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The thyroid follicle contains consists of two type of cells, namely Principal cells and Parafollicular cells or C-cells

The principal cells are numerous and they contain lesser number of mitochondria. They secrete thyroid hormones. The parafollicular cells are lesser in number but rich in mitochondria. They secrete thyrocalcitonin.

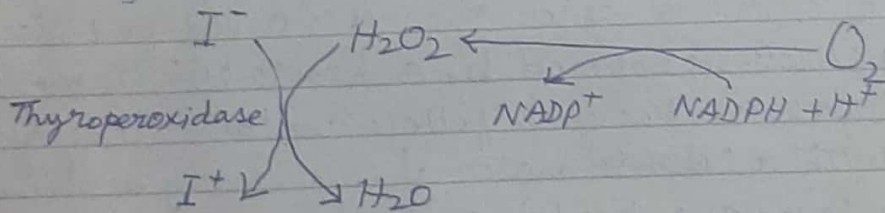
### Biosynthesis of thyroid hormones:

Thyroid gland produces two principal hormones - Thyroxine ( $T_4$ ) and Triiodothyronine ( $T_3$ ).

Iodine is essential for synthesis of thyroid hormones.

Uptake of Iodine: The uptake of iodine by thyroid gland occurs against the concentration gradient. It is an energy requiring process and is linked to the ATPase dependent  $Na^+ - K^+$  pump.

Formation of active Iodine: Thyroid is the only tissue that can oxidise inactive Iodine ( $I^-$ ) to highly valence iodine ( $I^+$ ) state. This reaction require  $H_2O_2$ .



### Thyroglobulin and Synthesis of $T_3$ and $T_4$ .

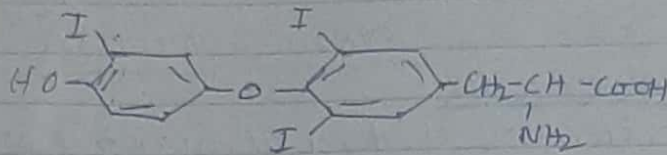
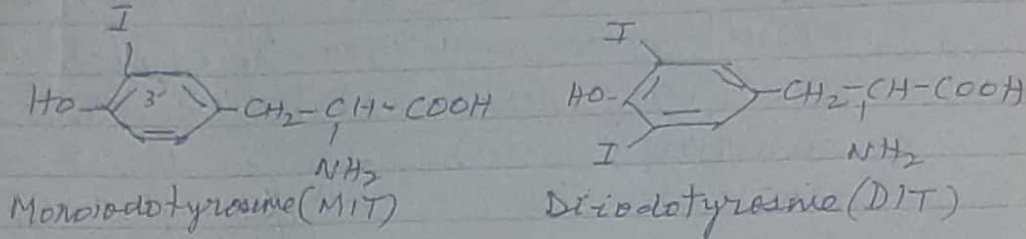
Thyroglobulin a glycoprotein are precursor for the synthesis of  $T_3$  and  $T_4$ .

Thyroglobulin contains about 140 tyrosin residues which serve as substance for synthesis of thyroid hormone.

Tyrosine is first iodinated at position 3 to form monoiodotyrosine (MIT) and then at position 5 to form diiodotyrosine (DIT). Two

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molecules of DIT couple to form Thyroxine (T<sub>4</sub>).  
One molecule of MIT, when coupled with one molecule of DIT, triiodothyronine (T<sub>3</sub>) is formed.



Triiodothyronine.

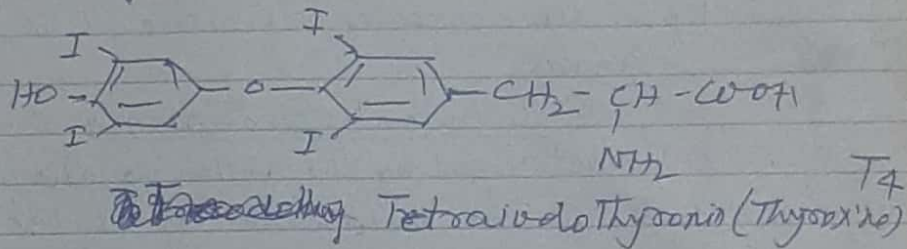


Fig. Structure of Thyroid hormone.

### Physiological action or Functions of Thyroxine:

(i) Thyroxine regulates the rate of metamorphosis in frog.

(ii) Thyroxine increases the basal metabolic rate (BMR) which results in an increase in body temperature and loss of body weight.

(a) Carbohydrate metabolism: - Thyroxine stimulates gluconeogenesis and glycogenolysis. It promotes uptake of glucose in intestine. It promotes peripheral glucose utilization.

(b) Protein metabolism: Thyroxine stimulates both synthesis and breakdown of protein.