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[Dietary and nutritional therapies](#)

Introduction to Dietary and Nutritional Therapies

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Definition

Dietary and nutritional therapies encompass preventive and educational approaches to diet and lifestyle changes, in order to promote and optimise physical and mental health. They encompass personalised dietary therapy and nutraceutical prescription, and lifestyle advice within a functional medicine framework. This represents a nutritional paradigm different to that which underpins current dietetic and public health nutrition practice. Scope of practice normally excludes artificial (parenteral/enteral) feeding and dietary management of acute life-threatening states.

Therapies/approaches:

Dietary and nutritional therapy may be practised by statutorily registered health professionals and by non-statutorily registered practitioners.

(1) Some statutorily registered health professionals use biochemical and immunological insights to help patients, including allergy, environmental and nutritional medicine.

(2) Nutritional therapists work with individuals often with challenging chronic health problems. Clients are either self-referred or referred by medical or other practitioners. Nutritional therapists do not diagnose or aim to treat medical conditions. Their advice is not a substitute for professional medical advice and/or treatment.

This article focuses primarily on nutritional therapy practice as part of complementary and alternative medicine (see definition below). Consequently, some of the terms and concepts within this article relate to the area of dietary and nutritional therapies and would not necessarily be acknowledged in conventional medicine.

Dietetics and public health nutrition are also concerned with diet and nutrition but are considered part of conventional medicine. Conventional dietetics practice is addressed by other Specialist Collections. For further information on dietetics, see the website of the [British Dietetic Association](#). Public health nutrition is covered by [NHS Evidence – public health](#). Management of medical conditions such as diabetes is covered by the relevant condition-based specialist collection.

Some terms used in dietary and nutritional therapy

Antinutrient: “An undesirable substance in food that can inhibit nutrient metabolism...or absorption, i.e. impede function.”¹

e.g. when dietary intake of calcium is marginal, the consumption of large quantities of oxalate (spinach, rhubarb, tea) or phytates (whole grains, legumes) and high fibre foods may inhibit absorption sufficient to create a deficiency state.¹

Antioxidants: The body produces highly reactive oxygen species, known as free radicals, as part of normal metabolism. They are produced in larger quantities during inflammation or intensive exercise, or when following some dietary regimes. These free radicals have the capacity to damage cellular and mitochondrial membranes and nuclear material. Antioxidants are naturally occurring (e.g. vitamins A, C and E, carotenoids, alpha lipoic

acid, glutathione peroxidase, superoxide dismutase and coenzyme Q10), helping to 'disarm' these free radicals, thus reducing damage.

Detoxification (Biotransformation): Any impairment of the ability to remove endogenous and exogenous harmful compounds from the body can play a role in the aetiology and exacerbation of a range of diseases and conditions. Nutrition provides substances required for the synthesis and activity of detoxifying enzymes. These include phase 1 cytochrome P450 enzymes and phase 2 conjugating enzymes. Some genotypes produce less active variants of these enzymes. Enzyme production may also be impaired by DNA damage, often through oxidative stress or through the presence of exogenous molecules or atoms adducted to the DNA.

Dietary challenge: When an allergy or other adverse reaction to food is suspected, this item may be removed from the diet temporarily. A food challenge involves the re-introduction of that item, ideally in the same format/food type as previously, in order to confirm the diagnosis and to investigate the development of food intolerance². If severe reactions are suspected, with obvious allergic characteristics, a challenge may be avoided on safety grounds or alternatively, only minute quantities are introduced initially under medical supervision. In the absence of symptoms, the challenge may continue for several days to cover possible delayed reactions.

Dietary supplement: Taken orally as pills, capsules, powders or liquids, supplements are additional to the diet³. They may contain essential nutrients (vitamins, minerals, essential fatty acids), may be normally present in the diet and/or have well-established biological functions (Co Q10, alpha lipoic acid, creatine) or provide plant extracts (garlic, milk thistle). The [EU Food Supplements Directive](#) (2002/46/EC) provides a framework that guarantees and regulates the future legal status of certain classes of food supplements within the UK and throughout Europe. It ensures that vitamin and mineral supplements are safe and appropriately labelled, so that consumers can make informed choices.

Drug-nutrient interactions: Any dietary or nutraceutical advice should take account of concomitant use of any prescription or over-the-counter drugs or herbs. This includes the effect of the drug on the body's nutrient metabolism⁴ as well as any other drug-nutrient interactions. For example, grapefruit juice inhibits one of the P450 cytochrome oxidase enzymes, reducing the rate at which certain drugs are metabolised, making the drug dose equivalent to a stronger one. St John's Wort (Hypericum) induces P450, increasing the metabolism of many drugs, so that higher doses may be required.

Ecological medicine involves the study and practice of allergy, environmental and nutritional medicine.

Emergence is a feature of a complex system where multiple agents produce an outcome which cannot be reduced in its simplicity. For example the properties of water cannot be predicted by knowing the properties of hydrogen and oxygen: the whole is more than the sum of the parts.

Exclusion diet: This involves the elimination of a suspect food to which an adverse reaction is suspected². This may include milk products, eggs, soy, wheat. The exclusion of the suspect food should result in symptoms subsiding, followed by evidence of recurrence when the food is slowly re-introduced. Sometimes, more than one food is involved. Excluded foods should be replaced by alternative, nutritionally adequate substitutes. If specific food items are not identified, a very restrictive exclusion diet may be necessary for a limited period.

Functional foods include those to which ingredients have been added which confer health benefit⁵, branded foods that claim explicitly or implicitly to improve health and wellbeing⁶ and any modified food or food ingredient that may provide a health benefit beyond the traditional nutrients it contains⁷.

Functional medicine is an approach to integrated medicine that "*is dedicated to prevention, early assessment, and improved management of complex, chronic disease by intervening at multiple levels to correct core clinical imbalances and thereby restore each patient's functionality and health to the greatest extent possible.*"⁸ It provides a conceptual framework of which dietary and nutritional therapy is the principal part.

Food allergy/sensitivity: Food allergy is defined by Brostoff & Gamlin⁹ as '*any adverse reaction to food in which the immune system is clearly involved. This includes... Classical IgE-mediated food allergy... and other reactions to food such as celiac disease... where the immune system is known to cause the symptoms*'. Food sensitivity is a broader term which includes food allergy but also encompasses adverse reactions to food which may be of currently unknown allergic or biochemical origin. Brostoff and Gamlin⁹ define it as an 'umbrella term for food allergy, food intolerance and all other adverse reactions to food, except where purely psychological in origin'. Food intolerance may also be used broadly to include any type of sensitivity reaction to foods, but typically there is a delay of several hours between eating the food(s) and experiencing ill-effects⁹. Other groups describe 'intolerance' as non-allergic, non-toxic adverse reactions or alternatively as an umbrella term for allergic and non-allergic reactions².

Genomics is the study of the genome of organisms. The degree to which diet influences health and disease may depend on an individual's genome. Some common dietary chemicals act on the human genome, directly or indirectly, to alter gene expression or structure. Some susceptible diet-regulated genes can play a role in the onset, incidence, progression and/or severity of chronic diseases. Dietary interventions based on knowledge of nutritional requirements, nutritional status and genotype (i.e. individualised nutrition) can be used to prevent, mitigate or cure chronic disease¹⁰. Evidence is accumulating that some classic essential micronutrients (vitamins and minerals) and non-nutrients (food bioactive chemicals found in fruits, vegetables, grains, nuts, seeds and oils) act at the molecular levels to regulate gene expression and modulate inflammatory and immune pathways.

Hormesis is the paradoxical or stimulatory effect in which exposure to a low dose of a chemical agent or environmental factor that is damaging at high doses, induces an adaptive beneficial effect on a cell or organism. It is characterised by a biphasic dose response, J- or U-shaped curve¹¹. This phenomenon is observed with many nutrients. '*A better understanding of hormesis mechanisms at the cellular/molecular levels is leading to novel approaches for prevention and treatment of many different diseases*'¹².

Macronutrients are nutrients required in quantity in the diet, for example, protein and fat.

Micronutrients are nutrients required in small quantities in the diet, for example vitamins and minerals.

Nutraceutical: any substance that may be considered a food or part of a food and provides health benefits, including the prevention and treatment of disease¹³.

Optimum nutrition refers to the intake of the range and quantities of nutrients that optimise the health of the individual and may in some individuals vary from public health recommendations.

Orthomolecular medicine describes the practice of preventing and treating disease by providing the body with 'optimal amounts' of substances which are natural to the body. Two-time Nobel Prize winner and molecular biologist Linus Pauling coined the term 'Orthomolecular' in his 1968 article 'Orthomolecular Psychiatry' in the *Journal Science*¹⁴.

Phytochemicals are plant-derived bioactive substances.

RDA: recommended daily allowance. This is a dietary reference standard for a particular nutrient calculated as being adequate in terms of avoiding deficiency symptoms for 97.5% of the population. The aim is to help groups and individuals (health professionals, the food industry, institutions, caterers, the public) to evaluate nutritional intake. In calculating RDAs, assumptions include that the population is healthy and that nutrient requirements do not change in older people¹⁵. More recently, the concept of optimal nutrition has emerged in terms of a nutrient intake that '*maximises physiological and mental function and minimises the development of degenerative diseases*'. Nutrient intake can be interpreted in terms of (a) preventing deficiency symptoms, (b) optimising body stores of a nutrient or addressing some biochemical or physiological function or (c) minimising disease incidence or risk factors for chronic disease, thus emphasising the importance of the individualised approach¹⁵.

Introduction

Nutritional therapy/ medicine developed in the twentieth century as a way of treating disease and optimising health, using nutrition and changes in lifestyle. It involves individual prescriptions for diet and lifestyle, in order to alleviate or prevent ailments and to promote optimal health. These recommendations may include dietary modifications, including the use of exclusion diets, and guidance on methods to support digestion and absorption of nutrients. They may also include the avoidance of ingestion or inhalation of toxins or allergens, detoxification, procedures to promote gastrointestinal health and the appropriate use of supplementary nutrients.

Treatment is patient-centred, i.e. based on a recognition of the individual's biochemical uniqueness (genetic/epigenetic) and their environment. It considers the web-like connections of physiological factors. Health is seen as vitality, and not just the absence of disease. It incorporates a consideration of nutritional, immunological, endocrine and gastro-intestinal imbalances, inflammatory responses, impaired detoxification and oxidative stress. It is based upon molecular medicine, nutritional biochemistry, preventive medicine and neuroscience.

Clinical applications

The aim of therapy is to modulate systems dysfunction, as applied for instance to allergies, digestive and bowel disorders, hormonal imbalances, fatigue, depression or anxiety, auto-immune conditions, migraine, skin complaints and degenerative disorders, including arthritis and cardiovascular disease. Parents with an overweight child, or a

child with learning or behavioural difficulties may seek to support their child with dietary or nutritional therapy. Nutritional therapy may be complementary to or alternative to mainstream medicine. In some cases, there is no mainstream treatment available, but nutritional treatment may be helpful.

Research & development

There are significant problems in researching the effects of diet and nutrients with multiple interactions and emergent properties. Historically, the science of nutrition was founded on the basis of discovering a specific nutrient required to avoid a specific major disease. Today, some of our understanding about the burden of chronic disease and its relationship to inadequate nutrition is based on observational studies of large groups of people, relating their diets to the diseases they later suffer. Chronic diseases, with their multifactorial basis and long latency period, challenge the methodology of a simplistic study design. It has been argued that the randomised controlled study (RCT) 'is poorly suited to the evaluation of nutritional effects' and that 'there are important differences between nutrients and drugs as applied to trials'¹⁶. For drug trials, a drug-free state can be compared with a drug-added state. With nutrients, this approach is not ethical.

A systems biology approach may be considered as appropriate for analysis of factors involved in chronic disease, which avoids a simplistic approach. The Foresight Project^{17,18} has used this approach to facilitate understanding of the broad range of factors affecting obesity and hence the need to avoid a simplistic view of its resolution.

Randomised controlled trials using individual nutrients, combinations of nutrients, or dietary instructions, are useful. Difficulties include choosing good quality forms of nutrients, understanding which nutrients act together (either in addition or producing an 'emergent' outcome) to achieve a desired outcome, how long the study should last, and what doses of nutrients should be used. Importantly the efficacy of different nutrient doses can vary for individuals with particular genotypes – and one person's safe upper level may possibly be below another's minimum requirement.

Comparative studies examining different food intakes and disease patterns in various countries may be useful. Animal studies can be helpful, provided that it is realised that human biochemistry may be different from that of the animals studied. Evidence should be obtained from a variety of different types of study. Most nutrients 'benefit' several tissue or organ systems, so that a single outcome measure (as in some RCTs) may not be appropriate.

Finally, an individual's disease status can also be associated with the benefits/disbenefits of nutrients. Thus folate/folic acid is considered beneficial for primary prevention of colon cancer, but may accelerate its development once established¹⁹.

The evidence: systematic reviews

Selected systematic reviews from the NHS Evidence - complementary and alternative medicine specialist collection can be viewed [here](#).

Safety

Nutritional supplements, while generally relatively safe, can be dangerous if 'safe doses' are exceeded, and in specific situations such as pregnancy. Some supplements, notably lipid soluble items such as vitamins A and D, can build up and cause undesirable consequences. For example, too much vitamin A can be teratogenic (harmful to unborn babies) and can cause very dry skin, short stature, and damage to liver cell membranes. Vitamin D in excessive amounts can cause calcification of soft tissue. However, individual variability makes allocation of 'safe doses' difficult, since the fate of the chemical within the body (toxicokinetics) and the toxicity of the chemical and its metabolites (toxicodynamics)²⁰ differ between individuals.

Variability in both toxicokinetics and toxicodynamics arises from aspects inherent to the individual, and other factors relating to individual physiology, diet and environment, which change over time. For example, liver disease can lead to low levels of retinol binding protein, increasing susceptibility to vitamin A toxicity. Oxidative stress, for example caused by smoking, may produce harmful products from beta carotene. Inherent characteristics include sex and genotype. Modulating factors include age, stage of development and functional maturation of organs and systems, co-exposure to other agents and compounds (e.g. nutrients or drugs), lifestyle, environmental factors, and disease. Recent scientific advances help to explain some variability in terms of genetic polymorphisms and post-genomic molecular biology.

For instance, natural dietary vitamin E is a complex of four tocopherols and four tocotrienols. Synthetic "vitamin E" is only one of the four tocopherols, and has a different isomeric molecular configuration to the 'natural' form. This may account for trials of synthetic "vitamin E" not achieving the benefit shown in dietary trials. Similarly, there are many carotenoids, with different characteristics. Beta-carotene is a precursor of vitamin A. In food it usually occurs with

other vitamin A precursors. Studies on synthetic beta carotene, which also has a different isometric form, cannot be expected to match the results of a diet rich in a variety of carotenoids. In order to interpret the results of studies in this field, it is important to confirm exactly which substance or product was administered to the participants.

Many participants in studies are taking drugs, and administering nutrients to them that are known to have adverse interactions with these drugs should be avoided. It is important to confirm that adverse drug-nutrient interactions are not wrongly reported as nutrient toxicity. For example, high dose vitamin C should not be administered to those taking oestrogen, as it competes with sulphate for conjugation. So a high dose of vitamin C will reduce conjugation of oestrogen, making it equivalent to a higher dose. A nutrient should not be given alone, when it is known that other nutrients are required for its activation. For example, vitamin B6 should not be administered without vitamins B1, B2, zinc and magnesium.

Regulation

Statutorily regulated medical and dental practitioners may choose to join the British Society for Ecological Medicine (BSEM), which provides some training in nutrition, as part of the process of becoming a registered ecological physician.

Nutritional therapy is not a statutorily regulated profession in the UK. There is no legal definition of who can call themselves a nutritional therapist. Anyone can call themselves a 'nutritional therapist' and there is no legal requirement to register.

Appropriately trained or qualified nutritional therapists can apply to join the voluntary register held by the Complementary and Natural Healthcare Council (CNHC).

National Occupational Standards for Nutritional Therapy were revised in 2009. There are a number of taught courses available at Diploma, Degree and Masters levels in the UK.

Professional bodies and organisations

- [British Association for Applied Nutrition and Nutritional Therapy \(BANT\)](#)
BANT represents the interests of nutritional therapy practitioners.
- [Nutritional Therapy Council \(NTC\)](#)
NTC was founded in 1999 to pave the way towards regulation of nutritional therapists.
- [Complementary and Natural Healthcare Council \(CNHC\)](#)
- [British Society for Ecological Medicine \(BSEM\)](#)
BSEM promotes the study and good practice of allergy, environmental and nutritional medicine for the benefit of the public, and supports doctors who use the insights of ecological medicine to help patients.

The roles and responsibilities of nutritional therapists are distinct from registered dietitians and nutritionists. These differences are described at <http://www.bant.org.uk/bant/jsp/nutritionTitles.faces>.

Other relevant information

Journals

- [Nutrition Practitioner](#)
- Other journals containing peer-reviewed, scientifically-based articles on diet and nutrition (e.g. American Journal of Clinical Nutrition, Lancet, British Journal of Nutrition, Journal of the Royal Society of Medicine, etc.)

Other information resources

- [Natural Medicines Comprehensive Database](#)
- [Natural Standard](#)

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