Nutritional supplements

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Nutritional supplements include a large and varied range of products that are generally sold for the purpose of improving health and/or preventing particular pathological conditions. Athletes do take many of these substances, both from food and as nutritional supplements, but few studies scientifically demonstrate a real benefit in athletic performance deriving from the use of particular nutrients, even when consumed in large doses. Nutritional supplements are useful and sometimes irreplaceable therapeutic aids. However, the use of "food drugs" to improve athletic performance should be discouraged, since it is unlikely that such products really work and, were they to work, their use would be ethically improper and thus should be prohibited, even if they are not listed as doping agents.

Nutritional supplements include a large and varied range of products (minerals, vitamins, energy nutrients, vegetable extracts, amino acids, etc.) that are generally sold for the purpose of improving health and/or preventing particular pathological conditions. In recent years there has been keen interest in these products in sports by virtue of their performance-enhancing potential. The production and sale of nutritional supplements for use by those engaged in sports has become big business and its prospects for further growth are excellent.

At the same time there has been an equally large boom in scientific research and publications in support of the various products from time to time presented by the manufacturers of these nutritional supplements. However, there tends to be considerable disagreement in the scientific data obtained by the different researchers and few published works have been subjected to rigorous validation of the methodology used and the results obtained. A serious effort in this direction is the work carried out for the European Community by the international group of experts led by F. Brouns, M. Williams and W.H.M. Saris, who examined a substantial part of the available bibliography, subjecting it to scrupulous scientific analysis.

The results of this work were first published in 1991 and then in a book published by Fred Brouns in 1993 entitled Nutritional Needs of Athletes, which also presents a good overview of nutritional supplements used by athletes. Another exhaustive review of the matter can be found in the chapter by Luke R. Bucci, "Nutritional Supplements as Ergogenic Aids" in Nutrition in Exercise and Sport, 3rd edition, by Ira Wolinsky, recently published by CRC Press (1998), and in the less recent, but nevertheless still authoritative, Perspectives in Exercise Sciences and Sport Medicine, Volume 4: Ergogenics-Enhancement of Performance in Exercise and Sport, D.R. LAMB and M.H. WILLIAMS (Eds.), published by C. Brown Publishers.

Among sports people the term 'nutritional supplements' is often synonymous with 'ergogens' or 'ergogenic aids'. According to WILLIAMS (1989) an
ergogenic aid is defined as ‘...a procedure or agent that enhances energy production, energy control, or energy efficiency during sport performance, and thus provides the athlete with a competitive edge beyond that which may be obtained through normal training methods’.

WILLIAMS classifies ergogens in five groups: (1) mechanical; (2) psychological; (3) physiological; (4) pharmacological and (5) nutritional.

Many pharmacological ergogens are actually substances normally contained in foods (caffeine, carnitine, creatine, ubiquinone, amino acids, etc.) and sold as extracts or industrially synthesized products.

As compared to the nutritional contribution obtained through normal consumption of various foods, the use of these substances differs mainly in the dosages ordinarily used in pharmacological prescriptions - real megadoses, whose efficacy and innocuousness over time are dubious.

Athletes do take many of these substances, both from food and as nutritional supplements, but few studies scientifically demonstrate a real benefit in athletic performance deriving from the use of particular nutrients, even when consumed in large doses.

In accordance with R.J. ROBERTSON et coll. (1990) we think that ‘when considering the use of an ergogenic, it is important that the sport practitioner ascertain unequivocally that the procedure is safe, legal, and effective’ (Figure 1).

Supplements may also be listed on the basis of the real or presumed effects claimed by producers. They can be grouped according to the following list of purposes:

- to reduce body fat
- to increase muscular strength
- to enhance energy production
- to enhance lipid metabolism
- to enhance recovery after sport activity.

![Diagram of Algorithm for deciding whether or not a purported ergogenic is appropriate for application to sport](after ROBERTSON et coll. 1990)
As we can readily see from this short and therefore limited overview, the subject of nutritional supplements is vast and complex; it is therefore necessary to evaluate the mass of advertising material addressed to athletes with great care, as it often contains misleading information, unsupported by scientific research and driven only by commercial interests.

Over the years a good many food substances have been proposed for athletes in the hope—often a vain one—of improving athletic performance. As already mentioned, the complete list would be a very long one and a detailed analysis of the individual items would require a yet longer discussion. However, it may be useful, solely by way of example, to examine the scheme suggested by Kris-Etherton and Williams, who focused on some of the ergogenic substances used by and suggested for athletes, the efficacy of which in improving athletic performance has yet to be scientifically proven. (Tables 1 and 2).

Nutritional supplements are useful and sometimes irreplaceable therapeutic aids. Therefore, their use must be exclusively based on sound therapeutic reasons, supported by proper scientific information and testing. Care should be taken not to be misled by advertising claims and the siren-call of unlikely miraculous effects.
Physicians and those involved in sports medicine need to know more about the real benefits of some innocuous and legitimate changes in the diet of athletes, aimed at improving their athletic performance. At the same time, they should place more trust in their ability to affect athletes’ training and physiological and psychological skills, and not hope that some new or exotic product will work miracles and lead to winning medals.

Only a sound training programme, supported by careful and constant clinical and functional evaluation of the athlete, can result in the physiological adaptations needed by athletes to fully express their genetic potential.

The use of “food drugs” to improve athletic performance should, therefore, be discouraged, since it is unlikely that such products really work and, were they to work, their use would be ethically improper and thus should be prohibited, even if they are not listed as doping agents.

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