

Research themes

Sports and clinical nutrition to optimise metabolism and performance

In the first theme intensive research has been carried out to identify new nutritional regimens and supplements to improve exercise metabolism and sports performance. The research revealed that saturation of the intestinal glucose transporters was limiting the absorption of carbohydrates during exercise.

By using a combination of glucose and fructose this limitation could be overcome and delivery of carbohydrate to the muscle could be increased with + 70%. The resulting increased carbohydrate supply improved exercise performance and also resulted in greater water delivery and reduced incidence of gastro-intestinal distress. As a result manufacturers of sports drinks worldwide are now adapting these formulations for sport drinks.



Optimising fat metabolism to improve insulin sensitivity

Facilitation of fat metabolism (theme 2) is important for both the performance and health-related aspects of exercise. The exercise intensity at which maximal fat oxidation occurs (Fatmax) varied greatly between individuals and depended on training status and gender, but not on BMI. Walking and running resulted in greater rates of fat oxidation than cycling. Training at Fatmax increased fat oxidation more than training at lower and higher intensities. Adipose tissue lipolysis generates 95% of the fatty acids oxidized during exercise in sedentary, obese and patient populations.

Only trained individuals and athletes were able to oxidise muscle and plasma triglycerides with rates contributing up to 50% of Fatmax. Inhibition of adipose tissue lipolysis with Acipimox substantially increased muscle lipid oxidation in all populations studied and led to an immediate increase in insulin sensitivity. This observation may have important implications for the treatment of insulin resistance. In theme 2 the metabolic effects of new anti-diabetes and obesity drugs are quantified in collaboration with Profil Institute for Metabolic Research (Neuss, Germany).

Protein/amino acid supplements to increase muscle anabolism

In theme 3 important contributions have been made to the development of carbohydrate/protein (hydrolysate)/leucine mixtures with the aim to increase muscle anabolism in athletes, prevent sarcopenia in the elderly and improve glucose homeostasis in patients with type 2 diabetes.

This research has received support from: Astra Zeneca, Alzheimer's Society, Cerestar, DSM Food Specialties, Dutch Diabetes Fonds, Gatorade, GlaxoSmith Kline, National Institute of Health (USA), Nestlé, Polar, Profil Institute for Metabolic Research, Sports UK, SPARC, and the Wellcome Trust.