Ornithine decarboxylase. O iodo inibe a ODC

As poliaminas, spermine, spermidine e putrescina, têm sido implicadas no crescimento e proliferação das neoplasias malignas. É conhecido o efeito do iodo e do iodeto de potássio como agentes anti-proliferativos e aqui temos uma das explicações: inibição da ODC enzima chave limitante da geração de poliaminas. José de Felippe Junior

Acute inhibitory effect of excess iodide on ornithine decarboxylase in the thyroid of propylthiouracil-treated rats.

Ma HT, Reuse S, Koibuchi N, Matsu zaki S. Endocrinol. 1996 Sep;150(3):369-76. Institute of Molecular and Cellular Regulation, Gunma University, Maebashi, Japan.

Abstract

Polyamines such as putrescine, spermidine and spermine have been thought to play an important role in thyroid growth induced by goitrogens. Reduced biosynthesis of these polyamines might play a role in the antigoi trogenic effects of excess iodide. This study was designed to examine the effect of potassium iodide (KI) on ornithine decarboxylase (ODC), a rate-limiting enzyme in the biosynthesis of polamines. Thyroidal ODC activity, protein content and mRNA were increased in rats made hypothyroid by 10 days of propylthiouracil treatment. The increase in ODC activity was suppressed after subcutaneous injection of KI (13mg/kg body weight); the apparent half-life of ODC activity after the treatment was estimated to be 19 min and the maximum suppression (90%) was seen 60 min after the treatment. On the other hand, administration of iodine-containing compounds including L-thyroxine, L-diiodotyrosine, amiodarone, iopanoic acid and erythrosine showed no significant effect on ODC activity. Inhibition effect of excess iodide was not reversed by pretreatment with dibutyryl cAMP and theophylline. The amount of immunoreactive ODC protein was reduced by iodide treatment (40%). However, the decrease was not as great as the decrease in ODC activity (90%). No significant change in thyroidal ODC mRNA content was seen 1 and 3 h following KI treatment. **These results suggest that excess iodide reduces ODC activity** in the rat thyroid gland by a post-transcriptional mechanism.

PMID: 8882155

Thyroid function and polyamines. III. Changes in ornithine decarboxylase activity and pol yamine contents in the rat thyroid during hyperplasia and involution.


Abstract

Changes in ornithine decarboxylase (ODC) activity and in polyamine contents of the rat thyroid were studied under various experimental conditions. Methylthiouracil (MTU) treatment produced several-fold increases in the thyroid ODC activity and in the content of putrescine, spermidine and spermine within a week. While serum thyrotropin (TSH) levels increased gradually up to 3 weeks, the content of both putrescine and spermidine tended to reach a plateau after 2 weeks of the goitrogen treatment; spermine content continued to increase progressively for 3 weeks. Discontinuance of MTU at 7 days resulted in a rapid decline in the elevated thyroid ODC activity, followed by a diminution of putrescine, spermidine and RNA contents. Thyroidal putrescine, spermidine and RNA responded more sensitively to both introduction and withdrawal of TSH stimulation than thyroidal spermine and DNA. Excess iodide, having no effect on the basal level of thyroid ODC, suppressed the MTU-induced increase in this enzyme activity without affecting circulating TSH, thyroxine (T4) and triiodothyronine (T3) levels. There was a significant negative correlation between the ODC activity and intrathyroidal concentration of iodine in MTU-pretreated rats. Theophylline increased the thyroid weight and ODC activity when given to rats fed with a subeffective dose of MTU. Analyses of serum TSH, T4, T3 and of thyroidal iodine revealed that TSH-induced thyroid ODC activity was suppressed by increased circulating thyroid hormones and/or intrathyroidal iodine. Furthermore, it was suggested that thyroid hormones and excess iodide acted directly on the thyroid to alter polyamine biosynthesis, possibly by changing the responsiveness of the gland to TSH.

PMID: 668626

Anti-goitrous effect of lecithin-bound iodine in propylthiouracil treated rats.

Department of Biochemistry, Dokkyo University School of Medicine, Mibu, Tochigi, Japan. matsuzaki@dokkyomed.ac.jp

Abstract

OBJECTIVE: Excess iodine and some iodine-containing compounds are known to affect various parameters of thyroid function. Lecithin-bound iodine (LBI) is a compound which induces involution of an enlarged thyroid. LBI was tested for its ability to affect thyroid ornithine decarboxylase (ODC) activity and apoptosis. METHODS: LBI was given orally to propylthiouracil-pretreated rats and the changes in ODC activity and apoptosis were observed. The thyroid apoptosis was detected by DNA laddering and flow cytometry. RESULTS: LBI suppressed the thyroid ODC activity within one hour after its administration and lowered slightly but significantly the thyroid putrescine levels at 3 h. The DNA cleavage ladder was evident at 3-6 h after LBI treatment. Propylthiouracil induced thyroid enlargement was reduced significantly at 3 days after chronic treatment with LBI. The thyroid content of putrescine was also decreased after chronic treatment. These effects of LBI were essentially the same as those of excess iodide, while other iodinated compounds including amiodarone, iopanoic acid and erythrosine had no effect on the thyroid ODC activity. CONCLUSIONS: These results suggest that LBI may exert its anti-goitrous effects, consisting of the inhibition of ODC activity and apoptosis, in the form of inorganic iodide in vivo.

PMID: 10911406