Regulation of Skeletal Muscle Glucose and Fat Metabolism by Omega-3 Fatty Acids

Omega-3 fatty acids are well known for their beneficial health effects, with docosahexaenoic acid (DHA) and eicosapentaenoic acid (EPA) being the ones with the greatest therapeutic potential. In this context, omega-3 fatty acids have been shown to improve glucose tolerance in humans. These effects could derive from a direct regulatory effect of these fatty acids on glucose utilization in skeletal muscle. However, only limited information is available regarding the potential beneficial effects of EPA and DHA on skeletal muscle glucose and fat metabolism. Importantly, skeletal muscles account for ~40% of body weight in men and ~30% in women and have great capacity to clear a large amount of blood glucose. In fact, skeletal muscle is the main site for insulin-stimulated glucose disposal. Thus, a potential direct effect of omega-3 fatty acids could be of therapeutic value for type 2 diabetes, a disease which is characterized by elevated blood glucose levels. Thus, the focus of my research is to investigate the direct effects of EPA and DHA on glucose and fat metabolism in skeletal muscle cells, as well as the molecular mechanisms underlying these effects.