



Supplements: why quality matters

The quality of supplements in the marketplace is more disparate than ever. **Simone do Carmo** looks at three companies, each sharing their values and viewpoints behind the standard of their supplements.

I always take a food-first approach in my practice. However, this doesn't mean that there isn't a place for supplements. While they shouldn't be handed out like Smarties, supplements can complement our athletic clients' diets and benefit both their health and performance.

The supplement world is a minefield, and it can be difficult to distinguish between different companies' products in terms of overall quality. Supplement quality is on a spectrum, with companies at one extreme concentrating on safety, sourcing of ingredients and the efficacy of their products, and companies at the other extreme simply fixating on their profit margins. Even though they usually claim high-quality levels, this claim may not be true.

I recently had the opportunity to interact with three supplement companies who shared their values and viewpoints behind the quality of their products.

Nucleotides

Dr Peter Koeppel, who has collaborated with the company Nucleotide Nutrition since its inception and is regarded as the Swiss pioneer for nucleotide supplementation, shared his viewpoints on the importance of nucleotide supplementation: "There are certain situations in which the quality of a supplement, in terms of nutrient availability, has greater importance, and this is when the body becomes overwhelmed by severe stress, illness or injury. During these times, certain nutrients become conditionally

essential. Under 'normal' circumstances, many of these nutrients can be produced in the body by de novo or salvage pathways. However, when these high challenging situations prevail, the body starts to have trouble creating enough of these nutrients. In such cases, these nutrients enter essential territory – hence, the term 'conditionally essential', and dietary sources become of paramount importance. This is where supplements that provide purified forms of these conditionally essential nutrients prove to be particularly effective versus provision by either more crude forms or indeed via food sources. Since these types of nutrients are particularly required during 'stressful' situations for rapid effectiveness, they are best supplemented in a purified form that is readily taken up by the body."

The seven non-essential amino acids that sometimes become conditionally essential – arginine, cysteine, glutamine, glycine, proline, serine and tyrosine – provide a good example of these nutrients.

Dr Koeppel explained that nucleotides are another group of nutrients recognised as conditionally essential (1, 2, 3): "Nucleotides are most familiar as the building blocks of DNA, which holds the genetic code, and RNA, which is responsible for translating information from the genetic code to producing proteins in 'ribosomal protein factories'. A balanced pool of five different nucleotides, pyrimidine and purine types, is required to build these genetic molecules. Every new cell requires nucleotides. Indeed, over a

billion nucleotides are required to build one DNA helix. It is the cells where there is a relentless demand for rapid proliferation that require additional sources of nucleotides from dietary means to enable optimal function (4). Immune cells, gut lining cells and gut flora are especially reliant on the availability of dietary nucleotides. The trouble is the foods we tend to eat nowadays are not only low in nucleotide content, but also lack pyrimidine nucleotides in particular. Plus, nucleotides in food and crude RNA sources, are well protected, leading to only a 5 to 15 per cent uptake, as shown in Figure 1. Purified nucleotides, by contrast, are freely available and have a superior uptake of 80-90 per cent in the gut (5)."

Dr Koeppel went on to explain that a positive spin-off from delivering nucleotides in a purified and balanced way through supplementation is increased absorption, which is achieved by the consequential improvement in gut morphology. Increasing the gut nucleotide pools leads to improved villi repair and maintenance processes, and higher levels of bifidobacteria. Not only is the absorption of nutrients supplied via food improved, so are those delivered via other supplements containing other conditionally essential nutrients, such as the amino acids mentioned earlier.

I was also fortunate to receive input from Rachel Hoyle, the CEO of Nucleotide Nutrition, regarding the safety of the company's supplements. She said: "All Nucleotide Nutrition's product formulas contain the Nutri-tide® nucleotide nutritional formula, which combines



purified forms of the five main nucleotides (pyrimidines and purines) in a balanced way to address dietary deficiencies. To ensure safety, all batches of the product premixes are sent to an independent laboratory for toxicological testing before they are released for onward packing.”

I also asked Rachel about Nucleotide Nutrition’s products and what testing or certification the company had in place for athletes subject to drug-testing. She said: “To address the additional requirements of the professional athlete, the supplement that has been formulated specifically for sportsmen and women, nnnSPORT®X-Cell, is covered by the Informed-Sport registration testing scheme. This ensures that the supplement is free from contaminants, giving additional peace of mind. Additionally, all the supplements have been tested in a range of clinical studies. No adverse effects were reported in any of these clinical trials (6, 7, 8, 9, 10).”

Free-from supplements

It’s easy to observe the impact of consumer demand for organic and ‘free-from’ products when we shop in our local supermarket, with greater awareness of sustainability, transparency and overall health. As a result, we’ve been witnessing a shift in the supplement market, with

companies also responding to this consumer demand.

Food allergies and sensitivities are also on the rise, which creates demand for supplements that individuals can tolerate while meeting their needs. Benjamin Brown, Director of Clinical Education for Pure Encapsulations, told me that while food additives get a lot of attention, food supplements have been overlooked. He shared interesting statistics that support the need for free-from supplements. For example, 1 to 10 per cent of adults in the UK have a hypersensitivity to foods and up to 20 per cent experience some adverse reactions. Food intolerances are estimated to affect 220 to 550 million people worldwide. From a consumer-demand perspective, free-from foods are perceived as more natural by 84 per cent of free-from consumers and 43 per cent of consumers agree that free-from foods are healthier.

To support individuals with food allergies and sensitivities, and meet the demand for products that do not contain unnecessary additives, Pure Encapsulations is known for offering the largest selection of hypoallergenic food supplements, free from wheat and gluten, egg, peanuts, trans fats and hydrogenated oils, GMOs, magnesium stearate, titanium dioxide, carrageenan, coatings

and shellacs, artificial colours, flavours and sweeteners, unnecessary binders, fillers and preservatives.

I asked Benjamin what defines quality for Pure Encapsulations. He said: “In general, food supplements are good quality if they are following industry standards, but Pure Encapsulations goes further than many brands to ensure confidence in what are often important prescriptions from health professionals. Two things define quality for the company: quality assurance and testing, and free-from food supplements.”

Benjamin explained that the company has a quality assurance programme that includes label transparency and rigorous ingredient sourcing. It uses third-party laboratories to verify the potency and purity of all raw materials and finished products, including ingredient identity, 30 solvent residues, 70 pesticide residues, and toxic metals. Its essential fatty acids and fish oils are also tested for oxidants, 17 dioxins and furans, 12 dioxin-like polychlorinated biphenyls (PCBs), and 7 PCBs. Pure Encapsulations is also certified gluten-free by The Gluten-Free Certification Organisation (GFCO), so a gluten-free statement means that the finished product has undergone testing to ensure it is actually

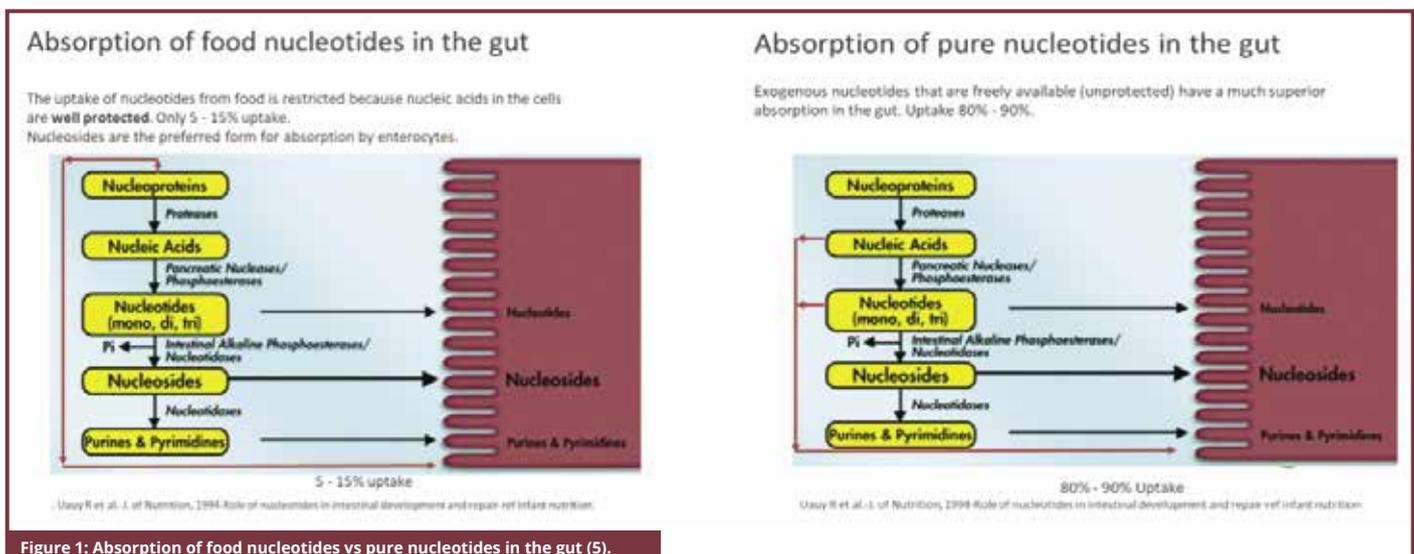


Figure 1: Absorption of food nucleotides vs pure nucleotides in the gut (5).

▶ gluten-free.

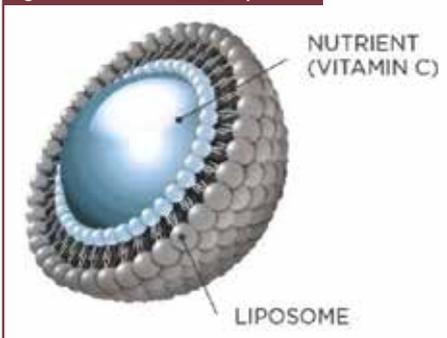
I also enquired about the research behind the company's supplements. Benjamin said: "Pure Encapsulations is also well-known for being evidence-based. The formulations provide nutrients at levels consistent with clinical research, that makes the range easy to navigate for people practicing nutritional medicine. Health professionals tend to be led by evidence-based doses and not formulations that provide ingredients more for marketing than efficacy. Over 30 clinical studies have involved Pure Encapsulations' finished products, most of which were independently led by researchers and universities that chose to use these products in their studies due to their predicted efficacy, purity and quality."

Liposomal vitamin C

A major issue with many supplements on the market is the lack of information about their ability to withstand digestive juices and their absorption rates. No matter how cutting-edge a supplement is, their efficacy may be limited by its rate of absorption.

I spoke to Szilvi Orchard, Head of Trade and Sales for Abundance and Health, about their Altrient liposomal vitamin C. Liposomal encapsulation technology is an innovative method of making liposomes, small artificial lipid vesicles that are spherical in shape. Similar to our cell membranes, liposomes are made from phospholipids with a hydrophilic head and a hydrophobic tail, which arrange themselves into a bilayer wall that surrounds a hollow sphere. As this bilayer wall is amphiphilic, it can incorporate and release both water-soluble and fat-soluble therapeutic agents, while offering a protective layer. The therapeutic agents are delivered when this bilayer wall fuses with another bilayer, such as our cell membranes. This type of technology provides protection from digestive juices and oxidation, enhances intracellular nutrient uptake, and slows down nutrient release. One of the adverse effects of high-dose vitamin C supplementation, in particular, is diarrhoea and gastric upset because excess vitamin C remains in the gut and attracts water from

Figure 2 – Cross-section of a liposome.



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intestinal contents. By wrapping vitamin C up into a liposome, it is gentler on the gastrointestinal tracts because it bypasses the digestive restrictions normally encountered by traditional supplements, targeting cells more effectively.

The liposomes used in Altrient products are made from phospholipids that include a high amount of phosphatidylcholine. This not only ensures protection and enhanced transport, but also contributes towards the body's needs for phosphatidylcholine, omega-6 fatty acids and choline.

Szilvi shared a key study that backed up the maximal absorption rates of their Altrient liposomal vitamin C product (11). Results revealed that the body retains vitamin C from the liposomal form longer than the traditional powdered form. A faster uptake of liposomal vitamin C by the white blood cells was also observed, and when comparing the Area Under the Curve (AUC) data for both vitamin C forms, it was 50 per cent larger for liposomal vitamin C. This means that 50 per cent more vitamin C was absorbed into white blood cells from the liposomal form. Although there were no significant differences in maximal plasma vitamin C concentrations, the plasma vitamin C concentrations remained at 100 per cent for an extra hour and a half for the liposomal vitamin C compared to the powdered vitamin C.

Szilvi also emphasised: "Altrient uses only the minimum number of the highest quality non-GMO ingredients, a patented process since 2004, to formulate the purest form of liposomal formulas to overcome absorption barrier and offer maximised cellular absorption of nutrients. There are no fillers, binders, colouring or glycerine."

The exciting news for athletes subject to drug testing is that the Altrient liposomal vitamin C is in the process of receiving Informed-Sport certification. Their Altrient liposomal B and mineral complex received certification in 2020.

Finishing remarks

As a registered sport and exercise nutritionist, my primary concern is the safety of a supplement. But safety doesn't always equate to high-quality. As I may only recommend supplements that

have been batch-tested and approved under the Informed-Sport testing programme, this currently rules out many supplements from reputable companies that put effort into sourcing good-quality and sustainable ingredients, proving the efficacy of their supplements with clinical trials, and ensuring safety with independent lab-testing. Hopefully more of them will obtain Informed-Sport certification in due course. Whichever type of practitioner you are, and whatever governing body you are answerable to, take the extra time to research your chosen company when it comes to safety, the sourcing of ingredients and the supplement's efficacy. **fsn**

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