

patrick  
**HOLFORD**

*Optimum Living Made Easy*

# OPTIMUM NUTRITION FOR THE MIND

'THIS IS THE BREAKTHROUGH  
WE'VE BEEN WAITING FOR'

Professor André Tylee,  
Institute of Psychiatry, London

**MIND**

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## Foreword

**No one can question the massive** adaptive stress all human beings are facing as we enter the 21st century. As the pace of life accelerates, with mobile phones, email and instant news, there are a number of big questions at hand. Can we cope? Do we have the brains to adapt? In many cases, the answer is no. Fatigue, anxiety, sleeping problems, mood swings, memory problems and the blues are the hallmarks of our age. Those even less well adapted become mentally ill. ADHD, autism, schizophrenia and suicide are all on the increase. How can we stay mentally sharp and happy in our hectic times?

When the needs are very great, the solution may be just around the corner. The needs of the majority, and especially the mentally ill, are enormous – and they are not being met. But the solution is, in fact, already visible and developing rapidly. Patrick Holford, a skilful and insightful writer and nutritionist, has provided the necessary information in this excellent and important book. If the methods he outlines were widely practised, they would go a long way towards meeting the problems of our modern mental health crises. People suffering from mental illnesses, who today receive too little help, will find this book just what they need to take to their mental health providers to show them highly safe and successful treatments, backed by considerable research.

Recently King County, in the state of Washington, passed legislation making their state institutions accountable for the treatment of the mentally ill. Their new mission is to vastly improve the recovery rates of their patients. This book contains the very information needed to persuade their psychiatrists that only by following orthomolecular or nutritional psychiatry will they be able to reach recovery rates that are greater than 10 per cent. Tranquillisers used alone helps well under 10 per cent of schizophrenic patients to fully recover.

I have been practising psychiatry for the past 50 years, and have seen it develop from our use of one vitamin, B3, to treat schizophrenia, to its present state, which is much more comprehensive and applicable to a large variety of psychiatric conditions. My clinical observations fully confirm what Patrick Holford describes so well in this book.

*Optimum Nutrition for the Mind* fulfills a major modern need for information about the causes, prevention and treatment of diseases, including psychiatric disorders, which today make up the massive wave of illness that is sweeping the globe. At the same time, ‘affluent malnutrition’ is spreading across all the high-tech nations. Is it a coincidence, or is such malnutrition triggering the massive deterioration in our nations’ health?

About half the population of Canada, the US and the UK suffers from one or more degenerative disease such as schizophrenia, the bipolar psychoses, depression, anxiety, Alzheimer’s, arthritis, diabetes, neurological disease, obesity, immune deficiency, addictions, cancer, cardiovascular disease and so on. It is difficult to pick up a daily paper without some reference to the serious health crises facing nations. In some of the wealthiest countries, like the US and Canada, governments are more and more concerned over the costs of health care and disease treatment and are making strenuous but mostly futile efforts to control costs – without any attempt to really reduce them by getting their

people well.

We do know what should be done. We must provide information to the public and to the healing professions which will halt the continual spread of disease due to malnutrition. And this is another area where Patrick Holford's book will be a key element. As a student and follower of Dr Carl Pfeiffer, one of the pioneers in nutritional medicine, Holford has followed the development of this new field assiduously, and it shows.

At the beginning of the orthomolecular era it was very difficult for physicians to enter the field. There were a small number of very good books which specialised in certain aspects of the entire programme. Some went very heavily into the question of hypoglycemia and carbohydrate metabolism. Some dealt much more with the allergic reactions that can create any psychiatric syndrome whatever. Some emphasised the vitamins, some the minerals. But most of the publishers were small, with small advertising budgets, and these books were never promoted very well. Only within the past 10 years have we had books which covered the whole field.

This is one of the better ones because of its wide coverage of every aspect of orthomolecular practice, with descriptions of all the syndromes with which psychiatrists must deal. For interested physicians, this makes it much easier to enter the field, as they can find the information they need in one or two books.

We desperately need doctors to transform their practices as quickly as possible in order to slow the ever-increasing rate of disease development. The curve that relates prevalence of serious chronic illness against time is not linear. It is curvilinear upward, and if unchecked we will see over 75 per cent of our populations suffer from one or more serious chronic illness in the next decade or two. *Optimum Nutrition for the Mind* gives us a most powerful weapon in our fight against mental disease. It is also essential reading for anyone wanting to stay in top mental health throughout life, free from depression, memory decline and, even worse, senility.

**Dr Abram Hoffer MD, PhD**

Dr Abram Hoffer, former Director of Psychiatric Research in Saskatchewan, Canada, ran the first ever double-blind controlled trial in the history of psychiatry, in the 1950s, proving the power of vitamins in treating schizo-phrenia. Even though his ideas were attacked and ridiculed he persevered helping hundreds of people with mental health problems get better through optimum nutrition.

# Introduction

**The first edition of this book** inspired many changes and gave birth to the Food for the Brain Foundation, for whom I now work. It all happened when I sent the book to André Tylee, Professor of Primary Care Mental Health at the Institute of Psychiatry, King's College London. He was so excited by the growing evidence of nutrition's power to promote mental health and reverse mental health problems that we started a 'think tank'. People from all the relevant fields – psychiatry, nutrition, brain chemistry, psychotherapy, psychology and so on – were invited to our meetings. Finally, we founded the charitable Food for the Brain Foundation, whose stated aim is

• To promote awareness of the link between learning, behaviour, mental health and nutrition. To educate and provide educational material to children, parents, teachers, schools, universities, the public, health professionals, caterers and the government thereby promoting mental health through optimum nutrition. •

I'd like to share our vision, because it's to this that this book is dedicated: to create a future where optimum nutrition as a way to mental health is understood by all, and implemented by many – a future where

- Babies are optimally nourished for brain development during pregnancy and infancy
- Nurseries and schools, from infancy to university, actively encourage optimum nutrition for brain function
- Governments actively encourage optimum nutrition to promote learning and prevent behavioural and mental health problems from childhood to old age
- The treatment of mental health problems involves correcting nutritional imbalances as a first-line procedure
- The public has easy access to information about optimum nutrition for mental health.

The Foundation has an unparalleled scientific advisory board made up of nine professors in fields such as psychiatry, education, nutrition, brain chemistry and so on. Their names appear on its website, [www.foodforthebrain.org](http://www.foodforthebrain.org), and are also scattered throughout this book in testament to their pioneering research in this field.

Over the past five years this collective wisdom, backed up by hundreds of new and important published research studies, has put more flesh on the bones of the original book, and also fleshed out

the theories that define a radical new approach to mental health: optimum nutrition for the mind. One of these is the growing awareness that faulty methylation – a body process that happens a billion times a second and is intimately linked to nutrition – lies behind many mental health problems, from depression to schizophrenia.

Nutrition is the key to well-being of mind and mood, but not the only one. Insightful, effective psychotherapy and an understanding of the genetics are as vital. This idea – that most mental health problems can be made better by resolving psychological issues, correcting biochemical imbalances through nutritional therapy, and comprehending the genetic make-up that makes each of us different and some of us more prone to mental health disorders – has also been the vision of two great men of science.

They are the late Dr Carl Pfeiffer, with whom I was honoured to study; and the late Dr Abram Hoffer. Hoffer successfully treated more people with schizophrenia than anyone else in the world, and his tireless dedication to science gave birth to a whole new approach – the optimum nutrition approach – in psychiatry. His autobiography, *Adventures in Psychiatry*, makes for fascinating reading.

These two men, between them, have made more than a dozen essential discoveries which even today continue to unfold. These include:

- The discovery of the importance of zinc in mental health
- The power of vitamin B3 (niacin) to reverse psychosis
- The importance of vitamins B6, B12 and folic acid in mental health, now known to be the lynchpins of methylation, one of the hottest new discoveries in this field
- The discovery of the ‘mauve factor’, an abnormal chemical in urine that indicates increased brain oxidation and a need for specific nutrients, often found in those with autism and schizophrenia
- The discovery that food allergies can cause mental illness.

Carl Pfeiffer’s work took place at the Brain Bio Center in Princeton. To honour it, we have named our own outpatient clinic for the Foundation the Brain Bio Centre. Dr Hoffer’s work is carried on through the International Schizophrenia Foundation ([www.orthomed.org](http://www.orthomed.org)).

This book is my way of showing these giants of medicine and psychiatry that their work goes on, and of showing you what has been learnt so far about how to protect and promote your mind, mood, memory and sanity through optimum nutrition in what often seems an increasingly mad world. The definition of insanity is to keep doing the same things and expect different results, and I hope this book will help wake up patients and professionals alike to the insanity of relying on drugs for the treatment of our children, elders and everyone suffering depression, anxiety or more severe forms of mental illness, when a better, safer and cheaper way is already in place – optimum nutrition.

Wishing you the best of health and happiness,

**Patrick Holford**

# CHAPTER 1

## You think what you eat

**H**ow sharp is your mind, how balanced is your mood, how consistent is your energy, how happy are you – and what, if anything, do these qualities have to do with what you eat? These are some of the questions we set out to answer in Britain’s biggest-ever health survey – known as ONUK for Optimum Nutrition UK – which involved 37,000 people and took place in 2004.<sup>1</sup> What we found was sobering stuff. Here, for instance, are the proportion of people who said they suffer ‘frequently’ or ‘always’ from certain conditions:

- Become impatient quickly 82%
- Have low energy level 80%
- Energy is less than it used to be 76%
- Feel have too much to do 67%
- Become anxious or tense easily 64%
- Have PMS/PMT (women only) 63%
- Easily become angry 53%
- Suffer from depression 44%
- Have difficulty concentrating 43%
- Become nervous/hyperactive 38%
- Have poor memory/difficulty learning 32%

Does this sound like anyone you know? Welcome to the 21st century. Despite improvements in diet and better standards of living, the average person is, as one child said in an exam howler, a knackered ape, not a naked ape! So what’s going wrong?

Our minds and bodies have been shaped over millions of years of evolution. Our species, *Homo sapiens*, learnt to adapt to changing climates, to changing food supplies and to a changing world. But it takes time to adapt and change can be painful. Right now we have a problem. Humanity is struggling to adapt to life in a phase that makes the Industrial Revolution seem like child’s play. Our

physical environment is changing, for instance. We have invented some 10 million new chemicals, thousands of which are added to our food, are found in common household products, and are in the water we drink and the air we breathe.

Our psychological environment is changing even faster. This layer of our environment consists of concepts of who we are, who we're with and what we do. Memories of times and places. Thoughts and feelings. All these make up the fabric of our psychological world. You can't see it or touch it, but it is no less real. We tell the story of our life across a matrix of time and space.

Yet in the last 50 years, our whole experience of time and space has changed fundamentally. What we could do in a week, we can do in a day. The distance we would have covered in a day we can cover in an hour. You want to speak to a friend while strolling through a park? Dig out your mobile. You want to send a letter? Write an email and get a reply in a minute or less. You want to go somewhere? Jump on a plane. We no longer live in towns and cities, we live in the world. Global news reaches us in seconds. We can even fly almost anywhere in a day. Every culture is exposed to every other culture.

But this 'cross-culturalisation' is placing untold strains on all of us, from America to Africa, Asia, Australia and Europe. Many of us are struggling to survive, let alone thrive, in the new millennium. Putting the squeeze on time and space isn't making us happy.

## The high cost of living

So these are exceptionally challenging times. Some of us are rising to the challenge, but most of us are struggling to keep up and are living with tiredness, anxiety, stress, depression and sleeping problems. Too many people are suffering from mental health problems ranging from autism and attention deficit disorder to Alzheimer's, depression and schizophrenia. In fact, recent research shows that each year in the UK, 350,000 elderly people are diagnosed with cognitive impairment, while 185,000 develop dementia. That is 500 people every day – the equivalent of four packed double-decker buses.<sup>2</sup>

The outlook on children's disorders is just as worrying. One in 6 children have special educational needs, while 1 in 3 live with behaviour, attention and learning problems.<sup>3</sup> The rise in cases of autism is positively alarming: current research indicates that 1 in 86 children in the UK now have the condition.<sup>4</sup> In the US, an estimated 1 in 10 women are on antidepressants.<sup>5</sup> In fact, the world over there's been a massive increase in the incidence of mental health problems, especially among young people. Suicide, violence and depression are on the rise, according to the World Health Organization (WHO). Mental health problems, says the WHO, are fast becoming the number one health issue this century, with 1 in 10 people suffering from them at any point in time, and 1 in 4 hit by them at some point in their life.<sup>6</sup>

Having worked with thousands of people struggling with these problems, and researched the underlying causes, I've come to the conclusion that most can be prevented, and in many cases reversed, by a fundamentally new approach to mental well-being.

This has nothing to do with today's therapeutic front-runners, drugs or psychotherapy. By 'drugs' I include the staggering array we prescribe for ourselves – from caffeine to chocolate. We've all been down this route. Tired? Choose caffeine, sugar or a cigarette. We drink 1.5 billion caffeinated drinks a week in Britain, including tea, coffee and cola, and we eat 6 million kilos of sugar and 2 million

kilos of chocolate every week. We also smoke 1.5 billion cigarettes in that time. Anxious or depressed? Have a drink. We drink 120 million alcoholic drinks a week – and smoke 10 million cannabis joints. And if things get really bad? Go to the doctor for a prescribed drug. In Britain we're popping 532 million tranquillisers, 463 million sleeping pills and 823 million antidepressants every year. All of these work to some extent, but at what cost, in terms of side-effects and dependence?

A more hopeful development, potentially at least, is that psycho -therapy is becoming increasingly popular. More people are now seeking professional help, and more and more frequently, with at least 10 million visits a year. Alternatively, you can do a life-changing course, read a self-help book, or change your state of mind through yoga or meditation. All of these can help.

But meanwhile, aren't we forgetting something? Any intelligent person can recognise that our diets have changed radically in the last 100 years, along with our environment. When you consider that the body and brain are made entirely from molecules derived from food, air and water, and that simple molecules like alcohol can fundamentally affect the brain, isn't it unlikely that changes in diet and the environment have had no effect on our mental health?

I believe that most of us are not achieving our full potential for mental health, happiness, alertness and clarity because we are not achieving optimum nutrition for the mind, and this book presents ample evidence for my case. I also believe that a significant proportion of mentally unwell people are suffering from a chemical imbalance brought on by years of poor nutrition and exposure to environmental pollutants. For them, drugs are not the answer – after all, they are hardly suffering from a lack of drugs – and their longstanding imbalance may actually hamper the success of any therapy they're receiving.

As Einstein said, 'The problems we have created cannot be solved at the same level of thinking we were at when we created them.' We need a new way of thinking about mental health that includes the role of nutrition and the chemical environment and how these affect the way we think and feel.

## Mind and body are not separate

One of the most limiting concepts in the human sciences is the idea that the mind and the body are separate. Try asking an anatomist, a psychologist and a biochemist where the mind begins and the body ends. It is a stupid question, and yet that is exactly what modern science has done by separating psychology from anatomy and physiology.

But it's not just the scientists who live by this false distinction. It's us. When you're having difficulty concentrating, when your mood is low, when you struggle to find a memory, do you consider that you may be poorly nourished? Why not? Every one of these states – your thinking, feeling, mental energy and focus – happens across a network of interconnecting brain cells, each one of which depends on an optimal supply of nutrients to work efficiently. Consider these experiments:

- Dr David Benton measured the IQ scores of 90 schoolchildren and then gave 30 of them a high-dose multivitamin, 30 a dummy pill and 30 nothing. After eight months we re-evaluated their IQ. Only those children on the vitamins had a staggering increase in their non-verbal IQ of over ten points!<sup>7</sup> Since this study, published more than a decade ago, 10 other studies have confirmed that

supplements boost children's IQ. The effect is real.

- Dr Thomas Crook from the Memory Assessment Clinic in Maryland in the US gave 149 people with age-related memory impairment a daily dose of 300mg of a nutrient called phosphatidyl serine. When they were tested after 12 weeks, their memory had improved to the level of those 12 years younger.<sup>8</sup>
- Dr Bernard Rimland from California compared the results of 1,591 hyperactive children treated with drugs to those of 191 hyperactive children given nutritional supplements. The nutritional approach was 18 times more effective.<sup>9</sup> Yet, despite this, drug prescriptions for children are almost doubling every year.
- Dr Carl Birmingham from the Eating Disorders Clinic in Vancouver, Canada, gave people with anorexia a zinc supplement or a placebo. Those taking zinc increased their body weight twice as rapidly as those given the dummy pills.<sup>10</sup>
- Dr Abram Hoffer from Canada has treated 5,000 people diagnosed with schizophrenia with high-dose multinutrients, especially large doses of vitamin B3 and vitamin C. His published 40-year follow-up reports reveal a 90 per cent cure rate – defined as free of symptoms, able to socialise with family and friends, and paying income tax.<sup>11</sup> Despite this lifetime of research and results, Hoffer's approach to schizophrenia has been largely sidelined.
- Dr Walter Poldinger and colleagues from Basel University in Switzerland gave depressed patients either a state-of-the-art SSRI antidepressant or a nutrient called 5-HTP. 5-HTP outperformed the drug on every measure, resulting in greater improvements in their depression, anxiety and insomnia, and no side-effects.<sup>12</sup> This is in sharp contrast to the estimated one suicide every day caused directly by adverse reactions to this class of antidepressant drug (see [Chapter 22](#)).
- Bernard Gesch of the University of Oxford gave prison inmates supplements of vitamins, minerals and essential fats, or placebos, and demonstrated a dramatic 35 per cent decrease in aggressive acts only in those taking the supplements.<sup>13</sup>
- Dr Jane Durga from Wageningen University in the Netherlands gave 818 people aged from 50 to 75 either a supplement containing 800 micrograms of folic acid a day, or a dummy pill, for three years. On memory tests, the supplement users had scores comparable to people 5.5 years younger.<sup>14</sup>
- A recent trial published in the *American Journal of Psychiatry* tested the effects of giving 20 people suffering from depression, who were already on antidepressants but still depressed, a highly concentrated form of the omega-3 fat EPA or a placebo. By the third week the patients taking EPA were showing major improvements in mood, while those on the placebo were not.<sup>15</sup>

The evidence is there if you look for it. You can change how you think and feel by changing what you put into your mouth. Whatever your state of mind now, you will notice gradual improvements in your mind and mood as you follow the guidelines in this book.

You don't have to be clinically depressed, anxious, unable to concentrate, hyperactive, or losing

your memory or your mind to benefit from this book, but it helps! Even if you feel ‘all right’, optimum nutrition can significantly boost your psychological well-being – because feeling *just* ‘all right’ isn’t all right. You should, and can, feel alert, energetic, happy and unstressed, with a clear mind and a sharp intelligence.

## Optimum nutrition and psychotherapy work wonders

Of course, as I’ve mentioned, improving our mental health isn’t only about nutrition. While most psychotherapists ignore the role of nutrition and the brain’s chemistry in how we think and feel, let’s not make the same mistake of omission. I believe the solution to the mental health problems that plague our society lies in a combination of optimum nutrition and good psychological support, which includes having a place you can call home, being treated with respect and dignity, and counselling. Certain kinds of counselling are highly effective for depression, for example, but far too infrequently prescribed or available. In fact, as the evidence for this grows, the UK National Health Service is actually cutting back on psychotherapists in an attempt to save money, yet spending more on less effective drugs.

The combination of optimum nutrition and psychotherapy works wonders for a wide variety of mental health problems, from depression to schizophrenia – and it works much better than drugs. Most of the psychiatrists I work with find that while drugs can be life-saving in the short term, they become unnecessary when people are receiving the right combination of nutrients and psychological support.

### **We need a radical new approach based on science**

With mental health problems rising at such a pace, we need a new way of thinking about the state of our minds. As Marcel Proust said, ‘The real act of discovery consists, not in finding new lands, but in seeing with new eyes.’ We need to wake up to the realisation that poor nutrition and chemical imbalances probably underlie the majority of mental health problems. You can’t just psychoanalyse away deficiencies in essential fats, vitamins, minerals and other key brain nutrients. We must think our way out of the box and get to grips with the fact that chemistry directly affects how we think and feel.

This means a new basis for both diagnosing and treating problems, and a new way of living and eating that supports our mental health, rather than eroding it. I believe we already have solutions to most forms of mental illness. We just have to look with new eyes. This book is dedicated to that vision.



## CHAPTER 2

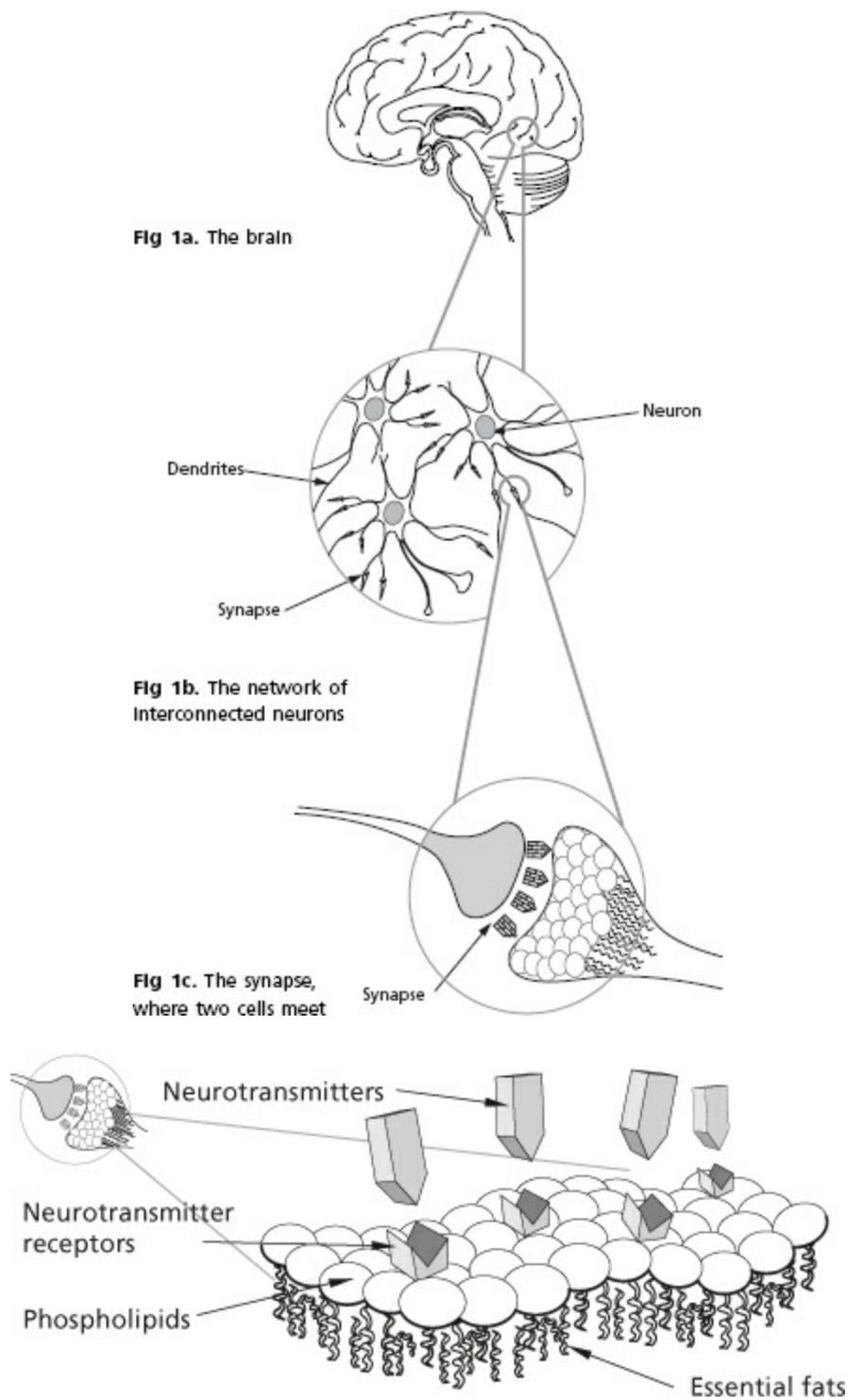
### The five essential brain booster foods – check yourself out

**Whether you're in good shape** or are currently dealing with depression, mood swings or another mental health problem, there are five essential foods you need to tune up your brain.

- **Balance your glucose** – it's fuel for the brain.
- **Essential fats** – these keep your brain 'well oiled'.
- **Phospholipids** – these memory molecules give 'oomph' to the brain.
- **Amino acids** – these are the brain's messengers.
- **Intelligent nutrients** – these include vitamins and minerals that 'fine tune' your mind.

Knowing a few simple facts about your amazing brain shows you why these foods are so important for your mind. Every day we have around 6,000 thoughts – most of them repeats! Every single thought you have is represented by a 'ripple' of activity across the network of nerves called your brain. Here's how it works.

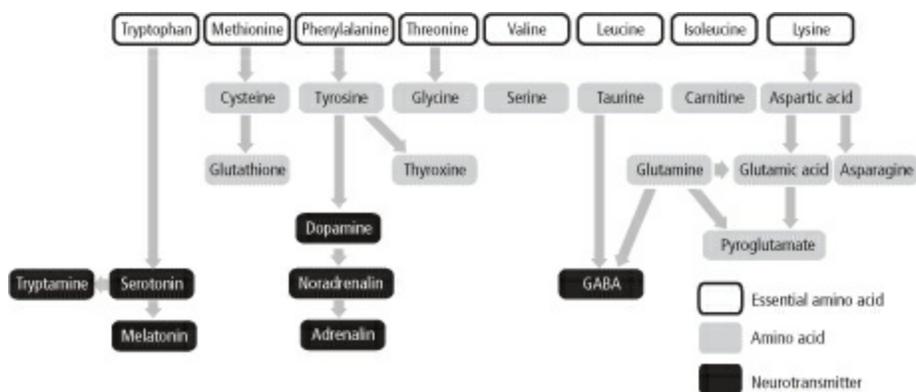
What we call the brain is a network of neurons – special nerve cells that connect to other neurons. You've got 100 billion neurons, each connecting to thousands of others. To get an idea of just how complex that is, let's look at the Amazon rainforest. The Amazon stretches for 2.7 million square miles and contains about 100 billion trees. So there are as many cells in our brain as trees in the entire Amazon rainforest, and as many connections as leaves!



**Fig 1d. How the brain receives a message**

The connections between neurons are called dendrites. Where one dendrite meets another neuron, there's a gap, like the 'spark' gap in a spark plug. This gap is called a synapse and it's across this gap that messages are sent from one neuron to another.

The message is sent from a sending station and received in a receiving station, called a receptor. These sending and receiving stations are built out of **essential fats**, found in fish and seeds; **phospholipids**, present in eggs and organ meats; and **amino acids**, the raw material of protein.



**Fig 1e.** Neurotransmitters are made from amino acids

The message itself, the neurotransmitter, is in most cases made out of amino acids. Different amino acids make different neurotransmitters. For example, the neurotransmitter serotonin, which keeps you happy, is made from the amino acid tryptophan. Adrenalin and dopamine, which keep you motivated, are made from phenylalanine (see Fig 1e on the previous page).

Turning an amino acid into a neurotransmitter is no simple job. Enzymes in the brain that depend on intelligent nutrients do it. These include vitamins, minerals and special amino acids.

You are what you eat, but that goes beyond the physical body. How you think and feel also depends on what you eat. You can check out whether you are getting enough of these essential brain foods using the Brain Food Check below.

## Brain food check

In each section there are ten questions. Tick the box for 'yes'. If you tick five or more in the 'yes' column, the chances are you're not getting enough of this essential brain food factor.

### **? GLUCOSE CHECK**

Do you usually eat white bread, rice or pasta instead of brown/wholegrain?

Do you crave certain foods such as carbohydrates?

Do you have tea, coffee and sugary foods or drinks, or cigarettes, at regular intervals during the day?

Do you usually eat fruit, vegetables or other carbohydrates without protein foods at the same time?

Do you sometimes skip meals, especially breakfast?

Do you wake unrefreshed or need something to get you going in the morning, like tea, coffee or a cigarette?

Do you often feel drowsy during the day?

Do you sometimes lose concentration?

Do you get dizzy or irritable if you don't eat often?

Do you avoid exercise because you don't have the energy?

## **❓ FAT CHECK**

Do you eat oily fish (salmon, trout, sardines, herring, mackerel or fresh tuna) less than once a week?

Do you eat seeds or their cold-pressed oils less than three times a week?

Do you eat meat or dairy products most days?

Do you eat processed or fried foods (such as ready meals, chips, crisps) three or more times a week?

Do you have dry or rough skin or a tendency to eczema?

Do you have a poor memory or difficulty concentrating?

Do you suffer from PMS or breast tenderness?

Do you suffer from water retention?

Do you suffer from dry, watery or itchy eyes?

Do you have inflammatory health problems such as arthritis?

## **❓ PHOSPHOLIPID CHECK**

Do you eat fish (especially sardines) less than once a week?

Do you eat fewer than three eggs per week?

Do you eat liver, soya/tofu or nuts less than three times per week?

Do you take less than 5g of lecithin each day?

Is your memory declining?

Do you sometimes go looking for something and forget what it was you were looking for?

Do you find it hard to do calculations in your head?

Do you sometimes have difficulty concentrating?

Do you have a tendency towards depression?

Are you a 'slow learner'?

## **❓ AMINO ACID CHECK**

Do you eat less than one portion of protein-rich foods (meat, dairy, fish, eggs, tofu) each day?

Do you eat fewer than two servings of vegetable sources of protein (beans, lentils, quinoa, seeds, nuts, wholegrains and so on) each day?

If you're vegetarian, do you rarely combine different protein foods such as those mentioned above?

Are you very physically active or do you work out a lot?

Do you suffer from anxiety, depression or irritability?

Are you frequently tired or do you lack motivation?

Do you sometimes lose concentration or have poor memory?

Do you have very low blood pressure?

Do your hair and nails grow slowly?

Are you constantly hungry and do you frequently get indigestion?

## **❓ INTELLIGENT NUTRIENT CHECK**

Do you eat fewer than five servings of fresh fruits and vegetables (excluding potato) every day?

Do you eat fewer than one portion of dark green vegetables a day?

Do you eat fewer than three portions of fresh or dried tropical fruit a week?

Do you eat seeds (such as pumpkin, sunflower, tahini) or unroasted nuts less than three times a week?

Are you currently not taking a multivitamin/mineral supplement every day?

Do you usually eat white bread, rice or pasta instead of brown/wholegrain?

Do you consume more than one unit of alcohol most days?

Do you suffer from anxiety, depression or irritability?

Do you suffer from muscle cramps?

Do you have white marks on more than two fingernails?

## **The gut-brain connection**

It used to be thought that all our thinking is done by neurons in the brain. We now know that the digestive system contains 100 million neurons, and produces as many neurotransmitters as the brain. The gut, for example, produces two-thirds of the body's serotonin, the 'happy' neurotransmitter. So in essence, you're feeding two brains. Every time you eat something it sends signals to the brain because the gut and the brain are in permanent communication. This is why the right foods can make you happy

## CHAPTER 3

### Complex carbohydrates – the best brain food

**The most important nutrient** of all for the brain and nervous system is glucose, the fuel they run on. We humans are solar-powered. We use plants to collect the Sun's energy for us in the form of glucose. The plants absorb hydrogen and oxygen ( $H_2O$  – water) from the soil, and carbon and oxygen ( $CO_2$  – carbon dioxide) from the air, and combine these atoms together using the Sun's energy to make carbohydrate (COH).

We then digest the carbohydrate down into glucose and deliver this into both our brain and body cells. The glucose is then 'burnt' within our cells, liberating the Sun's energy, which is what keeps us alive. Some of the excess is stored as a substance called glycogen, in our muscles and liver.

Your brain consumes more glucose than any other organ. In a sedentary day your brain can consume up to 40 per cent of all the carbohydrate you eat. That's why you get hungry after exams! Any imbalance in the supply of glucose to the brain and you can experience fatigue, irritability, dizziness, insomnia, excessive sweating (especially at night), poor concentration and forgetfulness, excessive thirst, depression and crying spells, digestive disturbances and blurred vision.

Basically, the more carbohydrates you eat, and the more regularly you eat them, the healthier you are and the better your brain works. But it's not quite that simple. Some carbohydrates are better at fuelling the body properly than others.

Research at the Massachusetts Institute of Technology found a massive 25 per cent difference between the IQ scores of children who were in the top fifth of the population for consumption of refined carbohydrates, compared with children who were in the bottom fifth.<sup>16</sup> So staying away from white bread, processed cereals and sugar seems to be crucial to having a higher IQ.

But that's not all. To maximise mental performance, you need an *even* supply of glucose to the brain. This has been well proven by Professor David Benton at Swansea University in Wales, who has found that dips in blood sugar are directly associated with poor attention, poor memory and aggressive behaviour.<sup>17</sup> That's why children who fail to eat breakfast can't think straight at school.<sup>18</sup> So what kind of carbohydrates will fit the bill?

### Food for fuel

Although we can make energy from protein, fat and carbohydrate, carbohydraterich foods are the best kind of fuel. This is because when fat and protein are used to make energy there is a build-up of toxic

substances in the body. Carbohydrates are the only ‘smokeless’ fuel.

But they need to be ‘slow-releasing’ too. Complex carbohydrates like wholegrains, vegetables, beans or lentils, or simpler carbohydrates such as fruit, take longer to digest than refined carbohydrates. So when you eat, say, brown rice, your body does exactly what it’s designed to do. It digests it and releases its potential energy steadily and gradually.

## **Why refined is bad**

What’s so bad about refined carbohydrates, though – sugars, white bread, white rice and the like?

When we refine sugars, we are in essence cheating nature by isolating the sweetness in a food (such as beets) and discarding the rest. All forms of concentrated sugar – white sugar, brown sugar, malt, glucose, honey and syrup – are ‘fast-releasing’ or, to put it another way, have a high glycemic load (GL), which triggers a rapid increase in blood sugar levels. (See [page 21](#) for the lowdown on GL.) The way the body responds to a sudden onslaught of sugar in the blood is to release the hormone insulin, which then escorts the sugar out into the cells. But there is only so much fuel they can take at any one time, so excess sugar is first put into storage in the liver and muscles as a substance called glycogen, and when that has reached its limits, as fat. So eating a lot of sugar regularly can leave you with a lot of stored fat.

Most concentrated forms of sugar are also devoid of vitamins and minerals, unlike natural sources such as fruit. White sugar has had around 90 per cent of its vitamins and minerals removed. Without vitamins and minerals, our metabolism becomes inefficient, contributing to poor energy levels, concentration and weight control.

Too much sugar also sends your adrenalin, the stress hormone, sky-high. Researchers at Yale University in the US gave 25 healthy children a drink containing the amount of glucose found in a can of a popular soft drink. The rebound blood sugar drop (which happens when too much sugar in the blood causes insulin to overcompensate by taking too much sugar out) boosted their adrenalin to over five times their normal level for up to five hours after ingesting the sugar. Most of these children had difficulty concentrating and were irritable and anxious, which are normal reactions to too much adrenalin in the bloodstream.<sup>19</sup> A similar study involving 404 Finnish children 10 to 11 years old showed that withdrawal, anxiousness, depression, delinquency and aggression were twice as frequent in those consuming 30 per cent more sucrose in the form of ice cream, sugary snacks and soft drinks.<sup>20</sup>

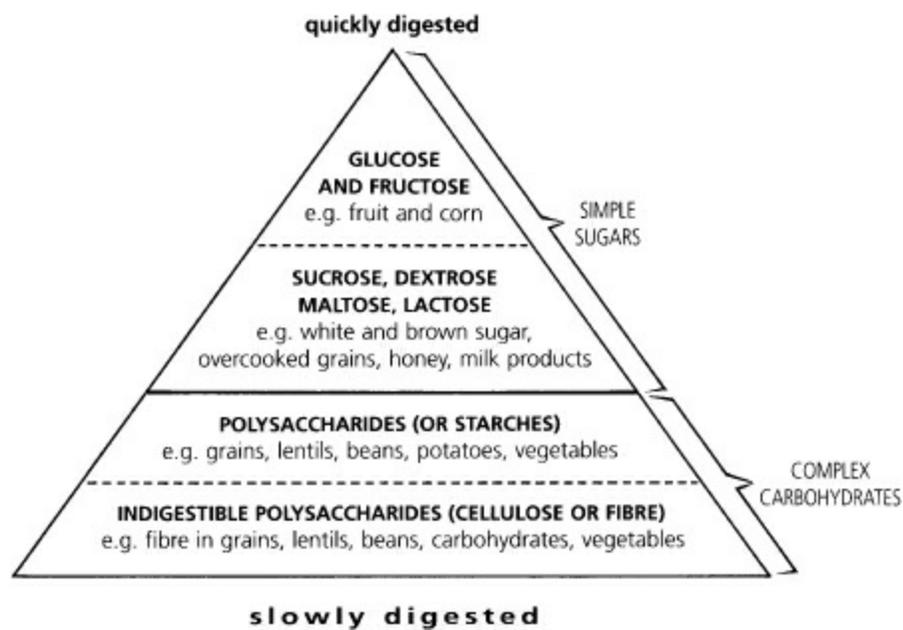
Other refined carbohydrates such as white bread, white rice and processed cereals have an effect similar to that of refined sugar. The process of refining or even cooking starts to break down complex carbohydrates into simple carbohydrates, in effect predigesting them. When you eat them you get a rapid increase in blood sugar level and a corresponding surge in energy. The surge, however, is followed by a drop as the body scrambles to balance your blood sugar level.

## **Fruit sugars – a mixed bag**

But it’s not just about added or even refined sugar. The main sugar in most fruit is the simple sugar fructose. This enters the bloodstream fast, but is classified as ‘slow-releasing’ because your body has to convert it to glucose before it can be used as fuel, and this process slows down its effect on the

body.

Some fruits however, such as grapes and dates, contain almost pure glucose, putting the carbohydrates they contain in the fast-releasing category. Apples, on the other hand, contain mainly fructose and so are relatively slow-releasing. Bananas contain both, and raise blood glucose levels quite speedily. But all fresh fruit does have two big advantages. One is fibre, which slows down the release of the sugars contained in the fruit. (This is why drinking juice, which is processed to remove most of the fibre, is a less desirable way of consuming fruit.) The other is vitamins, which as we'll see in [Chapter 7](#) are essential for physical and mental health.



**Fig 2.** The sugar family

What about dried fruit? In a nutshell, it's problematic. This is because, weight for weight, it obviously has much less water than fresh fruit, and this both concentrates the sugar and makes it much smaller and less filling – so you can end up packing away quite a lot of it without realising. More, the fibre in dried apples, say, is less effective at slowing down sugar release. So don't make dried fruit a substitute for fresh. And when you do eat dried fruit, soak it first – when it's plumped up and rehydrated it will be more filling, so you're likely to eat less of it.

## Carbohydrates to concentrate on

By this time you'll have an idea of how important the release rate of carbohydrates is. But how can you tell which is fast-releasing and which slow? As a general rule, you can assume that whole, unprocessed foods are the slowest to release their sugar. Beyond this, you can use a measure called glycemic load or GL.

GL describes both how much carbohydrate a food contains and how fast-releasing that carbohydrate is. So in essence, it measures a food's effect on blood sugar levels. Foods with a GL of less than 10 are good and should be the staple foods of your diet. A GL of 11 to 14 is okay, and can be eaten in moderation. A GL higher than 15 should be avoided. Beware of combining two moderate-GL foods in one meal. When they're eaten together, their GL adds up to high. For example, a crumpet with

unsweetened peanut butter (moderate with very low GL) remains moderate, but the GL score of a crumpet with a teaspoon of honey (moderate with moderate) shoots up.

The chart below gives GL scores for average servings of a range of common foods. You can start to use this now by checking out what you eat for breakfast.

If you start the day with cornflakes, which have a high GL score, you're getting rocket fuel first thing in the morning – and that means that a couple of hours later your blood glucose, and energy, will plummet. But have oat flakes, sweetened with a chopped apple – both of which are slow-releasing – and your energy and concentration will last right through to lunch.

## Glycemic load of common foods

Food	Serving size (in g)	serving size	GLs per serving
<b><i>Bakery products &amp; cakes</i></b>			
Low-carb muffin	-	1 muffin	5
Apple and almond cake	-	1 medium slice	5
Carrot and walnut cake	-	1 medium slice	5
Muffin – apple, made without sugar	60	1 muffin	9
Muffin – apple muffin, made with sugar	60	1 muffin	13
Crumpet	50	1 Crumpet	13
Muffin – apple, oat, sultana, made from packet mix	50	1 muffin	14
Muffin – bran	57	1 muffin	15
Banana cake, made without sugar	80	1 medium slice	16
Muffin – blueberry	57	1 muffin	17
Muffin – banana, oat and honey	50	1 muffin	17
Croissant	57	1 croissant	17
Doughnut	47	1 plain doughnut	17
Sponge cake, plain	63	1 slice	17
Muffin – carrot	57	1 muffin	20
<b><i>Breads &amp; crackers</i></b>			
Völkensbrot wholemeal rye bread	20	1 slice	5
Rice bread, high-amylose	20	1 small slice	5
Rice bread, low-amylose	20	1 small slice	5
Wholemeal rye bread	20	1 thin slice	5
Wheat tortilla (Mexican)	30	1 tortilla	5
Chapatti, white wheat flour, thin, with green gram	30	1 chapatti	5
Rye kernel (pumpernickel) bread	30	1 slice	6
Sourdough rye bread	30	1 slice	6
White, high-fibre bread	30	1 thick slice	9
Wholemeal (wholewheat) wheat flour bread	30	1 thick slice	9
Gluten-free fibre-enriched bread	30	1 thick slice	9
Gluten-free multigrain bread	30	1 slice	10
Light rye bread	30	1 slice	10
White wheat-flour bread	30	1 slice	10
Pitta bread, white	30	1 pitta	10
Wheat flour flatbread	30	1 slice	10
Gluten-free white bread	30	1 slice	11
Corn tortilla	50	1 tortilla	12
Middle Eastern flatbread	30	1 slice	15
Baguette, white, plain	30	$\frac{1}{3}$ baton	15
Bagel, white, frozen	70	1 bagel	25
Rough Oat Cakes (Nairn's) <sup>TM</sup>	10	1 oat cake	2
Fine Oat Cakes (Nairn's) <sup>TM</sup>	9	1 oat cake	3
Cheesy Oat Cakes (Nairn's) <sup>TM</sup>	8	1 oat cake	3
Cream cracker	25	2 biscuits	11

Rye crispbread	25	2 biscuits	11
Water cracker	25	3 biscuits	17
Puffed rice cakes	25	3 biscuits	17

### ***Dairy products***

Cottage cheese	120	½ medium tub	2
Plain yoghurt (no sugar)	200	1 small pot	3
Non-fat yoghurt (plain, no sugar)	200	1 small pot	3
Soya yoghurt (Provamel)	200	1 large bowl	7
Soya milk (no sugar)	(250ml)	1 glass	7
Low-fat yoghurt, fruit, sugar (Ski)	150	1 small pot	7.5

### ***Fruits***

Blackberries	120	1 medium bowl	1
Blueberries	120	1 medium bowl	1
Raspberries	120	1 medium bowl	1
Strawberries, fresh, raw	120	1 medium bowl	1
Cherries, raw	120	1 medium bowl	3
Grapefruit, raw	120	½ medium	3
Pear, raw	120	1 medium	4
Melon/cantaloupe, raw	120	½ small	4
Watermelon, raw	120	1 medium slice	4
Peaches, raw (or canned in natural juice)	120	1	5
Apricots, raw	120	4 apricots	5
Oranges, raw	120	1 large	5
Plum, raw	120	4	5
Apples, raw	120	1 small	6
Kiwi fruit, raw	120	1	6
Pineapple, raw	120	1 medium slice	7
Grapes, raw	120	16	8
Mango, raw	120	1 ½ slices	8
Apricots, dried	60	6 apricots	9
Fruit cocktail, canned (Del Monte)	120	Small can	9
Papaya, raw	120	Half a small papaya	10
Prunes, pitted	60	6 prunes	10
Apple, dried	60	6 rings	10
Banana, raw	120	1 small	12
Apricots, canned in light syrup	120	1 small can	12
Lychees, canned in syrup and drained	120	1 small can	16
Figs, dried, tenderised (Dessert Maid)	60	3	16
Sultanas	60	30	25
Raisins	60	30	28
Dates, dried	60	8	42

### ***Spreads & jams***

Pumpkin seed butter	16	1 tbsp	1
Peanut butter (no sugar)	16	1 tbsp	1
Blueberry spread (no sugar)	10	1 dessertspoon	1
Apricot fruit spread, reduced sugar	10	1 dessertspoon	2
Orange marmalade	10	1 dessertspoon	3
Strawberry jam	10	1 dessertspoon	3

### ***Snack foods***

Hummus	200	1 small tub	6
Olives, in brine	50	7	1
Peanuts	50	2 medium handfuls	1
Cashew nuts, salted	50	2 medium handfuls	3
Potato crisps, plain, salted	30	1 small packet	7
Popcorn, salted	25	1 small packet	10

Pretzels, oven-baked, traditional wheat flavour	30	15	16
Corn chips, plain, salted	50	18	17
Fruitus apple cereal bar	35	1	5
Euroviva Rebar fruit and veg bar	50	1	8
Apricot fruit bar (dried apricot filling in wholemeal pastry)	35	1	12
Muesli bar with dried fruit	30	1	13
Chocolate bar, milk, plain (Mars/Cadbury/Nestlé)	50	1	14
Twix® biscuit and caramel bar (Mars)	60	1 bar (2 fingers)	17
Snickers® bar (Mars)	60	1	19
Polos peppermint sweets (Nestlé)	30	16	21
Jelly beans, assorted colours	30	9	22
Kellogg's Pop-Tarts™, double choc	50	1	24
Mars Bar®	60	1	26

*A comprehensive list of the GL of foods is available in The Optimum Nutrition Bible and The Low-GL Diet Bible, or online at [www.holforddiet.com](http://www.holforddiet.com).*

## How to stay in perfect balance

As you can see in the chart on the previous pages, the GL of some foods is through the roof. So it will be bound to play havoc with your blood sugar balance and, in turn, your state of mind. You may have had a few shocks: baguettes and bagels have quite a high GL, for instance. But as you'll discover, it's amazingly easy to find delicious and thoroughly satisfying substitutes. Here are some examples of what you should and should not be eating to keep your blood glucose, and your brain, in balance.

### Bad news and good news foods

Instead of...	eat
White toast and jam	Wholegrain toast and baked beans
Sweetened cornflakes	Porridge with raspberries
Croissants and baguettes	Wholegrain rye bread
White rice	Wholemeal spaghetti
Chocolate bars	Raw vegetable crudités with hummus or low GL fruit bars
Bananas	Berries, apples or oranges
Crackers or rice cakes	Oatcakes

Picking the right carbs is vital, but you'll also need to follow a few other steps to achieve that perfect blood-sugar balance.

### The long goodbye to sugar

It's best to decrease the sugar content of your diet slowly. Gradually get used to less sweetness. For example, sweeten cereal with fruit. Dilute fruit juices with water by at least half to halve their GL score. Avoid foods with added sugar. Limit dried fruit, and cut down on fast-releasing, high-GL fruits like bananas – or combine them with slow-releasing, low-GL carbohydrates such as oats.