Mineral Requirements and Why They May Vary
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I am often asked, “how much carbs should a man eat each day?” or, “how much magnesium should a women take?” Of course, without knowing their lean mass, daily energy expenditure, aims, medical history and without the chance to become familiar with their own biochemical individuality, family patterns, digestive function and stress patterns, it is impossible to give a specific recommendation. In all cases, magnesium, zinc and iodine are the first minerals that I would focus on (as these are the minerals most likely to be deficient), but exact requirements for macro- and micro-minerals do vary.

Microminerals are metals required in small amounts by the body to function optimally. They include iodine, zinc, selenium, amongst others, and are contained in varying proportions in all the food we eat and have optimal levels within the body; however, these minerals (some of which are toxic) often become excessive or deficient in patients. Macrominerals (sometimes called electrolytes) are metals required in larger amounts by the body and are magnesium, calcium, potassium, sodium, chlorine and phosphorus. Both types of minerals are vital for optimal health. Both can become imbalanced in an individual, even if they eat an identical diet to those around them.

Whilst one does not need to travel far to hear the cliché ‘you are what you eat’, a more accurate phrase would be that we are what we absorb. Every cell in our body is made up of essential nutrients that come through our diet so the absorption of these in the gastro-intestinal tract is clearly vital. This absorption process can become disturbed in many ways at a various stages of the digestive system.

While some minerals (eg zinc) can be absorbed in the mouth, but, most absorption of minerals occurs in the intenstines and thus appropriate consideration must be given to this organ. Issues with absorption can be caused by more systemic problems, for example when the body’s feedback systems - which promote increased absorption of a mineral to maintain homeostasis – begin to fail in bad health. However, this could also be dysfunction of the intestines themselves; for example, damaged or badly-functioning cilia will leave the body unable to absorb the full spectrum of nutrients required for optimal health. Like so many organs in the body, the dietary intake has a specific effect on the health and function of the intestinal cells (eg. insufficient essential oils, vitamins and minerals, excessive saturated fats and sugars can have a negative impact on the composition and therefore the operation of the organ).

Moreover, even with optimal intestinal construction, optimal absorption of minerals will only occur properly without interruption. This is not possible if stress levels are excessive (as this activates the fight-or-flight response, increasing blood flow to the limbs in preference over the gut) or if there is insufficient fibre to aid peristalsis. In both of these situations, the

balance within the intestines will become unfavourable and can result in a an excess of putrefactive bacteria and thus the proliferation of other toxins. This can lead onto diarrhoea, a condition that leaves the duodenum and jejenum with little opportunity to absorb any minerals whatsoever and, whilst electrolyte imbalance is often emphasised after states of diarrhoea, attention should also be paid to the status of trace minerals. If your body has a mineral imbalance, good digestion is an essential aspect of correcting the situation.

However, even without these intrinsic problems affecting the absorption of minerals, there are still other angles that should be considered. Binding agents will cause binding to minerals in foods, leaving them unable to cross the intestinal barrier and therefore the level of dietary intake of a mineral will not relate to the availability at cell level. An example of this is phytic acid, found in a variety of difference foods such as beans, nuts, and grains; this is especially true of wheat. It acts as an anti-nutrient by binding both macro- and micro-minerals in the intestines, and can be responsible for nutrient deficiencies when intake of wheat and other grains is high. Oxylic acid, found in high concentrations in coffee, can illicit similar binding effects in the GI tract.

Thankfully, there are other substances that can enhance dietary absorption. These ligands, such as certain amino acids, bond to the mineral in question, assisting its passage through the intestinal lining. This is another reason for including sufficient protein in the diet, and also to ensure that the stomach digests and breaks down protein adequately before it arrives at the intestines. This principle is the driving force behind the production of chelated mineral supplements, created through the Albion process.

It therefore figures that, combined with a marginal dietary intake of minerals (especially magnesium and zinc), the excessive coffee and wheat consumption seen so regularly in the West has severe effects on the body generally. Zinc is a component of more than 80 different enzymes in multiple systems and Magnesium 300; as a result, compromising the absorption of these key mineral will have an impact on the function of neurotransmitters, the immune system, hormonal balance, detoxification and, significantly, the digestive system. Other minerals have similar widespread effects when their own absorption is disturbed.

Listed above are just a couple of reasons why the poor absorption can occur in the intestines when minerals are present. However, these factors will become irrelevant when the minerals in question are simply not present. At the crux of this issue is the dietary choices made by the individual, which can result in excessive levels of some minerals and deficiency in others. This can be caused by lack of variety in the diet, as certain foods/herbs have a tendency to accumulate high levels of particular nutrients. Whilst this can often cause an excess of particular microminerals in the body when particular foods are over-consumed, it more often leads to issues of deficiency when these foods are not included in the diet. A good example of this in action is the lack of heme-iron consumed by vegetarians who obviously do not eat enough good sources of this key mineral, such as beef.

However, this can be a more widespread concern even across populations who do not have specific diets. I regularly see clients who eat the same foods repetitively and, however healthy the individual foods are, this can easily lead to imbalances of minerals

when the intake is not selected with balance in mind. For example, brazil nuts contain around 1.9mg of selenium per 100g of food and so represent an excellent source of this key micromineral, which supports thyroid function and formation of anti-oxidants. However, if brazil nuts were to be eaten in large quantities (such as 300g per day – 10 handfuls), the selenium levels ingested would dwarf the recommended limit of 0.4mg per day. And whilst brazil nuts deliver selenium in good amounts, a diet based around this food would likely leave an individual short in other key microminerals, like chromium and iodine. Whilst it may sound like common sense, an inclusive diet that is made up of a variety of vegetables, fruit, nuts and seeds, meat, fish, eggs and some whole grains appears to be a good starting point in avoiding any imbalance of microminerals within the body.

This basic step should give the body the opportunity required to correct any imbalances before they become acute, although there are other complexities that should be considered. Ingesting sufficient levels of minerals for a well-functioning gut to absorb will not necessarily guarantee sufficient levels being absorbed. As touched on above, there are certain ligands that act as ‘carriers’ across the intestinal wall, and these substances serve to show the importance of the carrier system in absorbing minerals. Some minerals share the same carrier (or carrier site) as other minerals, which leaves them open to competition for absorption. It is with this in mind that one must consider when to consume minerals if optimum absorption is the aim.

Calcium, Magnesium and Zinc are all well-known competitors for absorption in the intestines and are certainly not alone. If delivering enough of a particular mineral is the primary concern, then this mineral/mineral antagonism is clearly an obstacle in restoring a healthy balance. However, it should be pointed out that this antagonism does help to control the absorption of the toxic minerals, such as Mercury, so it not a purely negative mechanism in regards to the health of the body. This complex chain of interaction can be seen in many different formats, but typically one might expect a low level of copper to fail in its suppression with Mercury, which will suppress absorption of Selenium, low levels of which allow easier passage for Cadmium, which blocks absorption of Zinc. This cycle will be destined to continue further when Zinc’s interactions with Mercury, Lead, Copper, Cadmium, Selenium, Calcium and Magnesium are considered. In any case, it is essential to be aware not only of what foods have accumulated high amounts of particular nutrients, but at what times they are being consumed and allowing sufficient time between intake of competing minerals.

In optimal health, the feedback mechanisms in place tend to operate a preferential absorption process which will help maintain homeostasis; however, in ill health, this system is often is disarray so knowledge of mineral/mineral antagonism is crucial.

There are clearly several angles to consider in ensuring that the body maintains ‘normal’ levels of nutrients. However, consideration must be given to what constitutes normal levels and the varying requirements between individuals. This biochemical individuality can occur for a variety of reasons (although often stress and athletic pursuits increase the demand for nutrients) but one that cannot be ignored is constitutionally weaker organs within some individuals. These organs will, in the struggle to maintain a normal output/function, overconsume nutrients, meaning an increased intake is required to avoid running short of this nutrient. A perfect example of this is the requirements for Chromium in patients who suffer from hypoglycaemia. Although other minerals are useful in these situations, the

chromium helps uprate the potency on insulin secreted, alleviating symptoms by making over-secretion less likely.

Sometimes it does not require overactivity or over-use of a nutrient at an organ to increase intake requirements. In cases of constitutional weakness, there may well be an in-built resistance of certain tissues to the take-up of minerals and other important nutrients – this would mean that a higher level in circulation would be necessary for favourable function, assuming there are no restrictions in intestinal absorption. To a certain extent, two different people will always exhibit different levels of absorption a) from the gut and b) from the bloodstream into the cells. This concept explains why some individuals respond well to higher levels of minerals (either through food or supplementation) and why finding a 'standard' supplementary dose of a nutrient remains a fruitless quest.

Just like muscle fascia is formed differently in some individuals, so are the tissues of their organs and this has a significant impact on the uptake and assimilation of each mineral. Whilst I feel that environmental factors will always be the prime factor in the different nutrient requirements between individuals, this genetic disparity should not be ignored in evaluating clients needs.

Clearly there are numerous factors involved that can disrupt delivery of minerals to the cell. The fluid balance of the body is extremely relevant in this sense and that, ironically, is controlled by the levels of two macrominerals, sodium and potassium. Both of these cations (positively charged ions) regulate water and fluid balance; sodium holds extra-cellular fluid (water outside the cells) potassium holds intra-cellular fluid (water inside the cells). When the levels of sodium are low, overall hydration and ability to hold onto water will be compromised – this will reduce the pool of fluid from which cells draw their fluid and nutrient supply from so this can reduce the cellular uptake microminerals. Potassium is massively important in controlling the micromineral content of cells as, through the process of osmosis, potassium entering cells draws with it the extracellular fluid (and the nutrients it contains).

Suitable sodium:potassium balance is dependant on the operation of the kidneys in removing whichever element is unneeded to maintain the most beneficial ratio. However, the kidneys are also responsive to adrenal hormones like aldosterone (which retains sodium). Of course, appropriate function of the adrenal glands is, like other organs, dependent on a good supply of fluids and minerals themselves. Like most other body systems, the task of finding perfect balance is complex and dependant on multiple factors.

A simple starting point is to eat a diet that contains vegetables in high quantities, especially the cruciferous types such as broccoli and spinach, together with a full-spectrum multivitamin/mineral complex. The additional of magnesium (200mg/day) and zinc (15mg) and iodine (2 drops Lugols solution) should form a strong base of mineral intake in many cases although, as mentioned in the first paragraph, there are numerous factors that could make this level of intake insufficient.

The level of interaction of individual organs, general fluid balance and the counter-dependence of different bodily systems shows perfectly the array of factors in maintaining mineral balance. It is impossible to maintain optimal levels of these nutrients without an appropriate intake that is absorbed, transported and assimilated well and all factors that

affect this should be properly considered.

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