**The concept of *strict liability*, supplements and how to avoid accidental doping**

An investigation by the United Kingdom Anti-Doping Association (UKAD) found that almost half of all positive tests in 2012 were traceable back to sports-people consuming supplements. In numerous cases, those with positive test-results claimed that they did not know that these products contained prohibited substances. Many other investigations have found that about 10% of supplements can contain banned chemicals. So considering that supplements can be beneficial, how do we know whether a supplement is both effective and safe? This feature describes the risks in taking supplements and how to significantly reduce such risks.

*The unlucky significant minority*

In 2016, British Powerlifting banned eight lifters for doping violations. Seven within this group received four-year bans, which typically means that there were strong signs that the violation was deliberate – or there was not enough mitigating evidence. However, one amongst the group had his ban reduced to a year following a successful appeal. The federation's rules state if there is evidence that a positive test was the result of unintentional doping after consuming a banned substance, then a ban might be reduced. In this example, the powerlifter had tested positive for two substances, which were higenamine and 1,3-dimethylbutylamine (DMBA). Tests on many products, for example, have found higenamine in several brands marketed as pre-workout supplements to improve athletic performance. In other words, consuming prohibited substances within supplements – even inadvertently - still earns a ban after a positive test.

The lifter's story is sadly quite common – in 2012, UKAD reported that 44% of the positive tests could be traced back to supplement consumption. Furthermore, research throughout the world has found that supplements, regardless of their nature, can contain steroids and stimulants on the World Anti-doping Association (WADA) list of banned substances. For example, an investigation in 2007 in the USA found that 25% of supplements and energy products contained prohibited steroids whilst 11% contained banned stimulants.

A year later, a similar investigation in the UK analysed 152 supplements bought from shops or the internet found that 10.5% contained steroids and/or stimulants. Five years on, an analysis of supplements available within 12 European countries echoed

these findings. Then in 2015, researchers found the stimulant DMBA in several products promoted to help with fat loss and improve performance. All the supplements were readily available and none stated that there was a prohibited substance amongst the ingredients.

As powerlifters within British Powerlifting, we all commit ourselves to comply the federation's anti-doping rules. In simple terms, we will not consume prohibited, performance-enhancing substances – whether this is deliberate or accidental. The requirement to avoid accidental doping can seem a bit harsh but it is founded on the principle of *strict liability*. This means that we are all responsible for everything that we consume and have to ensure that we do not even inadvertently consume any chemicals of WADA prohibited list. So how do we do this? Ultimately it depends on whether our appetite for increasing performance through supplements is matched by our appetite for risk.

**The position IPF and UKAD**

Since there is scientific data showing that consuming supplements is the sporting equivalent of Russian roulette in a tested federation, both the IPF and UKAD caution us against using supplements. Both advise us to even question the need for supplements, especially when the risks can be high; not only have numerous sports-people been surprised by positive tests and subsequent bans, but there are alleged cases of athletes' deaths being linked to the supplements they consumed.

Considering the risks of taking supplements, is there any point in taking them? The answer depends on an individual's needs and whether there is strong evidence showing that a supplement is beneficial as well as safe. The evidence for supplements is varied, in that some have little or no effect whilst others have proven benefits; for example, studies have found that beetroot juice, creatine and protein powders (such as whey isolate) can be very beneficial, when used knowledgeably and in addition to a balanced, systematic diet. So if we are interested in supplements, then how do we find out which supplements will support our aims, rather than damage our bodies or earn us a ban?

**The good, the bad and the useless**

Unless you have a penchant for research and Google Scholar, the *Office of Dietary Supplements* at the *U.S. Department of Health & Human Services* provides a useful A-Z summary of dietary supplements. This summary describes what the supplements are, how they work, and whether there is evidence supporting the claims of the suppliers (see https://ods.od.nih.gov/factsheets/ExerciseAndAthleticPerformance-HealthProfessional/ ). More importantly, there is also way to determine whether a particular brand of supplement is likely to be safe and unlikely to contain prohibited substances.

UKAD points those interested in supplements towards the *Informed Sport* programme. This is a scheme where an accredited (i.e. competent and qualified) test-laboratory analyses supplements for banned substances, and if a product is sound, then the laboratory certifies the supplements. The programme ( http://www.informed-sport.com/ ) contains a comprehensive list of compliant products. This list is not always up-to-date, so it is worth checking the news items on the *Informed Sport* website, as this contains updates of the latest certified products. Product suppliers must agree to regular testing and audits, to show that they meet strict requirements for quality assurance and control to keep their products clear of banned substances and hence certified.

Scanning the list of certified products reveals many commonly used and well-known brands. However, there are some notable, well-known omissions as well. This does not mean that a certified product is absolutely guaranteed to be clear of banned substances, nor that an uncertified product contains them. But if a product has not been tested, then we simply do not know. Furthermore, products sourced from overseas and uncertified, unknown origins have a higher chance of including contaminants, based on research findings.

Ultimately, for those with no or little appetite for risk, the only way to avoid consuming banned substances in supplements is to avoid such products altogether. Then again, a little research, such as at the websites above, can significantly reduce the risks and assure us that supplements are likely to be both safe and effective. Lastly, many medicines also contain banned substances, so the next feature will look

at the ways of accidentally consuming a prohibited substance when taking medicines, together with guidance on how to reduce the risks.