Regulation of organic nucleic acids and serum biochemistry parameters by dietary chromium picolinate supplementation in swine model.


Source

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Abstract

The relationships between chromium and metabolism are sophisticated. Organic nucleic acids and serum biochemistry parameters are affected by dietary chromium levels. The objective of this work was to study the effect of chromium picolinate (CrPic) supplementation on total DNA and RNA contents, the ratio of RNA/DNA in muscle and in pancreatic tissue, the level of insulin receptor (IR) mRNA and some serum biochemistry parameters in a porcine model. Young animals (48) were assigned randomly into three groups of 16 piglets, fed with three different dietary levels of Cr (common basal feedstuff alone or supplemented with CrPic at a dose of 1.61 μg/g or 3.22 μg/g, which corresponds to 0.2 μg/g and 0.4 μg/g Cr). After 80 days, the animals were sacrificed and skeletal muscle and pancreatic tissues were analyzed to detect differences caused by different levels of dietary Cr. The total content of RNA in muscle was increased significantly (P<0.05) in the CrPic supplemented groups. There was no significant difference between groups in the concentrations of total RNA in the pancreas or DNA in the muscle and pancreatic tissues. The RNA/DNA ratio in pancreas showed no significant change but the ratio was increased significantly (P<0.05) in muscle. There was a slight increase of the mRNA level of IR but there was no significant difference between groups. The content of serum cholesterol and insulin were reduced significantly (P<0.05) in the CrPic-supplemented groups and the content of high-density lipoprotein cholesterol (HDLC) was increased significantly (P<0.05) as the CrPic dose increased. There was a slight (non-significant) reduction of the concentrations of serum triglyceride and low-density lipoprotein cholesterol (LDLC) in the CrPic supplementation groups. Supplementary CrPic caused no significant change of muscular mRNA level of IR in healthy animals. An increased content of RNA in muscle, improved cholesterol metabolism and improved insulin sensitivity were found in these CrPic-treated groups in the porcine model.