



Food and Behaviour Research presents

CHANGING DIETS, CHANGING MINDS

The Importance of Nutrition for Behaviour Learning and Mood: Putting Research into Practice

THURSDAY, 6TH JUNE 2013

at The Green House, Beechwood Business Park, Inverness IV2 3BL



-
- | | |
|-------------------|--|
| 09.30am – 09.55am | Registration and Refreshments |
| 09.55am – 10.05am | Opening Remarks by Chair
<i>Dr Fiona Skinner (Subject Network Leader, Applied Life Studies, University of Highlands and Islands)</i> |
| 10.05am – 10.35am | The Role of Nutrition in Mental Health and Wellbeing: What's gone wrong and how can we fix it?
<i>Dr Alex Richardson (Founder/Trustee of FAB Research; Senior Research Fellow, University of Oxford; Author of 'They Are What You Feed Them')</i> |
| 10.35am – 11.20am | Dietary Fats and Human Brain Development: Implications for the Nutrition of Mothers and Infants
<i>Professor Michael A Crawford (Imperial College, London. Institute of Brain Chemistry and Human Nutrition)</i> |
| 11.20am – 11.40am | Refreshment Break |
| 11.40am – 12.05pm | The Importance of Nutrition for Child Behaviour and Learning: Theory, Evidence and the Real World
<i>Dr Alex Richardson (Founder/Trustee of FAB Research; Senior Research Fellow, University of Oxford; Author of 'They Are What You Feed Them')</i> |
-

- 12.05pm – 12.45pm **Dietary Approaches to ADHD; Autistic Spectrum Disorders and Related Conditions: What Works in Practice?**
David Rex (Dietitian, Health & Social Care – Children’s Services, Highland Council)
- 12.45pm – 1.00pm **Speakers’ Panel – Questions and Discussion**
- 1.00pm – 1.55pm **Lunch**
- 1.55pm – 2.40pm **Nutrition and Anti-Social Behaviour – Is there a Causal Link?**
Dr Bernard Gesch (Senior Research Scientist, University of Oxford)
- 2.40pm – 3.15pm **Dietary Interventions for Adult Mental Health – A Clinical Perspective**
(via Video Link)
Kevin Williamson (Senior Nutritionist for the Early Intervention in Psychosis Services, Rotherham, Doncaster and South Humber NHS Foundation Trust (RDaSH))
- 3.15pm – 3.35pm **Refreshment Break**
- 3.35pm – 4.10pm **Improving Children’s Food Choices: From Theory to Best Practice**
David Rex (Dietitian, Health & Social Care – Children’s Services, Highland Council)
- 4.10pm – 4.30pm **Speakers’ Panel – Questions and Discussion**

FAB Research Audio/Video Library

Delegates who attended today will have the chance to view the webinar for this event for the next two weeks. Instructions on how to access this will be emailed to you within the next few days.

After this time, the webinar will be archived to the FAB Research Audio/Video Library, where FAB Associate Members enjoy ongoing unrestricted access.

Current content in this resource includes the webinar from our recent event in London: ‘Sugar, Fat and the Public Health Crisis’ with Prof Robert Lustig MD, US paediatric obesity specialist and endocrinologist, and author of ‘Fat Chance: The bitter truth about sugar’. (This book will be on sale during today’s refreshment and lunch breaks, along with other titles in our recommended reading list.)

Find out how to become an FAB Associate Member on our website at www.fabresearch.org

The Role of Nutrition in Mental Health and Wellbeing: What's gone wrong and how can we fix it?

**by Dr Alex Richardson, Senior Research Fellow at the Centre for Evidence Based Intervention,
University of Oxford; and Founder Director of the UK charity, Food and Behaviour Research**

It has been recognised for some time that consumption of a typical modern, western-type diet – rich in highly processed and refined foods – significantly increases the risks for many physical health disorders, including obesity, Type 2 diabetes, cardiovascular disease (CVD), immune system disorders, and cancer. Nutrition is equally fundamental to mental health and wellbeing, and the evidence is now undeniable that diet plays an important role in many developmental and mental health conditions. In developed countries, these now contribute more to the overall burden of ill-health than do physical health disorders, and the associated cost burdens are already threatening to overwhelm public health services.

The nutritional composition of human diets changed quite fundamentally following industrialisation, and many of these changes are pathological for both brain and body. Two of the most notable are a dramatic increase in the intake of sugar and other refined carbohydrates (and a corresponding lack of fibre and essential micronutrients), and substantial changes in the type and balance of dietary fats (with a particular increase in the ratio of omega-6 to omega-3 fats). Both have important implications for brain development and functioning, as does a lack of any of the essential micronutrients, which is common in the general population.

This talk will provide an overview summarising the role of nutrition and diet in mental health, and the effects of both sugar and dietary fat on brain function. Evidence for causal links between diet and behaviour will be highlighted in a framework following the lifespan, starting with pregnancy and early life, childhood (when developmental conditions such as ADHD, autism and dyslexia usually first manifest), adolescence and young adulthood (typically the peak age of onset for antisocial behaviour, depression and schizophrenia) and older adulthood (associated with age-related cognitive decline and dementia).

Better education and training on the relevance of nutrition and diet to mental health disorders could improve both the diagnosis and management of these conditions.

Summary of key points

- Mental health disorders have now overtaken physical health disorders in terms of their cost burden in the UK and other developed countries.
- Nutrition affects mental as well as physical health, because diets that are good (or bad) for the body will also be good (or bad) for the brain.
- Typical modern, western-type diets (rich in highly processed foods) contain an excess of sugar, insufficient fibre, and are relatively deficient in omega-3 fatty acids and often other essential nutrients. Any of these features can compromise brain function and therefore mood, behaviour and learning.
- Good evidence shows that diet plays a role in many mental health conditions, ranging from ADHD and depression to dementia. Better public education and professional training in the relevance of nutrition could help in both prevention and management.

About Dr Alex Richardson

Dr Alex Richardson is a Founder/Trustee of FAB Research and a Senior Research Fellow at the Centre for Evidence Based Intervention, University of Oxford, having previously been based at Oxford's Dept of Physiology, Anatomy and Genetics from 1987-2007. She is internationally known for her work on the role of nutrition in behaviour, learning and mood, and is one of the world's leading researchers on the influence of omega-3 and other dietary fats on mental health and performance, particularly in relation to developmental conditions such as ADHD, dyslexia, depression and schizophrenia. Her research has always been multi-disciplinary, and currently involves both experimental studies and nutritional treatment trials. Alex is much sought after as a speaker for public, professional and academic audiences both nationally and internationally. She has over 80 research publications to date, and is also author of 'They Are What You Feed Them'.

The Changing Diet

by Professor Michael A Crawford – Imperial College London

Lipids played a major, as yet unrecognised, role as determinants in evolution. Life originated in the seas 2.5 billion years ago in an anaerobic environment. However, the prokaryotes included photosynthetic systems which released oxygen. It was not until about 600 million years ago when the oxygen tension rose to a point where air breathing life forms became thermodynamically possible, that a major change is seen in the fossil record. The sudden appearance of the 32 phyla we know today, in the Cambrian record was also associated with the appearance of intracellular detail which had not existed before. That detail was provided by cell membranes in which the lipids were structural essentials. The intracellular compartmentalisation of the nucleus, mitochondria, reticulo-endothelial system and plasma membrane led to cellular specialisation and then speciation. Thus not just oxygen but also the lipids were drivers in the Cambrian explosion. Docosahexaenoic acid (DHA) is a product of oxidative metabolism and provided the basic membrane backbone of the new photoreceptors that converted photons into electricity laying the foundation for the evolution of the nervous system and the brain.

The composition of the photo receptors, neuron and synapse has remained unchanged ever since. This astonishing conservation of composition is the clearest signal of DHA as a biological imperative for neural evolution, function and its relevance to contemporary nutrition today. Unlike proteins and DNA, lipids are highly responsive to changes in temperature, pressure and nutritional environments. This responsiveness alters protein function and gene expression. Over 600 million years of gene mutation leading to the emergence of many thousand new species, wave after wave, the composition of the photoreceptor and brain remained the same. In this sense DHA was the master of DNA Hence the omega 3 DHA associated with the anti-oxidants and trace elements so rich in fish and sea foods, would have played a critical role in the evolution of vision and the human brain. Lipids are still modifying the present evolutionary phase of our species with their contribution to a changing panorama of non communicable disease as in heart disease and cancers. The most worrying change in disease pattern is the sharp rise in brain disorders which in the European Union has overtaken the cost of all other burdens of ill health at €789 billion in 2010 with a separately assessed £105 billion in the UK - a cost greater than heart disease and cancer combined.

The solution to the rising vascular disorders last century and now brain disorders this, lies in a radical re-appraisal of the food system which last century was focussed on protein and calories with little attention to the requirements of the brain. The brain evolved in the sea 500 mya using the marine DHA and trace elements. It still uses the same today.

The likely explanation for the rise in brain disorders and mental ill health is the reduced use of sea foods and excessive use of other dietary fats which compete with the marine DHA. A calculation reveals that there is not enough fish caught today to meet the current recommendations world wide. Even without the rise in population this represents a serious threat to the future of mankind unless a solution can be found to enhance the food supply. With the world catch of fish having reached a limit 20 years ago the aquaculture which is dependent on by products of the wild fish catch must also reach a limit. Hence the importance of the Declaration of Manila January 21st, 2012 in which 65 countries agreed to protect the world's oceans from land-based activities. Reducing the rivers, estuaries and coast lines of pollution by human activity is vital to the health of the marine food web. Moreover it is essential if we are to take the next step in assuring future food security.

Food security has to mean marine agriculture with the development of estuarine, coastal and oceanic resources in a way that mankind learnt to develop land resources 10,000 years ago. Such development will be essential for the security of future health and intelligence. A global loss of intelligence is a predictable scenario. With it would come breakdown in social cohesion, anarchy, with the consequences of the worst kind. Exponential population growth ultimately leads to extinction which in our case would be unpleasant.

The alternative is to continue the evolution of human intelligence. It is no use thinking of maintaining the status quo. With increasing population density and the escalation of health, social and political ramifications the need is for expanding intelligence with its continued evolution. Both scenarios are on the cards. It is intelligence that brought H sapiens to the present set of achievements. For the first time in evolutionary history we are in a position to choose and drive our own intelligence and our future destiny.

About Professor Michael A Crawford

Professor Michael Crawford has been the Director of the Institute of Brain Chemistry and Human Nutrition since 1990. Having worked in the East-end of London on maternal nutrition and health with Newham, the Homerton and Queen Elizabeth Hospital for Children, he is now at Reproductive Physiology at the Chelsea and Westminster Hospital Campus of Imperial College, London. His special interest lies in the role that lipids and essential fatty acids play in interacting with the cellular signalling systems, i.e. the key interaction between nutrition affecting membrane lipids and gene expression. He has published over 300 peer reviewed papers and 3 books. Amongst his several honours and prizes, he was elected by his peers to the Hall of Fame at the Royal Society of Medicine in 2010. He collaborates in research internationally and is much in demand as a lecturer worldwide.

The Importance of Nutrition for Child Behaviour and Learning: Theory, Evidence and the Real World

by Dr Alex Richardson, Senior Research Fellow at the Centre for Evidence Based Intervention,
University of Oxford; and Founder Director of the UK charity, Food and Behaviour Research

In the UK and US, at least one in five school-aged children are now affected by Attention-Deficit Hyperactivity Disorder (ADHD) or related conditions - including dyslexia or reading disability (RD), developmental coordination disorder (DCD) and Autistic Spectrum Disorders (ASD). These diagnoses remain purely descriptive, as there are no objective markers for these conditions. In practice, they show substantial overlap with each other, and no clear-cut boundaries with normal functioning. These kinds of behaviour and learning difficulties place a heavy burden not only on affected individuals and families, but on society as whole, owing to their negative lifelong impact on educational, occupational and social outcomes. Effective strategies for their prevention and management are therefore urgently needed.

The causes of ADHD and related conditions are complex and multi-factorial, but increasing evidence shows that nutrition is fundamental to their etiology - particularly in early life, as mothers' diets during pregnancy can have a lifelong influence on their children's brain development and functioning. However, research also indicates that 'it is never too late' – as controlled treatment trials have shown that some dietary interventions can improve both behaviour and cognitive performance in children of school age.

An increased intake of the long-chain omega-3 fatty acids EPA and DHA, found in fish and seafood, has been shown to be beneficial in children with ADHD and related conditions. Furthermore, benefits from omega-3 DHA for both reading progress and parent-rated behaviour were recently found in healthy but underperforming children from mainstream UK schools, although this study still needs replication. Controlled trials have also shown that the removal of some common artificial food additives can improve attention and behaviour in children from the general population, as well as in children with ADHD-type symptoms (inattention, hyperactivity and impulsivity). Other dietary issues, such as food allergies and intolerances, are more individual, but again, research evidence shows clearly that in some cases these can have significant effects on mood, behaviour and learning.

In the real world, the diets eaten by most UK children fail to meet official dietary guidelines, and are sub-optimal for both physical and mental health and development. These problems are often compounded in children with recognised behaviour and learning difficulties. Improving this situation will require action at many different levels, so raising awareness of the links between nutrition and children's behaviour among the general public, professionals and policymakers is of prime importance.

Summary of key points

- Childhood behaviour and learning difficulties are an increasing problem in the UK and other developed countries. Their causes can be many and varied, but nutrition can play an important role in their prevention and management.
- For ADHD symptoms, controlled trials show that an increased intake of long-chain omega-3 fatty acids (EPA and DHA), and the removal of certain artificial food additives, can be beneficial.
- Food allergies and intolerances can also affect children's mood, behaviour and learning, but research in these areas is made more difficult by individual differences.
- The diets eaten by most UK children are not conducive to healthy physical and mental development, and better awareness of the links between nutrition and behaviour is needed.

About Dr Alex Richardson

Dr Alex Richardson is a Founder/Trustee of FAB Research and a Senior Research Fellow at the Centre for Evidence Based Intervention, University of Oxford, having previously been based at Oxford's Dept of Physiology, Anatomy and Genetics from 1987-2007. She is internationally known for her work on the role of nutrition in behaviour, learning and mood, and is one of the world's leading researchers on the influence of omega-3 and other dietary fats on mental health and performance, particularly in relation to developmental conditions such as ADHD, dyslexia, depression and schizophrenia. Her research has always been multi-disciplinary, and currently involves both experimental studies and nutritional treatment trials. Alex is much sought after as a speaker for public, professional and academic audiences both nationally and internationally. She has over 80 research publications to date, and is also author of 'They Are What You Feed Them'.

**Talk 1: Dietary Approaches to ADHD; Autistic Spectrum Disorders and Related Conditions:
What Works in Practice?**

Talk 2: Improving Children's Food Choices: From Theory to Best Practice

by David Rex, Dietitian, Health & Social Care – Children's Services, Highland Council

Talk 1: Dietary Approaches to ADHD; Autistic Spectrum Disorders and Related Conditions: What Works in Practice?

This presentation will share 10 years of experience of a Specialist Dietitian advising families that have children on the Autistic Spectrum, with ADHD or related conditions. It will explore the difficulties and potential solutions that parents and carers face when trying to influence their child's food choices. A set of "common sense" rules for judging the "pros" and "cons" of "special diets" for children with these conditions will also be presented. These rules are much needed to help parents, carers and professionals navigate the "minefield" of good, bad and sometimes impractical dietary interventions.

Summary of key points

- Selective eating in ASD can be improved with patience and the right approach.
- There are specific supplements and "special diets" that help improve the physical and mental wellbeing of many children with a neuro-developmental diagnosis.
- Narrow rules used for evaluating evidence based practice in medicine, need to be adapted if they are to be fit for the purpose of considering nutrition interventions.

Talk 2: Improving Children's Food Choices: From Theory to Best Practice

This presentation will explore the many influences on child and family food "choices" and the impact this has on their health and wellbeing. It will also propose a number of ways that different stakeholders can contribute to the development of a healthier food culture and environment.

Summary of key points

- For many children and families, there are a range of social, cultural, practical and financial factors that get in the way of making healthier food choices.
- Schools, nurseries and a range of other institutions can influence food culture in a positive way.
- Effective strategies should focus as much on how children feel, as how much they know.
- To create an environment in which change is more likely to happen, the food economy needs reform from the "top down", not just the "bottom up".

About David Rex

is a Dietitian for Highland Council, working in “Health & Social Care – Children’s Services”. He has a lead public health role for Food & Health in schools, nurseries and Children’s Residential Units; and provides specialist Dietetic advice for children with Autistic Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD). He advises on diet and children’s mood, behaviour and learning; and on how to deal with the selective eating patterns that are so common in children with ASD. He has been heavily involved in the development of the “High 5” Health & Wellbeing programme for Highland primary schools, and is a member of the Highland School Meals Stakeholder group. David has a first degree in Chemistry and Food Science, a post graduate Diploma in Nutrition and Dietetics, and a Masters in Food Policy. He has over 25 years experience of the food system, starting as a “Teenage burger flipper” for a well known fast food chain, and going on to look at food and health from a range of different perspectives, in posts as diverse as: food chemist and technical advisor in the food industry; community and hospital dietitian; and food policy advisor for a Health Authority. He is an advocate for sustainable and socially just food systems, and is passionate about cooking and eating well.

Nutrition and Anti-Social Behaviour – Is there a Causal Link?

by Dr Bernard Gesch FRSA, Department of Physiology, Anatomy and Genetics, University of Oxford

Since Industrialisation we have made unprecedented changes to our diet with little or no systematic testing for behavioural effects on our brain. We have a criminal justice system that seemingly judges behaviour without reference to brain function. Furthermore, young people form a disproportionate percentage of the prison population and there are concerns that insufficient attention is paid to their health. The maximal impact of a poor diet is likely to be among these disaffected young people who typically are dislocated from routine access to healthy foods that can keep up with the demands of their changing physiology. Hence their diet tends to be poor compared to international standards of dietary adequacy, which typically are set to protect the heart but not for optimal brain function. We review the evidence that tests a possible causal relationship between diet and antisocial behaviour.

We tested what happened to the behaviour of violent young male adult prisoners (18-21 years) when essential nutrients missing from their diets were reinstated. We used food supplements as an analogue of a better diet because it provided the possibility of a placebo control. On a random basis, where neither the volunteers, prison staff nor researchers in the prison knew who was getting which type, 231 volunteers were given either placebo or real capsules containing broadly the daily requirements of vitamins, minerals and essential fatty acids. The number of proven offences committed by each prisoner was monitored before and while taking supplements. The result was that those who received the extra nutrients committed significantly (26.3%) fewer offences compared to placebos. Those consuming real supplements for at least two weeks committed 37% fewer (highly statistically significant) of the most serious offences such as violence. These findings have been replicated by the Dutch Ministry of Justice, their double blind study found a 48% difference between groups. These effects will depend on the quality of the dietary baseline and these effects were observed without even removing the less healthy food choices. If these studies are widely replicated and they need to be, we may have a simple and humane means to help reduce and prevent a significant proportion of violence and antisocial behaviour. This should also work in the community because it is not about where you eat but what you eat. Thus, it has been posited that a poor diet may be a modifiable causal factor in antisocial behaviours; a factor still ignored by the criminal justice system. Indeed, this approach offers the prospect of simpler means to prevent such behaviour as providing a nutritious diet is never going to be discriminatory to these young people.

We question why the criminal justice system largely ignores brain function when its role is to judge behaviour. And why for instance young prisoners can purchase unrestricted quantities of sugar in prison. We consider if we would we be better off providing our children with a more nourishing diet than spending on average £76,000 per year to incarcerate a young person.

- Crime is not brainless, it involves a brain. The question is if the brain is working properly.
- What you have just eaten may turn out to be a better predictor of what you are about to do than what you have just done!
- Tough on crime, tough on the causes of crime is an excellent strategy but it requires us to begin to identify what these causal factors are.
- The only risk of better diet is better health.
- Diet is a major determinant of our brains working environment.
- If we are what we eat then changing our diet will change us.

About Bernard Gesch

Dr Bernard Gesch is a Senior Research Scientist at the Department of Physiology, Anatomy and Genetics, at the University of Oxford. Bernard is internationally known for his pioneering research into the links between diet and antisocial and criminal behaviour. In the late eighties he established a programme combining nutritional and social approaches to offending which some UK Courts used successfully as an alternative to imposing custodial sentences on persistent juvenile offenders. With the co-operation of the Home Office, Bernard and colleagues went on to conduct a carefully controlled clinical trial to test empirically if better nutrition could significantly improve the behaviour of maximum-security prisoners. It did! Bernard now collaborates internationally to replicate these findings, and is currently working with eminent colleagues from several institutions, including the Medical Research Council and the Institute of Psychiatry.

Dietary Interventions for Adult Mental Health – A Clinical Perspective

by Kevin Williamson

Senior Nutritionist for the Early Intervention in Psychosis Services, Rotherham, Doncaster and South Humber NHS Foundation Trust (RDASH)

Aim: To outline the rationale, process and evaluation of a nutritional care package in an NHS first episode psychosis service.

The Rotherham Early Intervention in Psychosis service has been at the forefront of nutritional care delivery for mental health in the UK. This unique, innovative service applies the convincing evidence that the nutrients we consume have an impact on the way we feel, think and behave that is highly relevant to clinical practice. In addition to its potential benefits for mental health, nutritional education is provided for individuals in order to help reduce health inequalities arising from the associated physical co-morbidities that have been well documented in mental health patients, such as cardiovascular disease, type-2 diabetes and obesity.

As part of the routine care for people experiencing their first episode of psychosis, we provide a thorough nutritional assessment, using validated methods, as well as engaging and building a rapport with the individual and their care network. The assessment incorporates dietary information, as well as a measure of nutritional knowledge, in the form of a questionnaire. A range of nutritional interventions are then delivered based on the findings of this assessment.

Service users are more likely to make positive changes to their nutrient intake if they are offered these nutritional interventions by health professionals who are equipped with appropriate knowledge and skills. As a response to this, Rotherham, Doncaster and South Humber NHS Foundation Trust developed the 'Nutrition in mental health' care package. This is delivered through e-learning and is specifically designed for health professionals from a range of different disciplines in order to boost their specific knowledge and enhance their skill set.

The presentation aims to:

- Provide a description of the nutritional assessment developed by RDASH NHS Foundation Trust.
- Provide a description of the nutritional interventions provided.
- Share an anonymised case example from the service.
- Introduce plans for the revised 'Nutritional care for mental health' training package, available for study from Spring 2014.

About Kevin Williamson

is a senior nutritionist for the early intervention in psychosis services, which are run by Rotherham Doncaster and South Humber NHS Foundation Trust (RDaSH). His work with young people with mental health problems received a Parliamentary commendation. He has developed a nutritional service for young people in Rotherham, Doncaster, North Lincolnshire and Manchester who have experienced their first episode of psychosis. The service looks at their diet in relation to their illness and provides a healthier, more nutritionally balanced alternative. It drew praise from the Government's Food and Health Forum, which recommended that other NHS trusts adopt a similar approach to RDaSH. Kevin said: "The diet of mental health service users is traditionally low in valuable nutrients, presenting numerous health risks. "There is strong evidence that improving the nutrient intake is beneficial in the treatment of depression, depressed mood and psychosis." To help others replicate the good practice in RDaSH, Kevin has developed an accredited training course on nutritional care in mental health, which is aimed at training mental health professionals to introduce tailored nutritional assessment and positive dietary change with their service users. Following the successful delivery of an e-learning package with Hull University's Centre of Lifelong Learning, RDaSH has now been commissioned to deliver a nutritional care training package by Kent and Medway NHS and Social Care Partnership Trust. Kevin added: "We are delighted to be sharing our knowledge with other trusts, and hope this will enable service users in other areas of the UK to benefit from improved health and wellbeing."