

<http://www.livestrong.com/article/499967-potassium-hypothyroidism/>

POTASSIUM & HYPOTHYROIDISM

The thyroid gland -- located in the neck -- produces thyroid hormones, which help in maintaining a normal metabolic rate, facilitating protein synthesis, regulation of bone growth and control of brain cell maturation. Hypothyroidism is defined as low thyroid hormone in the blood. Hypothyroidism is associated with reduced urinary excretion of potassium; when thyroid hormone is replaced in hypothyroid patients, urinary potassium excretion increases.

Potassium Regulation

Potassium is the most abundant positively charged electrolyte in the cell. However, it constantly leaves the cell and without adequate replacement of potassium or adequate control of urinary potassium excretion, the [body](#) may lose an excess of potassium. The kidneys adjust the rate of urinary potassium excretion in response to aldosterone, a steroid hormone produced by the adrenal glands. Aldosterone is released in hyperkalemia, or elevated blood potassium levels; it causes the increased excretion of urinary potassium.

Hypothyroidism and Hyperkalemia

Since hypothyroidism can slow urinary potassium excretion, certain conditions that result in the release of potassium into the blood may result in hyperkalemia; however, hypothyroidism-related hyperkalemia does not result from kidney dysfunction. Other mechanisms that do not involve dysfunctional kidneys result in hypothyroidism-related hyperkalemia. In a healthy person, hyperkalemia rarely occurs because the kidneys can respond appropriately to aldosterone, which increases urinary potassium excretion, thereby preventing hyperkalemia. According to an article in the April 2002 issue of "Domestic Animal Endocrinology" exercise in hypothyroid dogs may induce hyperkalemia. Such effects are also likely in hypothyroid human patients.

Symptoms of Hyperkalemia

Mildly elevated potassium levels may not be associated with symptoms, but moderate to severe elevations in potassium levels are frequently associated with symptoms. Hyperkalemia often results in blood pressure elevation, which occurs even with mildly elevated potassium levels and is unlikely to be associated with symptoms. The various symptoms of hyperkalemia include irregular heartbeat, tiredness, general weakness, numbness, paralysis, shortness of breath, nausea and vomiting.

Symptoms of Hypothyroidism

Since the thyroid hormones control metabolic rate, low thyroid hormone levels result in decreased breakdown and synthesis of nutrients for energy production. Due to reduced energy production, a person with hypothyroidism experiences fatigue and generalized weakness. Other symptoms of hypothyroidism include, hoarseness of the voice, constipation, weight gain, heavy menstrual bleeding, brittle fingernails and depression. When thyroid dysfunction is the cause of hypothyroidism, increased stimulation of the thyroid by the pituitary gland -- the gland that controls the thyroid -- may lead to goiter or enlargement of the thyroid.