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Modulation of Dio1 gene expression by edible mushrooms extracts in normo-and hypercholesterolaemic mice

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The maintenance of cholesterol homeostasis is vital for the human body therefore it is a largely controlled process at several levels (transcriptional, translational, enzyme modulation etc.). If this molecule is not absorbed with the diet, specific receptor senses the lack of the metabolite and activate specific genes and mechanisms to synthetize it. One of the not so well known but important factor in the cholesterol regulation is via thyroid. 3,3,5-Triiodothyronine (T3) is a thyroid hormone involved in LDL-r gene expression regulation. A 20% of this hormone is secreted by thyroid but the major amount is produced from thyroxine (T4) by 5'-deiodination in peripheral tissues. This reaction is catalyzed by the selenoprotein deiodinase in (Dio1). This protein activates thyroid hormone by converting the prohormone T4 by outer ring deiodination (ORD) to bioactive T3. It also degrades both hormones by inner ring deiodination (IRD). On the other hand, a few reports indicated that 1 ppm selenium supplementation to rats decreased the total cholesterol and LDL levels, increased Dio1 expression (and T3 levels) and decreased the ApoB and HMGCoA reductase mRNAs expression. Edible mushrooms are a good source of selenium as well as hypocholesterolaemic compounds such as i.e. sterols, fibers, inhibitors of the 3-hydroxy-3-methyl-glutaryl-Co A reductase (HMGCR) and of the S-adenosylhomocysteine hydrolase (SAHH) such as eritadenine. Thus, several mushroom extracts were prepared and administrated to normo-and hypercholesterolaemic mice in order to investigate their potential influence on the Dio1 gene expression in liver, duodenum, ileum and cecum. Results indicated that hypercholesterolemia induced a marked reduction, particularly in liver, of the Dio1 mRNA expression. Moreover, the Dio1 gene expression was also modulated by the mushrooms extracts but not by the hypocholesterolaemic control drugs. Some of the extracts down-regulated its expression while others promoted its up-regulation. The effect was tissue dependent.

Biography

Alicia Gil-Ramirez graduated in two carriers: Biological Sciences and Food Science and Technology, finished a Master in Biology and Food Scienceand now-a-days she is at the edge of defending her PhD about the hypocholesterolemic compounds of edible mushrooms. Besides her teaching activities, she has published so far 9 scientific articles and a book chapter in indexed journals, participated in more than 10 congresses, co-authored 1 patent and collaborated with the development of other research projects that are being carried out at her institution. She was granted with 2 fellowships to extend her experience in other research institutes in Prague (Czech Republic) and Wageningen (The Netherlands).

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