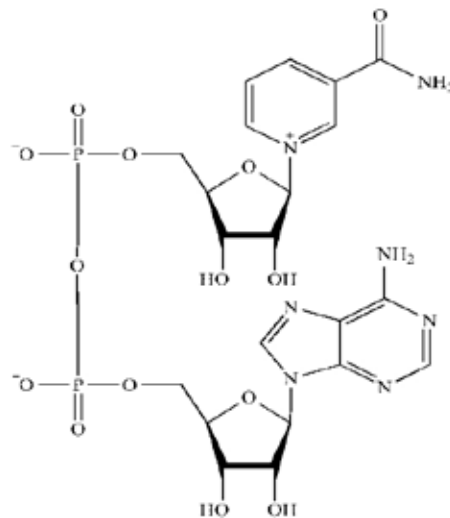
What has shifted our perception in the importance of this coenzyme is the realisation that NAD is not only involved in a tremendous number of different enzymatic reactions, and plays a central role in the mitochondria of each cell, but that without it, we would simply not be alive. That's a lot of responsibility for one little molecule. In fact, it is so essential to our wellbeing that if it reduces in number to a critical point, ageing and illness occur, as the body is no longer able to repair itself.

NAD is present in the body in two chemical states, oxidized (NAD⁺), in the following referred to NAD, and reduced (NADH). Whilst NADH plays an equally important role in the body, our focus in this article is on the production of NAD within the body and the supplementation of NAD to support a client's system functioning.

NAD is a coenzyme involved in numerous enzymatic reactions and vital bodily functions, such as energy production, regulating ageing, lifespan extension, overall metabolic health, and DNA repair. Despite being widely recognised for many metabolic functions in overall health and longevity, it is also involved in several detoxification pathways, such as the breakdown of alcohol² and other chemicals in the liver due to its involvement in phase 1 and 2 of liver detoxification.

But over time, as we age or suffer from illness, our bodies become less efficient at producing NAD to repair and support our bodies. It is established that NAD levels decline with age in several tissues³, but ironically, it is also when we age or are unwell that we need ever-increasing levels of NAD to enable our body to function well. The decrease of NAD, therefore, triggers a spiral effect where ageing and/or illness produces less NAD, and in turn, this decline means our bodies need more NAD but cannot produce it. Therefore, our cells, organs, brain function and immune system become weaker and succumb to the effects of illness or ageing.

Research is now linking low levels of NAD to numerous diseases, such as heart disease, type 2 diabetes, fatty liver disease, retinal diseases,



neurodegeneration, slowed metabolism, and many chronic diseases that put extra demand on our immune system to repair and reduce inflammation.^{4,5}

NAD metabolism and health

With the ever-occurring question of how to decelerate ageing, NAD has

only function in the presence of NAD and with the rise of NAD levels, sirtuin genes are activated and can alter several metabolic substrates, which influence different metabolic adaptations, for instance, in mitochondria or the skeletal muscle.^{6,7}

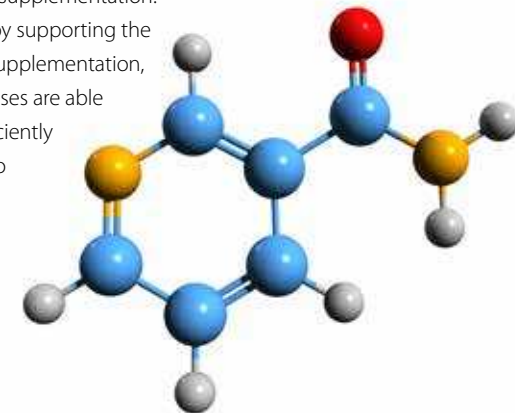
Several studies have successfully established a link between degenerative diseases such as Alzheimer's and Parkinson's and the NAD metabolome, not least through the pathogenesis of mitochondrial dysfunction, which is an accompanying factor in many cases.

Progress is currently being made in understanding some of the fundamental links between Alzheimer's disease and NAD metabolism^{8,9} and further interesting research is being published in the field of Parkinson's disease¹⁰, where it is believed NAD levels play a critical role. It should be noted, however, that most literature is still mainly based on animal research, whereas large human clinical trials to determine NAD influence are still relatively scarce.

Involvement of NAD levels have also been reported in chronic fatigue syndrome and other disruptions of metabolic energy. Mitochondria are indispensable cellular organelles involved in the body's energy production in the form of adenosine triphosphate (ATP). Our body's respiratory chain is placed in the mitochondrial membranes, where NAD plays a crucial role in the transport of electrons that enable energy production as an end point. Low levels of NAD, therefore, can be involved in low levels of energy production.

Disorders of the mitochondria are a hallmark of several diseases, such as chronic fatigue¹¹ and ageing and are very frequently revealed in respective patient cohorts, which makes these cohorts potential beneficiaries from NAD supplementation.

It is believed that by supporting the body through NAD supplementation, mitochondrial processes are able to function more efficiently and, therefore, help to reverse or slow the ageing or disease process, as well as improve energy levels and overall bodily health.



Metabolism and internal synthesis of NAD

NAD is essential for all vital functions within our body, such as energy production and nutrient breakdown. Internally, it can either be created de-novo from the essential amino acid, tryptophan, or from other biochemical pathways using NAD precursors, such as vitamin B3 (in the form of nicotinamide/nicotinic acid), coming from dietary sources like fish, meat, mushrooms or supplemental support. Additionally, our body has an effective recycling pathway for NAD, known as the NAD salvage pathway, to ensure a sufficient supply.⁵

become popular in the health industry, sometimes described as the fountain of youth that we can take orally to stay young and healthy. To what degree this is true is still undergoing intense research, but it appears that there are benefits to taking NAD which are only just starting to be understood.

We know, for example, that NAD has a protective effect on the genome by playing a role in the activation of so called sirtuin genes, which have been found to be involved in longevity and ageing. Sirtuins are a family of signalling proteins that help with metabolic regulation. They appear in all forms of life and play a key role in regulating cellular homeostasis. Homeostasis is about keeping a cell in balance. Sirtuins can

How can we boost NAD levels?

If our bodies are no longer producing or recycling NAD levels to a sufficient level, we know that the body ages and declines in health. Therefore, the maintenance of good NAD levels to flood the system seems to be key to supporting a healthy body.

There are three ways in which the boosting of NAD levels can be done; the inhibition of NAD degradation internally, the increase of enzymatic activity for its synthesis, and the external supply of NAD or its precursors through supplements.

Four different types of ingredients represent the current state-of-the art in the supplement industry, namely NAM (niacin/nicotinamide), NR (nicotinamide riboside), NMN (nicotinamide mononucleotide) and NAD/NADH itself.

Vitamin B3 is known to have been used for increasing NAD levels but this approach has shown to not be effective enough, with certain forms of vitamin B3 leading to side effects and hence to a low patient's compliance.

When applying NR, adverse reactions were lacking. One of the disadvantages is the lack of stability in the NR molecules' circulation within

the body and, as mentioned above, a limitation in its conversion to NAD as it depends on another enzyme, the NR kinases, to be fully functional.¹² The fact that these other options are not stable or reliable in driving the production of NAD for the body lead to increasing interest by scientists and naturopaths in using the whole NAD molecule as a form of oral supplementation, which is currently available in both NAD+ and NADH forms.

Research has found that oral NAD supplements are broken down in the intestine in smaller compounds to be absorbed effectively.¹³ More recent publications suggest that at least NAM could be absorbed as well as a whole, as a respective carrier molecule has been described in mice.¹⁴

Creating NAD internally by the body for use as a coenzyme is an energy consuming process that indicates taking NAD supplement molecules in its 'whole' form can be more beneficial than simply taking its precursor forms. By delivering the whole NAD coenzyme, you are providing the body with all the building blocks it needs to get on with the essential process of repair and support.

What to look for when buying NAD

Like any ingredient that is on the market, NAD is also provided in a range of qualities and packaged or combined in different ways.

One of the ways in which you can ensure that the NAD you are buying is as pure and high quality as possible is by understanding the source and how it is made and packaged. Gluten free and vegan product casings can be key criteria to look out for when purchasing NAD, as well as to ensure as pure an ingredient as possible that does not have any additives or molecules that could contribute towards inflammation within the body.

What does the future hold?

Restoring NAD levels has already shown great success in several diseases, yet the research field still holds numerous interesting approaches and possibilities yet to be discovered.

Interventions that successfully increase the NAD content in humans are of great therapeutic interest to improve overall health and energy parameters. It has been shown that NAD may even be more potent when combining it with other key supportive ingredients that have successfully shown to improve symptoms of fatigue. These include vitamin C that contributes to the reduction of tiredness and resveratrol, another well studied ingredient influencing health span and metabolic parameters.

More research needs to be conducted to fully understand the potential and benefits of the incredible molecule, NAD, but based on early findings, we have unlocked another secret to how our body functions and the potential this has to help it heal from chronic disease and the ageing process.



Lydia Madrigal, MSc Nutrition & Biomedicine, is a representative and speaker at MakeWell Nutritionals, a German company providing natural science-based products. Lydia provides nutritional advice with a focus on nutrition to treat chronic diseases and Inflammation. She writes health blogs and published articles and is involved in product development.



CPD DIRECTORY

If you want to top up your CPD, take inspiration from these forthcoming events.

Methylation Masterclass, Lifecode GX Online – June

CPD hours: BANT six hours

Speakers: Emma Beswick MBA, Dip CNM, mBANT, rCNHC, Karen Harrison MSc (Genetics) BSc (Hons, Nut Science) Dip CNM mBANT rCNHC

Cost: Full price £129/BANT member price £79

Website: www.lifecodegx.com/events/

The Gastrointestinal System: Digestion, Absorption and Mucosal Integrity Module 2

**Functional Medicine University
Online**

CPD hours: BANT 35.5 hours

Speakers: Cheryl Burdette, N.D, Court Vreeland D.C., D.A.C.B.N, Jill Carnahan M.D, Ronald Grisanti D.C., D.A.B.C.O., D.A.C.B.N, MS, William Shaw PhD

Cost: \$495 (BANT members have access to the entire programme at a \$500 discount. Individual modules are only on offer to BANT members and to no other organisation or individual)

Website: <http://www.profcs.com/SecureCart/SecureCart.aspx?mid=E53817D6-9C5D-4E79-9C4F-45611C015D73&pid=0cb55cc2c71a409e883c2ce6afffe024&bn=1>

The Immune System, Module 3 Functional Medicine University Online

CPD hours: BANT 27 hours

Speakers: Lise Alschuler N.D., FABNO, Michelle Corey C.N.W.C, Ronald Grisanti D.C., D.A.B.C.O., D.A.C.B.N., MS. Dr. Russell Jaffe M.D

Cost: \$495 (BANT members have access to the entire programme at a \$500 discount. Individual modules are only on offer to BANT members and to no other organisation or individual)

Website: <http://www.profcs.com/SecureCart/SecureCart.aspx?mid=E53817D6-9C5D-4E79-9C4F-45611C015D73&pid=415332ce14054b01a1f5b21cad3b58b1&bn=1>

Female Ecology Mastercourse Invivo Online

CPD hours: BANT nine hours

Speakers: Moira Bradfield, ND

Cost: £249

Website: <https://invivohealthcare.com/products/education/female-ecology-mastercourse/>

Personalised Sports Nutrition, CNELM Online

CPD hours: BANT 54 hours

Speakers: Elizabeth Scott-Moncrieff MSc, BSc, NLP Practitioner, Ian Craig MSc, BSc, INLPTA, SAANT, Alex Manos MSc, BSc, NASM, AFMCP, NLP Practitioner, Tom Fox MSc, Akademiek PNI, Dr Joanne Larkin, Consultant in Sport & Exercise Medicine

Cost: £500 (full module access with assessment £800/without assessment £500, access to one of nine Activity Content Blocks £90, 10 per cent student discount, 10 per cent discount for full module access with/without assessment for BANT professional members)

Website: <http://cnelm.co.uk/courses/cpd/>

Certificate of Integrative Sports Nutrition: Module 3 – Specialised Sports Nutrition

The Centre for Integrative Sports Nutrition

September 8-12 – online

CPD hours: BANT 34 hours

Speakers: Ian Craig, Simone do Carmo, Paul Ehren, Charlene Hutsebaut, Henrietta Paxton, Matt Lovell, Graeme Jones, Rick Miller

Cost: £750

Website: www.intsportsnutrition.com

FORTHCOMING WEBINARS

Target Publishing, which publishes *Nutrition I-Mag*, is hosting a series of webinars for practitioners.
Register at www.ihcanconferences.co.uk/webinar

Anxiety and Stress: Causes, Consequences and Countering Naturally with Therapies



Specialists in South American Botanicals

Presented by Rose Holmes, Registered Nutritionist, mBANT, BSc, Dip.ION, PGCE
Tuesday July 7, 6.30pm-7.30pm

Are anxiety and/or stress impacting the effectiveness of your suggested health protocols?

Anxiety and stress are extremely common mental illnesses, with most people experiencing one or both of these at some point in their lives. These conditions are also both highly treatable, yet may result in headaches, tension, high blood pressure, loss of sleep, panic attacks, irritability, fatigue, poor weight regulation and a host of other psychological, behavioural and physiological effects.

Mental health issues are much in the news, especially now, in response to various aspects of the current Covid-19 pandemic. The impact of stress and anxiety on health is an important area of concern – whether Covid-19-related or otherwise – with repercussion on clinical outcome in protocols to address physiological health issues.

This webinar will look at nutritional, lifestyle and supplement suggestions to help when anxiety and/or stress is an issue, and where the stress/anxiety may be preventing or hindering the effectiveness of protocols addressing chronic physiological health concerns.

Covid-19: What it is, the disease process and nutritional interventions



Presented by Louis Soteriou, Naturopathic Nutritionist
Tuesday, July 14, 6.30pm-7.30pm

Louis will talk about features of the virus, how the disease manifests in the body, our body's reaction and how nutritional interventions can be used along various stages of the process.

Louis is a Naturopathic Nutritionist with a special interest in the synergy of nature and the potential and reality of a human being.

Exploring nutritional science and psychology while tying in traditional naturopathic principles from Ayurveda, various forms of meditation, Hunyuan QiGong/Taiji and Chinese medicine, he explores achieving balance as an individual and with our extended environment, physically and psychosomatically. He currently works with Natures Plus in product development, business development and training.

Nutrition, Mental Health and Sleep – new evidence for the direct link between food, mood and sleep



Presented by Dr Marilyn Glenville Ph.D
Tuesday, September 15, 6.30pm-7.30pm

Mental and physical health is fundamentally connected, and nutrition has the potential to influence the impact of mental wellbeing, including anxiety, depression, stress, trauma, sleep and PTSD.

Research suggests that diet is an important modifiable risk factor for mental health. Oxidative stress, inflammation and changes in the gut microbiome are some of the physical effects of stress which can be reduced by changes in diet. Also, research has now shown how important sleep is, not only to how well people feel the next day in terms of mood and energy but we now know that not having enough sleep increases the risk of Alzheimer's, type 2 diabetes, cancer and obesity.

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September
2020

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Building ULU Nation



Having been founded last year to create products to support people stressed with today's hectic lifestyles, ULU Nation positions itself as a brand dedicated to authenticity and quality. With a leading range of CBD products, its founder, Paul Hembery, detailed the road ahead.

It was while studying a life course in California that Paul Hembery first came up with the idea for ULU, the natural health and lifestyle company founded in Cheltenham last year.

Paul's background was not in the natural products sector, having previously worked as a top name in Formula 1. But he felt that there was a place for a range of products that tapped into the growing needs of the modern consumer.

"I was studying a life course in California with the Bob Proctor Institute and was struck by the need to increase positivity and confidence in people and life in general," Paul explained, adding that it was also during this time he experienced CBD products for the first time.

Finding that it helped ease pain from his arthritis, Paul recalled: "The more I looked at it, the more I realised that there was the opportunity to combine the benefits of CBD with the message of positivity to improve peoples' lives. And that's really how ULU was born. Using my experience of motorsport and the corporate world, we were able to come up with a range of CBD products specifically targeted at people who lead hectic and pressurised lives, to help them cope with those everyday strains better."

Paul himself brings more than 25 years of management expertise in a fast-paced and precision environment at the helm of ULU, while

the company is also in the process of appointing medical and charity partners.

AN ULU GAP

We have seen the CBD market flooded with a vast number of products in recent years, and so in terms of being a new brand to market, what did Paul think ULU could deliver that wasn't already in the marketplace?

Quality, he explains, was at the forefront of his thinking.

"Quality is our watchword. We use only EU-cultivated hemp and all our products are made in Germany using cutting-edge extraction





techniques. We have third-party laboratory reports available for every product and are currently developing partnerships with well-known medical institutions," Paul explained.

"The American market for CBD is massive, and the UK is only at the very beginning of a similar explosion. There is a lack of high quality, UK-based CBD businesses with genuine brand authenticity at the premium end of the market, aimed at time-conscious people feeling stressed by modern life. There are already quite a few CBD companies out there, but ULU is very different for a number of reasons."

One of these is focused around the attention to detail that Paul insisted on in grand prix racing, ensuring that the products they sell actually contain what they claim to. As part of this, every ULU CBD product will go through stringent laboratory testing and will be certified to ensure complete transparency and the highest standards of quality is offered to its customers.

Paul explained: "At the moment, because the CBD industry in the UK is largely unregulated, it's a little bit like the wild west. We wanted to put a stop to that instantly with our own products, so that our customers can feel 100 per cent confident about

what they are getting."

The second aspect worthy of note in terms of the brand's unique selling points is the actual quantity of CBD contained in each product; ULU CBD comes in a variety of high concentrations, with its products being among some of the highest concentrations available on the UK market.

"So, although ULU offers a premium product, it represents the best value for money. ULU CBD products have a genuine effect, rather than being just a placebo or novelty product. In other words, ULU is there to serve a serious purpose," Paul continued.

"The ethos of the business is total quality, and what sets it apart is the high standards used at every stage of the production process, with the oils made in Germany and associations with high-profile partners, including medical institutions. ULU is currently a UK business, but we think internationally."

The range started with drops, e-liquids, and creams, to cater for different ways people use CBD, but the brand is also looking to other areas.

"What we want to do with ULU is help people maximise their potential," Paul advised, adding that the portfolio ranges from oils, to capsules, to e-liquids, to topical creams, with more to follow.

EXPANDING THE MARKET

CBD is found in so many retail outlets these days, both bricks and mortar stores and online, but the market is still expected to grow as demand rises. For ULU, it's important to stay ahead and evolve the offering – again, setting itself apart in the sector.

"The CBD market has exploded in recent years, especially in the United States. The UK market is currently further behind, but likely to see similar expansion in future. We're closely monitoring market trends, particularly those originating in the USA, and seeing how they could potentially translate into the UK market. We're expecting growth in all our established products, but also looking at introducing new bespoke niche products," Paul explained.

One of the areas ULU has evolved its offering away from just standard CBD products is with its range of CBD aminos, specifically formulated to enhance sleep quantity and quality, boost mood, and beat stress.

Paul explained: "The body's natural endocannabinoid system (ECS) is involved in a variety of processes, including appetite, inflammation, pain-sensation, mood and



memory. Amino acids come with a wide variety of benefits to keep your body functioning properly. A powerful combination of amino acids with full spectrum 10 per cent CBD influences the ECS, while CBD reduces inflammatory and neurogenic pain, and calming GABA aids better quality of sleep. Amino L-tryptophan helps reduce anxiety disorders and improve mood. Enhancing your daily intake of essential L-glutamine acid can enrich the energy to immune and intestinal cells during stressful times. We've received plenty of positive feedback that vouches for their effectiveness."

As we look ahead, ULU has plenty of plans to develop and to further build the reputation of the brand as one of quality and integrity.

Paul revealed: "We've got some truly innovative plans to develop the ULU brand, in line with our message of positivity and

inspiration. In the short-term, we're developing partnerships with medical institutions and launching some eye-catching charity initiatives.

"Longer term, ULU will expand internationally and put in place specific events and programmes to help people from all walks of life maximise their potential. A strong brand identity is one of our hallmarks, to effectively convey our mission and values."



Easy vegan cooking

Indulge in these recipes from new cookbook, *Go Vegan*, for some easy-to-cook, healthy fare.



Chocolate adzuki bites



Summer sweetcorn chowder



Teriyaki black bean burgers



Chocolate adzuki bites

INGREDIENTS:

- 1 cup of cooked adzuki beans
- 1 cup of pecans
- 8 medjool dates (stones removed)
- ¼ cup cocoa powder
- ¼ tsp of vanilla extract
- Desiccated coconut

METHOD:

- 1** Blend all the ingredients (except the coconut) in a food processor until you achieve a creamy texture. If the mixture is too dry, add a tablespoon or two of water.
- 2** Take a heaped teaspoon and roll into balls. Drop the balls into a bowl filled with the coconut and shake until well covered. Chill in the refrigerator for a few hours and enjoy. Truly scrumptious and healthy.

SUMMER SWEETCORN CHOWDER



TERIYAKI BLACK BEAN BURGERS





Serves 6

Summer sweetcorn chowder

A simple sweetcorn chowder recipe for you to cook a great meal for family or friends. Fresh sweetcorn is paired with coconut milk for the ultimate summer comfort food. Using frozen sweetcorn in this quick and easy recipe reduces the cooking time to 20 minutes.

INGREDIENTS:

- 4 cups organic frozen sweetcorn
- 2 heaped tbsp sweet white miso
- 4 cups hot filtered water
- 1 large onion, chopped
- 3 garlic cloves, crushed
- 1 cup sweet roasted red bell pepper, cut into small dice
- 1 small bunch spring onions, thinly sliced on the diagonal
- 2tsp tamari
- 1 cup unsweetened coconut milk
- ¼ cup fresh chives, chopped
- ¼ cup fresh coriander, chopped

METHOD:

- 1** In a measuring jug, mix the sweet white miso with the hot water to make a miso stock.
- 2** Heat a splash or two of filtered water in a large soup pot and sauté the onion and garlic over a low-medium heat for five minutes.
- 3** Add the sweetcorn, red pepper, spring onions, tamari and miso stock. Bring to a boil, covered, reduce heat to low and simmer for 15 minutes. Stir in the coconut milk.
- 4** Place half of the soup mixture into a high-speed blender and blend until smooth. Return to the pot and stir in the fresh chives and coriander.

CHOCOLATE ADZUKI BITES



TERIYAKI BLACK BEAN BURGERS





Teriyaki black bean burgers

Makes 8 good-sized burgers

Vegan burgers can be made with chickpeas, black beans, white beans, potatoes, lentils and pretty much any other vegetable that can be mashed and formed into a burger.

INGREDIENTS:

- 2 cups cooked black beans or mixed beans
- 1 cup cooked short-grain brown rice
- 1 cup silken tofu
- 2 heaped tbsp mild salsa
- 1tbsp umeboshi paste
- 1tbsp lime zest
- 1 red onion, chopped
- 2-3 garlic cloves, minced
- 1tsp ground coriander
- 1tsp dried oregano
- 1tsp smoked paprika
- 2tbsp teriyaki sauce
- ½ cup fresh coriander, minced
- 1 cup sourdough breadcrumbs
- Oil free mayonnaise for serving
- Note: for kids, I would suggest using regular paprika – no spices.

METHOD:

To make the burgers:

- 1 Preheat the oven to 180° (350°), gas 4.
- 2 Line two baking trays with parchment paper.
- 3 In a large bowl, mash the beans with a fork or potato masher. Add the cooked rice, tofu, salsa, umeboshi paste and lime zest, and mix well.
- 4 Warm a splash or two of filtered water in a small pan and sauté the red onion, garlic, dried herbs, paprika and teriyaki for five to seven minutes. Add this mixture to the bowl and stir to combine. Fold in the fresh coriander and breadcrumbs.
- 5 Take a heaped tablespoon of the mixture and squeeze together with your hands to form a burger. If not cohesive enough, add some more breadcrumbs.
- 6 Place on the baking trays and cook the burgers in the middle of the oven for 25 minutes, turning once halfway through. Double or triple the quantities and freeze for quick lunch/dinner options.



Go Vegan is a cookbook which contains lifestyle and health advice, together with beautifully illustrated pictures of easy to cook vegan recipes. Dispelling the myth that veganism is elitist, Marlene Watson-Tara's new book highlights that a diet based on whole food plants will prevent many illnesses, maintain a good physical condition, and change lives. Marlene is a health counsellor and teacher with over 40 years' experience of transforming lives.

CHOCOLATE ADZUKI BITES



SUMMER SWEETCORN CHOWDER



I-Mag giveaways



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



TIME HEALTH NATURAL RESVERATROL

Resveratrol is well-known for being the beneficial compound within red wine and has been linked to improved immunity and anti-ageing. Time Health has teamed up with renowned resveratrol experts, Puredia, to formulate this market leading supplement. Each capsule contains concentrated levels of resveratrol from red grape and Japanese knotweed root, is 100 per cent vegan, with no fillers, binders or flow agents.

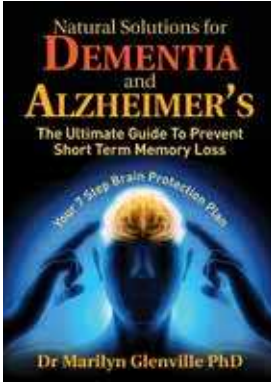
I:Win: We have five 180 capsule pouches to give away (worth £21.99 each).



NUTRI ADVANCED IMMUNOBLAST

ImmunoBlast is a powerful combination formula designed to provide nutritional support for a healthy immune system. It combines Wellmune WGP Beta 1-3/1-6 Glucans, together with vitamins A, C, E, D and zinc, key nutrients for the normal function of the immune system. Beta glucans are one of the most widely studied and effective natural substances for supporting balanced immune function.

I:Win: We have 25 Immunoblast 60 tablets to give away



NATURAL SOLUTIONS FOR DEMENTIA AND ALZHEIMER'S BY DR MARILYN GLENVILLE PHD

This book offers insight into the many things you can do to protect your brain. Inside, you will discover the number one diet tip to help protect your brain, how making the wrong food choices are harmful to your brain health, no matter what age you are, which supplements can help improve and boost your brain function and what lifestyle factors you should avoid and include to help improve your memory. The book also covers the most important tests to take to show if you have any deficiencies or imbalances that could be affecting your memory and concentration and features an easy questionnaire to determine if you are headed towards Alzheimer's

I:Win: We have 10 to give away, worth £12.77 each.



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- Supports immune health**

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I:Win: We have five Ancient Magnesium Oil Ultra 200ml, worth £18.95, to give away.

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