

GLOSSARY

adaptogen	Compound which damps the body's response to stress, making it less damaging to our health.
AGEs	Advanced glycosylation end-products. Produced by high temperature cooking, but are also formed in the body if we consume excess sugars and starches, and insufficient flavonoids. They trigger inflammation in our arteries, lungs and other tissues
amino acid	Basic building block from which proteins are assembled.
amino sugar	A molecule which combines a sugar with an amino acid, eg glucosamine. These are the basic building blocks from which hyaluronic acid and other micro-fibres in the extra-cellular matrix are assembled.
angiogenesis	The growth of new blood vessels, an important step in the development of diseases including cancer and arthritis.
angiostat	Compound which prevents the formation of new blood vessels (eg shark cartilage, genistein, certain flavonoids, troponin 1 blockers, thalidomide, etc).
anti-adhesin	A molecule which prevents bacteria and other pathogens from binding to docking sites on cells in the body. Can be either a sugar or a flavonoid.
anti-oxidant	A substance or an enzyme capable of neutralising free radicals, which could otherwise cause tissue damage in the body.
apoptosis	Cellular 'suicide'.
arteriosclerosis	Literally, hardening of the arteries. Generally includes atheroma, thickening and/or stiffening of the arterial walls, and some degree of calcification.
astaxanthin	A red carotenoid (responsible for the red in lobster shell and flamingoes' legs) which has relatively unexplored anti-oxidant and anti-cancer properties.
atheroma	The fatty material which deposits inside the lining of the arteries (if you eat the wrong diet and/or smoke) – which can culminate in a heart attack.
bacillus subtilis	One of three attested pro-biotic strains of bacteria, along with the lactobacilli and bifido-bacteria.
betaine/trimethyl glycine	The most efficient dietary source of vital methyl groups.
bifido-bacteria	Health-promoting bacteria, occur in throat, lower bowel and vagina where they form an important defence against infections.
bioavailability	The degree to which a compound can be absorbed into the body.

breakers	New drugs which 'break' cross-links. These are caused by excess sugar linking to protein molecules in the body, 'sticking' them together and impairing their function. This is an important part of the ageing process, so 'breakers' are as critical in anti-ageing as anti-oxidants. Many flavonoids are natural 'breakers'.
carcinogen	A substance which can cause cancer.
carotenoids	A group of compounds derived from foods which have anti-oxidant, immuno-stimulating, anti-cancer and other health-promoting properties. Typically coloured, varying from red (lycopene, astaxanthin) to yellow (lutein) and orange (alpha and beta carotene).
catechins	A group of flavonoids found in various plants, including green tea.
chelation	A process whereby trace minerals are bonded to other molecules (amino acids or sugars) which makes them more bioavailable.
cholesterol	A waxy fat which is a vital constituent of cell membranes. It is also present in the blood, and is the precursor for steroid hormones and bile acids; some of which are carcinogenic.
cholesterol oxidation products (COPs)	When cholesterol in the blood or in cell membranes is oxidised, it breaks down into cholesterol oxidation products. These are highly toxic, and are implicated in various diseases including coronary artery disease.
choline	A methyl group donor. Less effective than betaine.
co-enzyme/co-factor	An atom or molecule which is an essential aid to enzyme function.
collagen	A protein micro-fibre, one of the key components of the extra-cellular matrix. Gives tensile strength.
colloid/colloidal system	A solution in which very fine particles of a substance are suspended in a liquid, eg minerals in water. It is claimed these are better absorbed: there is little data to support this.
cosmeceutical	Cosmetic containing molecules which modify skin chemistry and physiology to produce genuine structural improvements (eg anti-ageing).
cross-linkage	See breakers and glycosylation .
cytokines	Messenger substances formed by cells for local (ie cell to cell) interactions. Involved in speeding or slowing inflammation.
deficiency	A serious state of malnutrition, where intake of a micro-nutrient is so low that characteristic symptoms of disease appear, typically within weeks or months.
deficiency disease	An illness with a consistent pattern of symptoms that appear soon after the intake of a micro-nutrient, such as Vitamin C, falls below critical levels.
depletion	A type of malnutrition where intakes of several micro-nutrients are sub-optimal; causing metabolic imbalances that, if left untended, surface many years later as a chronic degenerative disease.

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DHA/docosahexaenoic acid	One of the Omega 3 acids found in oily fish. It is cardio-protective and essential for the growing brain.
DHEA	A steroid hormone, made in the body from cholesterol. DHEA is linked to sustained health, and is used in various anti-ageing regimes.
electrolyte	Sodium, potassium and magnesium are examples of electrolytes, ie charged atoms which contribute to the density and pH of body fluids, the efficiency of enzyme function and the maintenance of electrical voltages over cell membranes.
elastin	A protein micro-fibre, one of the key components of the extra-cellular matrix. Gives elasticity.
enzyme	A protein molecule, made in the body, which catalyses specific chemical reactions.
enzyme inducers	Substances in the diet which stimulate the body to produce increased amounts of various (generally detoxifying) enzymes.
EPA/eicosapentaenoic acid	One of the Omega 3 fatty acids found in oily fish. It is cardio-protective.
extra-cellular matrix	The matrix of micro-fibres (collagen, elastin and amino-sugar polymers) that makes up our 'soft skeleton', and provides structure to all our soft tissues.
flavonoids	A group of compounds derived from foods which have anti-oxidant, anti-glycosylant, anti-inflammatory, anti-bacterial and anti-viral properties. Formerly known as Vitamin P, these are vital ingredients in our diet. Often coloured, they range from curcumin (yellow) to anthocyanins (typically red, blue and purple).
folate/folic acid	Folate is a B vitamin found in foods; folic acid is the synthetic form.
free radical	A highly reactive atom or molecule which, if unchecked, can damage cells in the body. This is thought to be a major cause of illnesses such as coronary artery disease, cancer, cataract and many other chronic degenerative diseases.
fructo-oligosaccharide (FOS)	A non-digestible oligosaccharide found in onions, leeks and garlic – a good prebiotic.
functional foods	Foods which either naturally contain ingredients with health benefits; or, increasingly, foods to which such ingredients have been added.
GAGs/glycosaminoglycans	Important structural molecules which form (among other things) part of the extra-cellular matrix. Built partly from amino sugars.
genistein	An isoflavone found in soy with many therapeutic indications, including heart disease, cancer, osteoporosis, menopause, etc.
GLA/gamma linoleic acid	Omega 6 fatty acid found in plant oils such as borage oil.
glucosamine	An amino sugar that is the basic building block for hyaluronic acid, and the amino sugar polymers in the extra-cellular matrix. Bypasses the rate-limiting enzyme glucosamine synthetase.

glutathione	A critical anti-oxidant compound inside your cells which is made in the body. Also involved in detoxification reactions and may be substituted by alpha lipoic acid.
glutathione peroxidase	A key anti-oxidant enzyme. It requires selenium to function.
glycemic index (GI)	The extent to which the carbohydrate elements in food increase blood sugar levels. Refined, and easily digested, carbohydrates have a high GI, while unrefined carbohydrates have, in general, a low GI. A high GI diet is linked to an increased risk of Type 2 diabetes.
glycemic load (GL)	The total amount of glucose delivered in an individual's diet.
glycosylation	The addition of sugar to other molecules in the body. May cause considerable tissue damage via cross-linking; or increase the risk of infection by providing more docking sites for bacteria. A major cause of ageing, but one which can be blocked by certain flavonoids.
HDL (high density lipoprotein) cholesterol	Cardio-protective form of blood cholesterol. Removes cholesterol from the tissues and deposits it in the liver, and takes phospholipids from the liver and distributes them in the tissues.
homocysteine	An amino acid formed in the body, toxic if there are insufficient methyl groups in the diet. Linked to coronary artery disease and Alzheimer's.
hormone	Messenger substances made in our glands for remote (ie organ to organ) interaction. Hormones include insulin, growth hormone, oestrogen, adrenalin, etc.
hyaluronic acid	A polymer of glucosamine found in the synovial fluid in joints. Provides some cushioning and lubrication.
hypertension	Excessive blood pressure. Risk factor for heart attacks and strokes.
immune system	Complex system of cells and cell messengers which defend us against infection and cancers. May deteriorate with age, and does deteriorate in multiple micro-nutrient depletion.
insulin	A hormone made by the pancreas, needed to transport glucose into cells.
inulin	A non-digestible oligosaccharide found in Jerusalem artichokes and other plants – a pre-biotic.
isoflavones	Flavonoids with hormonal properties found in soy beans and other plants – see genistein .
LDL (low density lipoprotein) cholesterol	In excess, and if unprotected by anti-oxidants, a risk factor for coronary artery disease. Essential for taking fat-soluble micro-nutrients such as Vitamin E and Q10 from the liver to the tissues.
lectin	A glycoprotein with a tightly packed structure, generally found in plant foods. Many lectins are resistant to digestion, and are biologically active, ie they block protease, or trigger cell division. Some are toxic; others are potentially important nutraceuticals.

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lipid oxidation products (LOPs)	When lipids in the blood or in cell membranes are oxidised, they form lipid oxidation products. These are highly toxic, and implicated in various diseases including coronary artery disease. See cholesterol oxidation products .
lipofuscin	The brown pigment in age or 'liver spots', formed when lipids in the body are oxidised. Large numbers of age spots indicate that your anti-oxidant defences are inadequate, and your cells are ageing.
lipoic acid	Like Q10, this is a co-factor in oxidative phosphorylation and an anti-oxidant. Interacts very positively with Vitamin E.
lutein	Carotenoid derived commercially from marigold and chrysanthemum petals. Occurs also in kale and spinach. Protects against macular degeneration of the eye, and probably cardio-protective also.
lycopene	A carotenoid derived from tomatoes. Anti-cancer agent, and powerful cardio-protectant.
matrix metallo-proteases (MMPs)	A group of up to 20 enzymes which between them dissolve all the elements in the extra-cellular matrix. Produced by cancer cells, so-called 'flesh-eating' bacteria, and cells whose membranes have been damaged by oxidation.
metabolism	The complex chemistry, consisting of many thousands of reactions, that is the basis of life – and all our bodily functions.
methyl group	A simple group of atoms (1 carbon and 3 hydrogen atoms) which cannot be synthesised in the body, and must be obtained from the diet. Essential for DNA replication, detoxification mechanisms, stress responses and many other metabolic functions.
micro-nutrient	Compounds derived from the diet, typically in milligram or microgram amounts, which are essential for normal growth and for maintaining health. Classically, only vitamins and trace minerals fall into this group; but flavonoids, carotenoids and certain other groups of molecules also qualify.
mineral	A chemical element such as calcium or magnesium. If you need less than 100mg/day, it is termed a trace element; such as iron, copper, zinc and selenium.
mitochondria	Tiny bean-shaped structures in the cells where energy from the food you eat is transferred to the cell by a process called oxidative phosphorylation. This is a slow form of burning; carbon is burned in oxygen to produce carbon dioxide, water and heat.
mono-unsaturates	Mono-unsaturated fatty acids (MUFAs) contain a single double bond, and are liquid at room temperatures (eg olive, peanut oils)
multiple micro-nutrient depletion	A form of malnutrition prevalent in the West, where the diet is low in many or most micro-nutrients. Increases the risk of many diseases.

natto	A Japanese dish of fermented soy beans and a rich source of Vitamin K2 – an acquired taste!
neurotransmitter	Chemicals made in the body which transfer information between nerve cells. These include acetyl choline, serotonin, dopamine and noradrenaline.
non-digestible oligosaccharide	A type of carbohydrate which is not digested in the small bowel, so passes intact into the large bowel where it stimulates the growth of healthy bacteria. A pre-biotic.
nutraceutical	Extracts from foods, presented as pills or tablets, which have health benefits.
nutrient	Compounds derived from the diet, typically expressed in gram amounts, which are essential for normal growth and health. Proteins, fats and carbohydrates fall into this group; more recent work indicates that certain fibre types also qualify.
oestrogen	A female sex hormone made in the ovaries and uterus.
OPs/organo-phosphates	New pesticides which have replaced the organo-chlorine poisons such as DDT. Implicated in many disease states.
OPCs/oligomeric proanthocyanidins	Flavonoids, found in red wine, grapeseed, pine bark and other plant sources, with many therapeutic indications.
osteoid	A soft matrix consisting of protein and other microfibrils, laid down by the bone-building cells. K vitamins are essential to trigger the subsequent mineralisation, which forms bone.
osteoporosis	Thinning of the bones leading to increased risk of fracture. Nutritional factors are very important.
oxidation	The biological equivalent of rusting, which occurs when free radicals attack the body.
PCBs/poly-chlorinated biphenyls	Industrial chemicals used, among other things, as coolants. Implicated in various disease states.
PGs/proteoglycans	Important structural molecules which form (among other things) part of the extra-cellular matrix. Built partly from amino sugars.
phosphatidyl choline	A phospholipid which forms the bulk of cell membranes, and is fairly unreactive. Some is broken down to form the neurotransmitter acetyl choline.
phosphatidyl serine	A phospholipid which anchors proteins such as ion pumps into cell membranes. Some may be transformed into phosphatidyl choline.
phospholipids	Molecules which contain fatty acids, and are the building blocks of cell membranes and HDL cholesterol particles. Derived from food or made in the liver.
phytochemical	Compounds derived from plants.

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phytoestrogen	Substance derived from plants that mimics oestrogen. One example is genistein, from soy.
phytonutrient	Compounds derived from plants, generally food plants, which have been shown to be important for health, such as the carotenoids and flavonoids.
poly-unsaturate	Poly-unsaturated fatty acids (PUFAs) contain more than one double bond, and are liquid at room temperature (eg sunflower, safflower oils).
pre-biotic	A dietary substance which stimulates the growth of bifidobacteria and other healthy bacteria in the gut. Non-digestible oligosaccharides and resistant starches do this. More effective than ...
pro-biotic	Healthy bacteria, consumed either in fermented milk products or as supplements. Less effective at changing gut bacterial populations, but useful in treating certain types of diarrhoea, as well as colitis and pouchitis.
progesterone	Female sex hormone, made in the ovaries by the corpora lutea.
prostaglandins	Messenger substances made in the body from fatty acids. May be pro- or anti-inflammatory, depending on the type of fats and oils in the diet.
protease	Enzyme produced by damaged cells, and cancer cells. Activates the destructive matrix metallo-protease enzymes.
Q10	The rate-limiting co-factor in oxidative phosphorylation, an anti-oxidant, and a mitochondrial protector.
quercitin	A flavonoid found in onions and apples. Probably the quantitatively most important flavonoid in the Western diet.
resistant starch	When starches have been cooked and cooled several times (ie in food processing), they become resistant to digestion and may function as pre-biotics.
saturated fatty acids	Saturated fatty acids (SAFAs) contain no double bonds. They are solid at room temperature, and are mostly derived from meat and dairy foods.
SOD/super oxide dismutase	One of the key antioxidant enzymes. Requires zinc and copper to function.
sterols/sterolins	Important dietary compounds with profound anti-inflammatory effects. Currently considered as micro-nutrients, but in line for vitamin status.
tocopherols	A group of important fat-soluble anti-oxidants, derived from plant foods. One of these is D-alpha tocopherol which is commonly used in supplements, but gamma tocopherol is as or more important. Mixed tocopherols offer the best protection.
trans-fats	Generally plant oils which have been modified for food processing. The process alters the molecular structure, producing a fat which is considered to be cardiotoxic.

type A malnutrition	The classical type of vitamin or mineral deficiency where the lack is so acute as to cause symptoms within a period of months. Examples are scurvy, beri-beri and pellagra. This form of malnutrition is rare in the developed world.
type B malnutrition	Multiple micro-nutrient depletion, leading to metabolic imbalance and catabolic dominance, which in turn drive the chronic degenerative diseases. This form of malnutrition is prevalent in the developed nations.
vitamin	One of the classically defined types of micro-nutrient. Essential for normal growth and the maintenance of health.
zeaxanthin	A carotenoid involved in protecting the eyes from oxidative damage. Found in green, leafy vegetables.

