Nano mineral iron and gut protection

Integrated Doctor and Clinical Nutritionist, Dr Zouë Lloyd-Wright, explains the fundamentals of iron, and the protective effect it offers to the gut.

Iron is the core of every solid object in the Universe, and it is also particularly vital for most life forms, from bacteria to mammals. Iron is an essential component of hundreds of proteins and enzymes supporting essential biological functions, such as oxygen transport, energy production, DNA synthesis and cell growth and replication.

Oral administration of iron is essentially the most effective treatment to decrease iron deficiency in human beings. Unpleasant side effects are correlated to the source of iron supplementation and factors such as duration of Iron Deficiency Anaemia (IDA) in developing countries associated and connected to malnutrition and infection compared to western countries. The pathophysiology of IDA is predominately found in blood loss such as peptic ulcer, certain intestinal cancers, lymphoma, inflammatory bowel diseases, and heavy menstrual bleeding, malabsorption and chronic diseases such as autoimmune disorders, Crohn's disease, rheumatoid arthritis, kidney disease and ulcerative colitis.

Gut dysbiosis

The life sustaining homeostatic balance of iron levels and microbiome is multifaceted, involving two very significant concepts: iron-mediated host-mediated interaction in the gut; and bi-directional information exchange, between iron homeostasis and the mucosal immune system primed by gut microbiota.

Both deficiency and excess of iron levels are important in terms of gut microbiota dysbiosis, and the appearance and development of inflammation such as colorectal cancer. Excessive amounts of unabsorbed iron leave undesirable side effects at the highly interactive host-microbe interface of the human gastrointestinal tract. It could be said that host-microbiota interactions influence microbial/viral growth and ratios, acting on the host immune system, and enhancing a range of biochemical processes critical to sustain life.

Furthermore, these fluctuations can have pathological effects, negatively influencing the intestinal microbiota composition, increasing specific bacteria that mediate the development of intestinal pathologies such as *Streptococcus bovis, Enterococcus faecalis*, and *Clostridia*. They release hydrogen sulphide and secondary biliary salts, which accelerate inflammation and carcinogenesis. Highlighting the dynamic modulation of intestinal microbiota by iron fortification and supplementation on the gut microbiome, and the essential preservation of probiotics, prebiotics, and/or synbiotics (combining probiotics and prebiotics in the form of synergism) in iron absorption and the availability for the organism is crucial.

The above shows that a critical solution is necessary, and there are fundamental advantages to sources of iron supplementation that bypass the gut. Two such viable sources are nano mineral iron (NMI), which is an elemental iron in structured water that potentially has beneficial application in one key global health priority – the prevention and treatment of IDA, without inducing redox cycling in the gastrointestinal tract and third generation intravenous (IV) iron therapies. These are strongly-bound iron-carbohydrate complexes existing as colloidal suspensions of iron oxide nanoparticles with a polynuclear Fe(III)-oxyhydroxide/oxide core surrounded by a carbohydrate ligand. The IV has been proven to be safe but not without side effects and impracticalities. NMI is a pure, elemental, bioavailable form of iron and therefore is not subject to the primary absorption routes, which are performed through the enterocyte cells on duodenum and upper jejunum of the small intestine.

Although many studies are available on iron (more than any other trace mineral), it is still the number one deficiency in the world and many unresolved questions and problems remain.

One of the main limiting factors in the treatment of IDA is the gastrointestinal adverse side effects of soluble iron supplements. With over one billion people being severely affected by IDA, it remains the most prevalent nutritional deficiency disorder in the world, with increased morbidity and reduced cognitive development. For over 30 years, the World Health Organization (WHO) has considered IDA as one of the top five serious targeted global health problems.

People do not always realise that they are iron deficient, but this should not be ignored, as a lack of iron or inadequate levels of iron can lead to long-term health problems. The first step in addressing iron deficiency is to consume a varied diet which contains plenty of iron-rich foods such as dark leafy vegetables (kale, spinach, dandelion), legumes (lentils, peas, tofu, kidney beans, cannellini beans), fruits (dates, prunes and figs), protein sources (meat, poultry and fish), as well as blackstrap molasses, hemp seeds and, of course, iron-fortified foods. Important to note that foods containing phytates (for example, cereals and grains) and polyphenols (for example, tea and coffee) may decrease iron absorption by 33-50 per cent. ▶

Fundamentals of iron

There are two types of iron: heme-iron (derived from haemoglobin and myoglobin of animal food sources) called ferrous-iron (Fe2+); and non-heme iron (derived from plants and iron-fortified foods) called ferric iron (Fe3+).

Ferrous iron is absorbed much better than ferric iron and therefore we mostly consume ferrous iron, as this is more commonly used due to its bioavailability and can be an effective supplement if taken in smaller quantities. However, if someone is anaemic or urgently requires iron in larger concentrations, ferrous iron supplements will affect gut health adversely, and you will start experiencing a range of unpleasant side effects such as stomach cramps, nausea, dizziness, disturbed intestinal flora, constipation, dark stools and a metallic taste in the mouth. Iron is absorbed best on an empty stomach.

Ferrous iron also produces free radicals in your intestines, which will impact your gut microflora, wherein the small intestinal bacterial overgrowth (SIBO) tends to prosper, lowering the gut microbiota, gut microbiome, or gut flora, which alters your intestinal balance. All of these lead to a range of side effects, especially bloating, and at the extreme, you may even start experiencing blood in your faeces. Elemental iron such as NMI is not bound to any other substances and therefore will not have any of the adverse effects of bonded iron compounds, as described above. Ferrous iron works synergistically with vitamin C and to a lesser extent, vitamins A, D, B2, B12, folic acid and magnesium.

Many of my patients would question why a health professional cannot come up with an iron supplement that is pleasant, with no unnecessary side effects. NMI can address iron deficiency in a perfectly pleasant and gentle way, solving the worldwide problem with IDA.

There are two amounts usually listed on the label of iron supplementation, the larger number is the chemical compound form, because iron is bound to salts (for example, ferrous sulphate) and where there is a smaller number, this refers only to the amount of iron in the compound, also called the elemental iron. Elemental iron (those with a lower number) is the most important number, because this is the amount available for the body to absorb, but it must be liberated from the iron compound in the body. It is important to mention that iron compound supplements, including tablets, capsules, powders and liquids on the market, can also contain fillers, residues, additives, excipients and adulterants.

Most liquid iron supplements contain ferrous gluconate, and are only 12 per cent elemental iron, which does not fare much better for iron supplements, which contain between 12-15 per cent elemental iron, in a compounded form. The liberation or release of the iron from the iron compound supplement occurs in the entire gastrointestinal tract, especially the upper, which contains the stomach. In healthy individuals, there is usually 10-15 per cent absorption and those with IDA, the body can absorb up to 50 per cent. This is extremely important when a healthcare professional prescribes an iron supplement or a specific dose of iron.

Generally, all types of iron supplements help to increase red blood cell production but will vary in cost and amounts of elemental iron. Iron nano particles (FeNP) with a spherical shape and average size of 40nm, revealed a remarkable anti-anaemic activity, in a dose 10 times lower than the generally accepted therapeutic dose and an even greater outcome of the FeNP study was the high biological safety and low toxicity in vitro, favourable effects on the gastrointestinal tract and the complete absence of side effects such as constipation and intestinal dysbacteriosis. The authors concluded this is the future to a new class of anti-anaemic preparations and the worldwide implications are life changing for individuals and many nations.

All the above can be alleviated and resolved by using NMI, which is entirely elemental iron and therefore not bonded to anything. NMI contains the smallest possible particles between 0.5-7nm, in the purest elemental form, which is dissolved in purified water. It completely bypasses the gut and is absorbed as whole nanoparticles directly into the cells via the soft tissue in the mouth (oral mucosa). Unlike many conventional iron supplements, NMI does not require solubilisation in the stomach prior to its uptake.

Nano mineral iron solution is providing an economic, safe and effective oral iron to combat the world's commonest nutrient deficiency, namely iron deficiency anaemia.

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THE HEALTH FACTORY

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No gut
compromise.

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in highly purified and energised
water, and nothing else.