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Physiology of Thyroid

**Thyroid gland produces three hormones:**[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal" \l "cite_note-:3-5)

1. Triiodothyronine, also known as T3
2. Tetraiodothyronine, also called thyroxine or T4
3. Calcitonin

**Physiology of thyroid hormones:**[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal" \l "cite_note-:3-5)

* **T3** and **T4** are the only proper thyroid hormones, they are made in follicular epithelial cells of the thyroid gland.
* The third hormone produced by thyroid gland **calcitonin** is made by c-cells.
* Iodine is the building block of both T3 and T4. Hence, dietary intake of this trace mineral iodine is vital.
* Amount of thyroid hormone required by the human body at a particular time varies; and to make the perfect quantity of thyroid hormone at any given time, the human body needs help from the **pituitary gland.**

**Thyroid hormones affect your:**[[1]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal" \l "cite_note-:0-1)[[2]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:1-2)[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:3-5)

1. T3 and T4 increase the basal metabolic rate.
2. T3 and T4 promote physical and mental growth in children.
3. Calcitonin is involved in calcium and bone metabolism.
4. Thyroid hormones activate the nervous system which improves concentration.
5. Thyroid hormone affects your: body temperature and circulation, appetite, energy levels, growth and bone development, muscle tone and suppleness, heart rate, blood sugar levels, central nervous system and bowel function, cholesterol levels, fat, carbohydrate and protein metabolism.
6. Higher the amount of T3 and T4 in the body, higher is the body metabolism. If the level of T3 and T4 drops in the body, so does the rate of metabolism.

Iodine for thyroid hormone

* Human body need iodine to create the thyroid hormone. As we know iodine is the building block of both T3 and T4.
* This trace mineral cannot be produced by the human body.
* Hence, dietary intake of iodine is vital.
* Iodine is absorbed into the blood stream from food and bowel, from where it is carried to the thyroid gland to be used by the thyroid gland in due course. [[1]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:0-1)[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:3-5)

The pituitary gland and thyroid hormone

* The pituitary is an endocrine gland that is located at the base of your brain.
* It controls the **endocrine system**.
* It effects the thyroid by producing a hormone called **thyroid stimulating hormone (TSH)**.
* TSH stimulates the thyroid gland to produce right amount T3 and T4.
* If there is more amount of T4 present in ones blood stream, the pituitary gland will produce less TSH which will slow down the thyroid activity leading to less production of T4. Whereas, if the level of T4 hormone is less then required amount in they body, the pituitary gland will produce higher quantity of TSH to boost the metabolism and production of thyroid hormone.[[1]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:0-1)

Hormone imbalances: Overactive and underactive thyroid gland

Overactive thyroid ( [hyperthyroidism](https://www.physio-pedia.com/Hyperthyroidism)) occurs if the thyroid gland produces thyroid hormones in excess. And an underactive thyroid ([hypothyroidism](https://www.physio-pedia.com/Hypothyroidism)) is where the thyroid gland does not produce enough thyroid hormones.[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:3-5)

**Overactive thyroid (hyperthyroidism):**[[1]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:0-1)[[2]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:1-2)[[6]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:4-6)[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:3-5)[[7]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:5-7)[[8]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:6-8)

1. Rapid [pulse](https://www.physio-pedia.com/Pulse_rate)
2. Hand tremors
3. Sweating more than normal
4. Feeling hot
5. Increased appetite
6. Weight loss
7. Nervousness
8. Increased agitation and anxiety
9. Diarrhoea
10. Bulging eyes
11. Goitre

**Underactive thyroid (hypothyroidism):**[[1]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:0-1)[[2]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:1-2)[[6]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:4-6)[[5]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:3-5)[[7]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:5-7)[[8]](https://www.physio-pedia.com/Thyroid_Gland?utm_source=physiopedia&utm_medium=search&utm_campaign=ongoing_internal#cite_note-:6-8)

1. Feeling tired and fatigued
2. Feeling cold even on warm days
3. Weight gain
4. [Depression](https://www.physio-pedia.com/Depression)
5. Reduced concentration
6. Brain fog
7. Puffy face
8. Hair loss
9. Dry skin
10. [Constipation](https://www.physio-pedia.com/Constipation)
11. Hoarseness
12. Elevated blood [cholesterol](https://www.physio-pedia.com/Hyperlipidemia) level
13. Muscle aches, tenderness and stiffness
14. Pain, stiffness or swelling in your joints
15. Heavier than normal or irregular menstrual periods
16. Goitre