

## **Article 10 - Thyroid Part Three: Thyroid testing and how to make sense of it.**

We had such a lot of interest in the previous articles on thyroid function that I thought I would answer some of the questions we have had in regards to thyroid testing. I find that a lot of people come in with their thyroid test result but have very little idea as to what it actually shows.

Like all blood tests, a thyroid test has a reference range which is classed as “normal”. A thyroid test will usually be used to measure levels of thyroid stimulating hormone (TSH) and the thyroid hormones T<sub>3</sub> and T<sub>4</sub>, with TSH and T<sub>4</sub> being the most common tests run. A test for the presence of thyroid anti-bodies may also be run if auto-immune disease is suspected.

The thyroid gland is under the control of the pituitary gland, a small gland the size of a peanut at the base of the brain. When the level of thyroid hormones (T<sub>3</sub> & T<sub>4</sub>) drops too low, the pituitary gland produces Thyroid Stimulating Hormone (TSH) which stimulates the thyroid gland to produce more hormones. Under the influence of TSH, the thyroid will manufacture and secrete T<sub>3</sub> and T<sub>4</sub> thereby raising their blood levels. As the levels of T<sub>3</sub> and T<sub>4</sub> rise, the pituitary senses this and responds by decreasing its TSH production. One can imagine the thyroid gland as a furnace and the pituitary gland as the thermostat. Thyroid hormones are like heat. When the heat gets back to the thermostat, it turns the thermostat off. As the room cools (the thyroid hormone levels drop), the thermostat turns back on (TSH increases) and the furnace produces more heat (thyroid hormones) which lifts the temperature, turns off the thermostat until the room cools again and so on. The pituitary gland itself is regulated by another gland, known as the hypothalamus. The hypothalamus is part of the brain and produces Thyroid Releasing Hormone (TRH) which tells the pituitary gland to stimulate the thyroid gland (by releasing TSH). One might imagine the hypothalamus as the person who regulates the thermostat, since it tells the pituitary gland at what level the thyroid should be set.

When reading a test, it is assumed that the level of TSH tells us how well the thyroid is being stimulated and whether thyroid hormone production is likely to be adequate.

If the TSH levels are below normal, it usually means there is too much thyroid hormone being produced and that the brain is trying to halt production. Too high, and the brain is trying to increase the activity of the thyroid. Because the TSH level doesn't give us the complete picture on its own, it will often be combined with a test for T<sub>4</sub> and in some cases, T<sub>3</sub>. This combination usually gives us a fair indication of thyroid function. If the result doesn't match the symptom profile, it is an indication that more questions may need to be asked.

Tests only register the amount of hormone in the blood at the time of the test. Production of TSH, T<sub>3</sub> and T<sub>4</sub> may be fine, but there may be a problem with the uptake and use of T<sub>3</sub> and T<sub>4</sub> by the body's cells. This will often not be reflected in a test, and is something which should be taken into consideration with anyone showing a normal test but low thyroid symptoms. Many things may impair the action of thyroid hormone in the cells, including poor detoxification, various metabolic substances, auto-immune antibodies and some medications.

The fatigue experienced by people who are on the verge of Type II Diabetes is a case in point. Metabolic syndrome which is the precursor to Type II Diabetes doesn't only affect the way insulin is used; these people often have a problem using thyroid hormone effectively as well. The issue often lies not in the ability to produce the

hormone (although this can be a problem), but in the ability of the cells to use the hormone.

Another factor which can throw a spanner in the works is the high blood fat level (triglycerides) often seen in diabetic or insulin resistant patients and patients with high cholesterol. This can prevent the body's cells from taking up thyroid hormone properly, leading to thyroid hormone resistance. Thyroid hormone resistance can also be an issue in patients who have been on thyroxin for a few years where they feel the medication is not working as well as it used to, and the efficacy of their medication can be improved by taking a few simple measures to ensure that uptake and conversion are correctly supported. Other factors which may affect thyroid hormone conversion and uptake include high cortisol levels (long term stress, pain or inflammation); chronic illness such as chronic fatigue and chronic non-thyroidal illness; poor or sluggish liver function; and bowel toxicity. All of these should be investigated and addressed as appropriate.

Another major contributor to thyroid problems which is now being investigated as the origin of most thyroid disease is that of oxidative damage within the gland. Without getting too complicated, the thyroid gland has many cells where thyroid hormones are produced and stored. These cells take up as much iodine as possible and use this along with the amino acid tyrosine to make the thyroid hormones. Before the iodine can be used, it must be oxidized (loses some electrons through exposure to oxygen). The thyroid uses the highly volatile substance hydrogen peroxide to achieve this, and to prevent the substantial damage which would normally occur in the face of this reaction, the body uses the powerful anti-oxidants glutathione and selenium to mop up any unstable molecules that are produced as a result. However if there is not enough iodine to constantly engage the hydrogen peroxide, or there is a deficit of selenium present in the gland, the levels of hydrogen peroxide will rise above normal and over time will cause oxidative damage to the thyroid tissues. Thyroid cells which are exposed to high levels of hydrogen peroxide are known to have an increase in DNA damage and early cell death. It is possible that many people show the effects of the oxidative stress before they show with a pathological test result, and may explain why addressing this aspect of thyroid health often results in improvement. New Zealand diets are notoriously deficient in both iodine and selenium so you can see perhaps where the some of the problem lies.

Sometimes thyroid problems will be caused by a malfunction in the immune system where the immune system has confused the thyroid tissue for a foreign invader and is attacking it. These conditions are referred to as auto-immune and include Hashimoto's Disease, Grave's Disease and auto-immune Nodular Goitre. A basic thyroid test will generally reflect some abnormalities and if auto-immune disease is suspected, a test will be run to check for the presence of thyroid antibodies. These are the immune factors which tell us that the immune system is attacking the thyroid tissue and destroying it.

The presence of auto-antibodies can create some interesting anomalies in the blood test results; for example, a person with Nodular Goiter may show very low TSH and normal T4. Usually, if TSH is abnormally low it would be assumed that there was far too much T4 being produced, or that the low TSH would result in a thyroid gland which was not being stimulated properly, in which case the levels of T4 should also be low. With Nodular Goiter, it is possible to have nodules in the thyroid which start producing thyroid hormones of their own accord without the stimulation of TSH. This means the production of the hormones becomes unregulated because the usual on-off button (TSH) does not work. If there is auto-immune involvement in the Nodular

Goiter, auto-antibodies can sometimes bind to the thyroid hormone-producing cells in the thyroid gland causing them to produce normal levels of hormone without the gland being stimulated by TSH. Again, this is a problem because the hormone production is unregulated.

It is often assumed that there is very little that can be done where there is auto-immune involvement. This is not the case. Whether the issue is hyperactive thyroid or hypothyroid, natural medicine can be very useful. Where there is no auto-immune involvement, there is no reason why the thyroid function can't be improved. If there is auto-immune involvement, improvement can be gained by reducing the over-active immune response and preventing further oxidative damage and in many cases a more normal thyroid function can be restored provided the thyroid gland has not been removed. To quote the Australian Medical Journal Feb 2004, "Despite the development of highly sensitive laboratory tests, clinical assessment and judgment remain paramount"; in other words, consider the whole picture not just the blood test result.

**If you require further help, please contact us at The Self Heal Clinic 06 304 8177. The dispensary is open Tuesday, Thursday, Friday and Saturday.**