

The Active Diabetic: The Role of Nutrients and Supplements

Chair: *Dalip Ragoobirsingh*

Rates of Chronic Diseases in Retired Jamaican Athletes Can be Reduced by Adaptive Nutrition

Rachael Irving

A recent survey of retired Jamaican athletes between ages 35 and 75 years showed that approximately 35% suffer from a chronic disease with one or more co-morbidities. Answers from dietary questionnaires indicated that many do not adjust their eating habits after cessation of competitive sports and as such continue to consume nearly the same amount of calories as if they were still competing competitively. Based on their dietary habits, nutritional maladjustment might be contributing to the high rates of chronic disease. An adaptive diet as they transition from the competitive to the non-competitive stage may help to reduce the rates of chronic diseases in these athletes.

The Nutritional Management of an Athlete with Diabetes: More than Just for Energy

Marsha Woolery

The importance of the nutritional management of an athlete with diabetes is to improve quality of life, delay or prevent the long term effects of the chronic disease, enhance performance and maintain the balance between hypoglycaemic, euglycaemia and hyperglycaemia.

Nutrition is the study of the science of food, the nutrients that are entailed and the effects of these nutrients on the human body. It describes the processes of ingestion, digestion, absorption, metabolism and excretion.

Food is anything that when consumed, provides the body with energy, protein, vitamins, minerals and phytonutrients for proper functioning.

The goals of nutritional management for an athlete with diabetes are:

- * to achieve and maintain normal or near normal blood glucose levels
- * to achieve and maintain near normal lipid levels
- * for sustained energy before, during and after sporting event
- * for normal growth and development in children
- * for the maintenance of strong bones
- * to achieve and maintain healthy lean body weight
- * to maintain hydration status

The dietary requirements vary depending on the activity, type of medication, dosage, body weight and age of the athlete. Consideration must be given to the different periods which include practice/training sessions, pre-game and post-game.

The key to the nutritional management of athletes with diabetes is achieving and maintaining good blood glucose levels which will increase the benefits of training. Athletes with diabetes must understand how their bodies respond to exercise, food consumption and medication. To achieve success in sporting activity and health, athletes should work in conjunction with a registered nutrition professional. Coaches and training partners of the athletes should be aware of the condition, be supportive and know how to recognize and treat hypoglycaemic.

It is of utmost importance to develop nutritional management strategies to include:

- * monitoring and recording of training activities and food intake
- * blood glucose monitoring, especially before and after activities
- * making healthy food choices based on individual needs, type and amount of medication(s) and type, duration and intensity of physical activity
- * understanding metabolic responses and the treatments

Nutraceutical Supplementation in Sports and Diabetes Management

Charah Watson

Improvements in the management of diabetes mellitus have made it possible for diabetic athletes to compete in sport at all levels. An effective management plan for an athlete with Type 1 diabetes must include an effective nutrition and supplementation regime. Nutraceuticals are an acceptable way of supplementation for diabetes management and can also aid in athletic performance. However, like synthetic performance enhancers, nutraceuticals can pose a problem to athletes and could induce positive drug test. The aim of this paper is to identify nutraceuticals and herbal products that can be confidently used by athletes that will not lead to adverse analytical findings. The data presented were obtained from searches in all major scientific databases

including Google Scholar, PubMed, SciFinder and Science Direct for published information on nutraceutical supplements and diabetes management and nutraceuticals and sports. Conference abstracts and reports, journal articles and books, and the World Wide Web containing information on the above subject were also used. Herbs such as *Ginkgo biloba*, ginseng, bitter orange, plant extracts (CoEnzyme Q10, choline and caffeine), vitamins (B vitamins: B1, B2, B3, B5, B6 and B12) and mineral (chromium and boron) were reviewed for their use in both diabetes management and athletic performance enhancement. This review of the available literature is a part of Bio-Tech R&D Institute's research activities. The Institute is currently developing nutraceutical formulations for athletic performance enhancement. Our main objective is to ensure that the nutraceuticals consumed by athletes are standardized, safe, and effective and will assist athletes in their overall health and wellness.

Vitamin D3, Diabetes, Sports Medicine and Nutritional Supplements

Joseph Bryant¹, Ngeh J Toyang^{1, 2}, Henry IC Lowe^{1, 2, 3}

¹Institute of Human Virology, University of Maryland School of Medicine, Baltimore, Maryland, USA,

²Educational and Scientific Corporation, Florida, USA and

³Bio-Tech R&D Institute, Kingston, Jamaica

Vitamin D is a hormone related to skeletal integrity. Recently, the extra skeletal effects of vitamin D have raised considerable interest, especially as it relates to the development of diabetes Type 2. Three hundred and sixty-six million people worldwide have been estimated to have Type 2 diabetes and the prevalence is expected to rise to 51% by 2030. The data presented in this paper were obtained from a search through PubMed on the above subject from inception to December 31, 2012 using the words "vitamin D" and "skeletal muscle" and "athletic performers". Vitamin D deficiency and insufficiency is at epidemic proportions in the United States of America and worldwide, with recent estimates indicating that greater than 50% of the global population is at risk. On the basis of evidence from both human and animal studies, vitamin D has emerged as a potential risk modifier for Type 1 and Type 2 diabetes. A common conclusion was that vitamin D deficiency is common in athletes. It was found to be associated with muscle pain, inflammation, myopathy and poor physical performance. The Bio-Tech R&D Institute in Jamaica has been studying and analysing the relationship between vitamin D

deficiency, diabetes, and sports medicine and has concluded that vitamin D administration improves neuromuscular function, muscle strength, and plays a major role in preventing Type 2 diabetes. From the early findings, the Bio-Tech R&D Institute started studies based on developing nutraceuticals supplemented with vitamin D3 as a supplemental for Type 2 diabetes. Some of the results from the work indicate that nutraceuticals with ball moss, which possesses tyrosine kinase inhibitors, have efficacy against diabetes. Studies are underway testing our hypothesis related to ball moss and its effect as a supplement along with vitamin D3 for Type 2 diabetes.

Inhibition of the Postprandial Hyperglycaemia Enhancing Enzyme Alpha-glucosidase by the Diabetes Formula Nutraceutical

Ngeh J Toyang^{1, 2}, Kenneth NN Ayeah^{1, 2}, Charah T Watson³, Joseph Bryant², Henry IC Lowe^{1, 2, 3}

¹Educational and Scientific Corporation, Florida, USA,

²Institute of Human Virology, University of Maryland School of Medicine, Maryland, USA and ³Bio-Tech R&D

Institute, Kingston, Jamaica

Type 2 diabetes mellitus is a highly prevalent chronic health condition requiring long term management. Type 2 diabetes is commonly diagnosed using the fasting blood glucose level approach. This approach is a poor predictor of postprandial hyperglycaemia which provides a more accurate measure of metabolic defects associated with Type 2 diabetes. The prevention of postprandial hyperglycaemia is crucial as it can result in severe vascular complications even in people that do not have diabetes. Postprandial hyperglycaemia is as such implicated in both the onset and progression of Type 2 diabetes. Postprandial hyperglycaemia commonly occurs following the consumption of a high carbohydrate meal followed by the rapid conversion of the carbohydrates into glucose by α -glucosidase and other enzymes such as α -amylase. The prevention of postprandial hyperglycaemia requires the use of agents that inhibit the release of the enzymes that enhance the breakdown of carbohydrates into glucose. In an effort to increase access to effective, safe and affordable alternatives for the management of Type 2 diabetes, Eden Garden Nutraceuticals developed the Diabetes Formula. The Diabetes Formula has been reported to inhibit α -amylase which is one of the enzymes implicated in postprandial hyperglycaemia. In this study, we report the inhibition of α -glucosidase by the Diabetes Formula.