Extended Abstract

Effects of Diet and Exercise on Endocrine Function of Skeletal Muscle [†]

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[†] Presented at the Meeting of the NutRedOx COST Action CA16112 “Natural Products and the Hallmarks of Chronic Diseases”, Luxemburg, 25–27 March 2019.

Published: 6 May 2019

Keywords: myokines; IL-10; inflammation; antioxidants; iron

Skeletal muscle has been recognized as an endocrine tissue that releases appreciable amounts of circulating proteins, called myokines. Currently, we know that the skeletal muscles synthesize several hundreds of peptides classified as myokines, and muscle contraction stimulates their release [1,2]. Myokines can act in autocrine, paracrine or endocrine mode and there is an increasing number of data showing that they can affect different organs and tissues, e.g., the brain, bones, adipocyte tissue, heart artery, and many others [3]. For instance, the interleukins IL-6 and IL-10, released by the muscles during exercise, exert powerful local and systemic anti-inflammatory effects. Furthermore, IL-10 has been shown to provide cardio- and neuroprotection, which is mediated by the activation of anti-apoptotic protein kinase B (PKB or Akt) [4,5]. In addition, myokines like SPARC and oncostatin M show inhibitory activity against colon and breast cancer cells, respectively. Skeletal muscles represent the largest organ of the human body (the muscles constitute approximately 40% of total body mass), thus their role in the regulation of metabolic processes via myokines appears to be very important. Unfortunately, there is a limited amount of data demonstrating the effects of nutraceuticals on exercise-induced release of myokines. It has been shown that release of IL-6 from skeletal muscle was inhibited in persons supplemented with vitamin C and E. We hypothesize that natural compounds may exert their protective activity against some human diseases by modulating myokine synthesis.

Funding: This work is based upon work from COST Action NutRedOx-CA16112 supported by COST (European Cooperation in Science and Technology).

Conflicts of Interest: The authors declare no conflict of interest.

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