Abstract

Thyroxine is the main thyroid gland's hormone. The state, when the thyroid gland does not produce enough of it into the bloodstream is called hypothyroidism. Hypothyroidism is related with several health complications; therefore it is required to take replacement therapy in adequate doses. Concerning pregnant women, it is important especially to keep the blood level of thyroxine in the normal, because increasing or decreasing of it, has an adverse effect on the health of the mother and also on the normal child development.

The objective of my thesis was to describe malformations spectra of thyroxine, to find out the beginning of its embryotoxicity dose range for chick embryos, and recalculate this value for human embryos, allowing us to decide, if the level of thyroxine was increased by a replacement therapy, this could be embryotoxic for human.

The experimental part of my work was to search an alternative method for testing embryotoxicity on chick embryos *in ovo* – CHEST, testing of embryotoxic potential of the thyroxine. Embryotoxicity is a feature of the external factors affecting the embryo, it may manifest as lethality, growth retardation, and teratogenicity; which is an ability of the external factor to induce the developmental defect.

The most common manifestation of embryotoxicity in this experiment was lethality, while the most frequent developmental defects were ventricular septal defect, eventration of abdominal viscera, transposition of the great vessels, hyperlordosis and the strait jacket syndrome, other defects were less frequent. The beginning of the embryotoxicity dose range for chick embryos lies between 0.03 µg to 0.3 µg of applied thyroxine. After the theoretical conversion to mammals, and also humans, the beginning of the embryotoxicity dose range of thyroxine is between 0.1 mg/kg to 1 mg/kg, which corresponds to concentration of 10^{-6} to 10^{-7}. The upper limit of normal level of thyroxine in the blood is 110 µg/l, which corresponds to concentration 10^{-7}. In this upper limit, the concentration of thyroxine in the blood might approach the embryotoxicity dose range. We cannot rule out, the option, that the replacement therapy of hypothyroidism in pregnant women may contribute to an increased risk of malformations to their offspring.