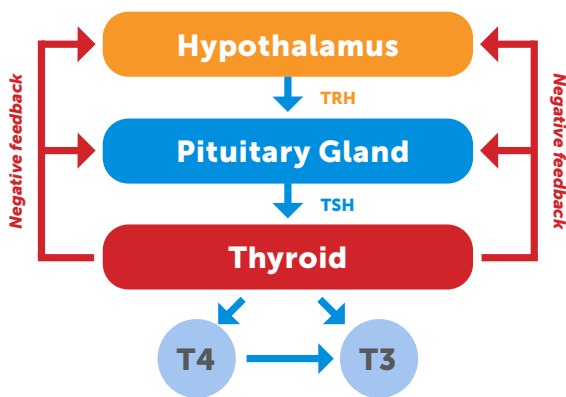


## Understanding Thyroid Disorders – Thyroid Function Tests

- Thyroid hormones act on nearly all cell types and affect many important body functions
  - E.g.: Basal metabolic rate, body temperature, growth and development
- Thyroid Function Tests (TFTs) help identify the presence and type of dysregulation that can cause many health issues
- To properly interpret TFTs, it is important to understand the process by which the body regulates thyroid function



Thyrotropin Releasing Hormone ( <b>TRH</b> )	Produced in hypothalamus. Stimulates release of Thyroid Stimulating Hormone ( <b>TSH</b> ) from pituitary gland.
Thyroid Stimulating Hormone ( <b>TSH</b> )	Produced by pituitary gland. Stimulates the thyroid gland to produce thyroid hormones: Thyroxine ( <b>T4</b> ) and Triiodothyronine ( <b>T3</b> ).
Thyroxine ( <b>T4</b> )	Primary form of thyroid hormone in circulation. Prohormone of the more active <b>T3</b> .
Triiodothyronine ( <b>T3</b> )	Active hormone ~ 4x more potent than ( <b>T4</b> )! Like ( <b>T4</b> ), it influences almost every physiological process in the body.

The body self regulates this pathway through a process called **negative feedback**. The presence of circulating T4 and T3 sends signals to both the Hypothalamus to stop producing TRH and the Pituitary Gland to stop producing TSH.

### - Dysregulation of this balance can lead to HYPOTHYROIDISM or HYPERTHYROIDISM -

	<b>HYPOTHYROIDISM</b>	<b>HYPERTHYROIDISM</b>
<b>DEFINITION</b>	Underactive thyroid gland activity produces too little thyroid hormone to meet the body's needs	Overactive thyroid gland produces more thyroid hormones than the body needs
<b>CAUSES</b>	Autoimmune disease (Hashimoto's thyroiditis) Radiation (cancer radiation therapy) Over-response to hyperthyroid therapy Medications (Lithium)	Autoimmune disease (Graves' disease) Hyperfunctioning thyroid nodules (Plummer's Disease) Thyroiditis
<b>PHYSICAL PRESENTATION SIGNS AND SYMPTOMS</b>	Weight gain Thinning hair Bradycardia Altered menstruation Cognitive impairment Puffy face Constipation Goiter Dry skin Cold intolerance	Weight loss Brittle hair Tachycardia Altered menstruation Sleep disturbances Increased appetite Increased BM frequency Tremor / Palpitations Thinning skin Heat intolerance

Because of the interplay between the endocrine glands, their respective hormones and the resulting thyroid function, you can pair your patient's physical presentation with the following TFT results to inform your assessment

	<b>Adult Normal Reference Range*</b>	<b>HYPERTHYROIDISM</b>	<b>Primary HYPOTHYROIDISM</b>	<b>Secondary HYPOTHYROIDISM</b>
TSH	(0.4-4.5mIU/mL)	Low	High	Low
T4	(5-11ug/dL)	High	Low	Low
Free T4**	(0.9-1.7ng/dL)	High	Low	Low

\***Reference ranges** will vary per test and laboratory testing site.

\*\***Free T4**: measures unbound T4 free to enter and affect the body tissues; may more accurately reflect the thyroid function because this value eliminates the effects of circulating proteins that bind T4

**Primary Hypothyroidism**: low thyroid hormone levels due to debilitated thyroid gland

**Secondary Hypothyroidism**: low thyroid hormone levels due to debilitated pituitary gland