

ANTI-THYROID DRUGS

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Endocrine – I Module

Theme neck swelling with bulging eyes

MBBS Year-2

Synthesis of thyroid hormones

Thyroid hormones

Triiodothyronine (T3)

Tetraiodothyronine (T4, thyroxine)

Materials

Iodine & Tyrosine

Synthesis of thyroid hormones

Steps

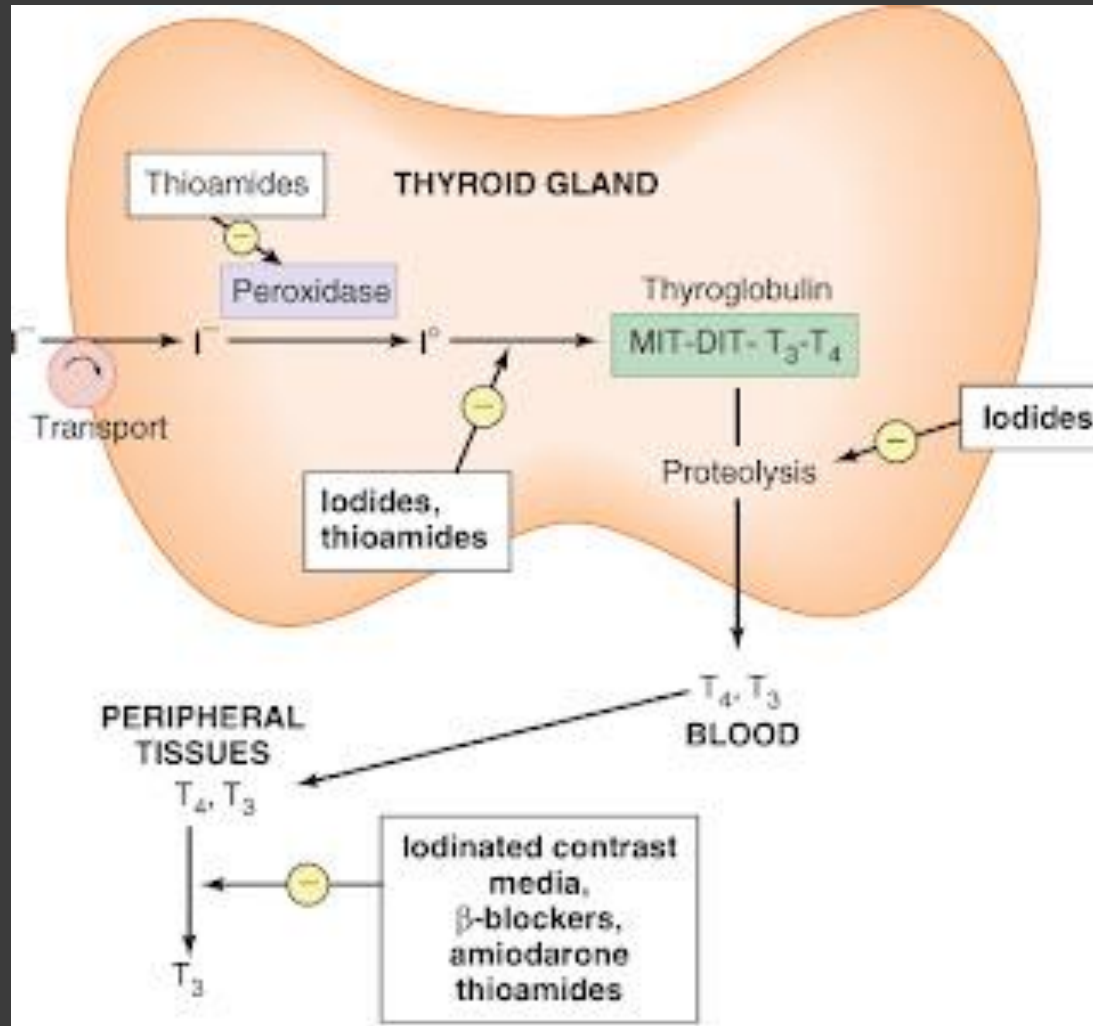
1. Iodide is trapped by sodium-iodide symporter
2. Iodide is oxidized by thyroidal peroxidase to iodine
3. Tyrosine in thyroglobulin is iodinated and forms

MIT & DIT

4. Iodotyrosines condensation



Synthesis of thyroid hormones



Anti Thyroid Drugs

Class	Representative
Thioamides	Propylthiouracil
	Methylthiouracil
	Methimazole
	Carbimazole
Anion inhibitors	Perchlorate, Pertechnitate & Thiocyanate
Iodides	KI, NaI
Radioactive iodine	I ¹³¹
β -adrenoceptor blockers	Propranolol

THIAMIDES

INHIBITION OF THE SYNTHESIS of T3 & T4

Mechanism

All thioamides inhibit peroxidase-catalyzing reactions

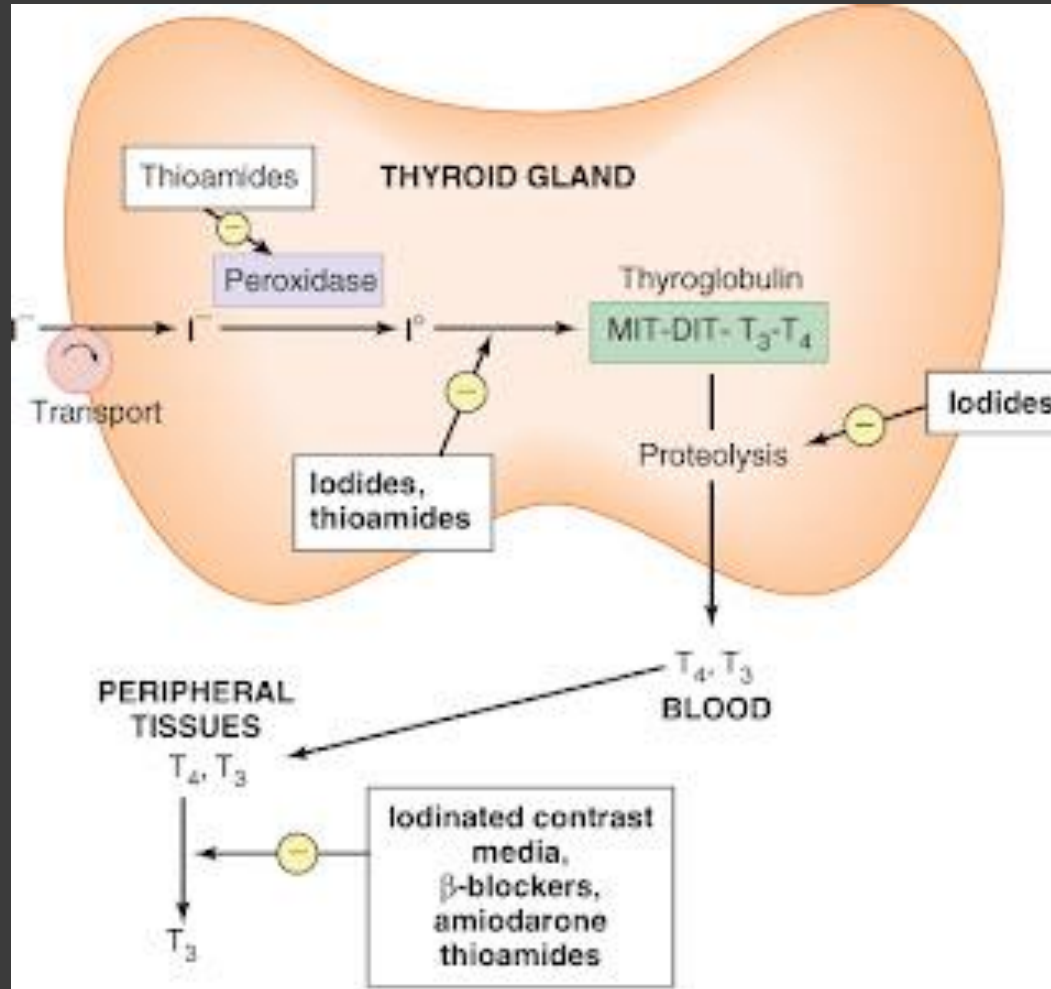
Iodine organification

Iodotyrosines condensation

inhibits coupling of iodotyrosines (MIT & DIT)

Propylthiouracil also inhibit T4 converting to T3

First choice for
thyroid crisis



Thioamides (propylthiouracil)



Thioamides (carbimazole)



ANION INHIBITORS

Anoin inhibitors

- Perchlorate
 - Pertechnitate
 - Thiocyanate
- ⊙ Blocks uptake of iodide by the gland through competitive inhibition
 - ⊙ Not used in clinical practice



spectrum
CHEMICAL MFG. CORP.

**Sodium Perchlorate,
Anhydrous
Reagent, ACS**

Caution: For manufacturing, processing or shipping,
Read and understand the label and Safety Data Sheet (SDS)
prior to use.

Chemical Emergencies: (800)424-4300

www.spectrumchemical.com

Spectrum Chemical Mfg. Corp. 10000 Spectrum Blvd. Houston, TX 77036

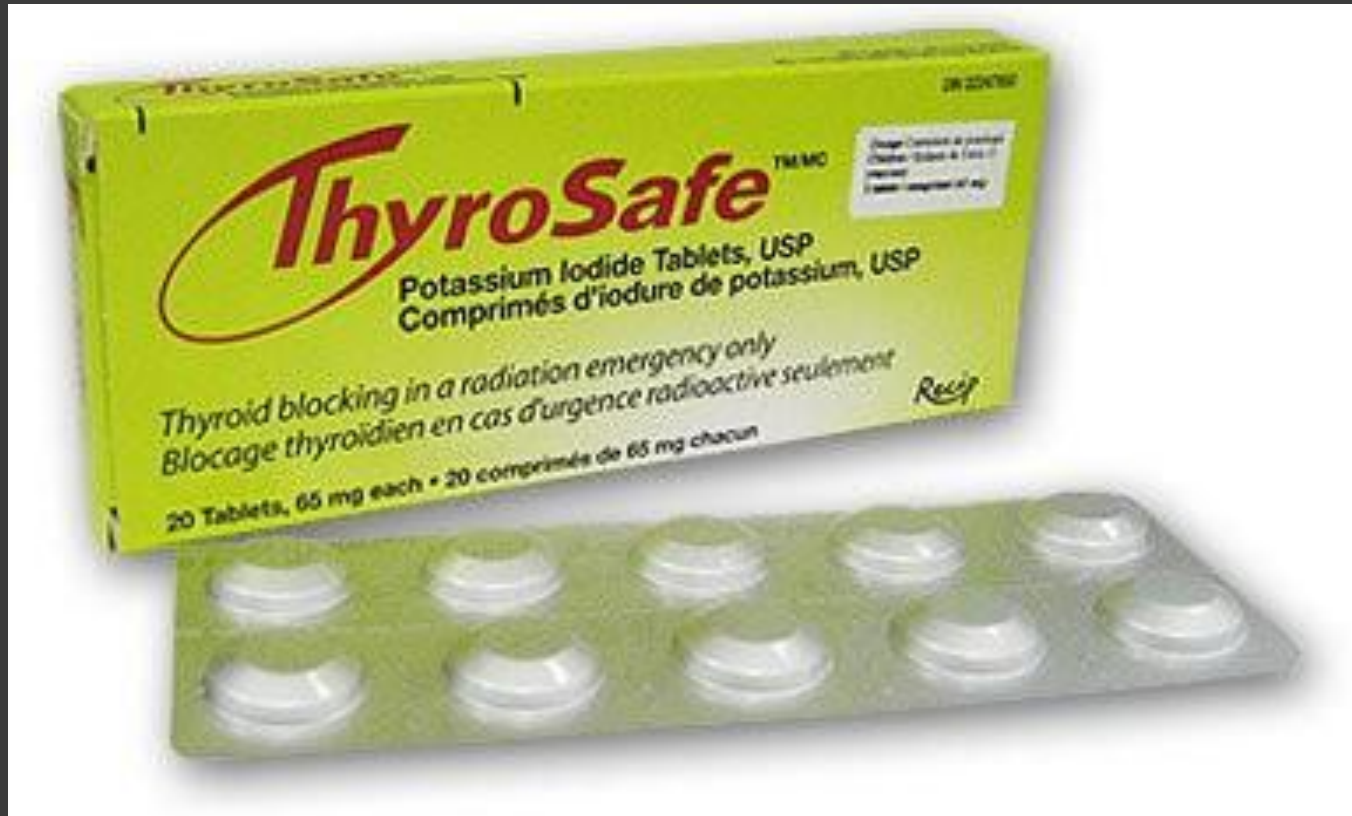
IODIDES & IODINE

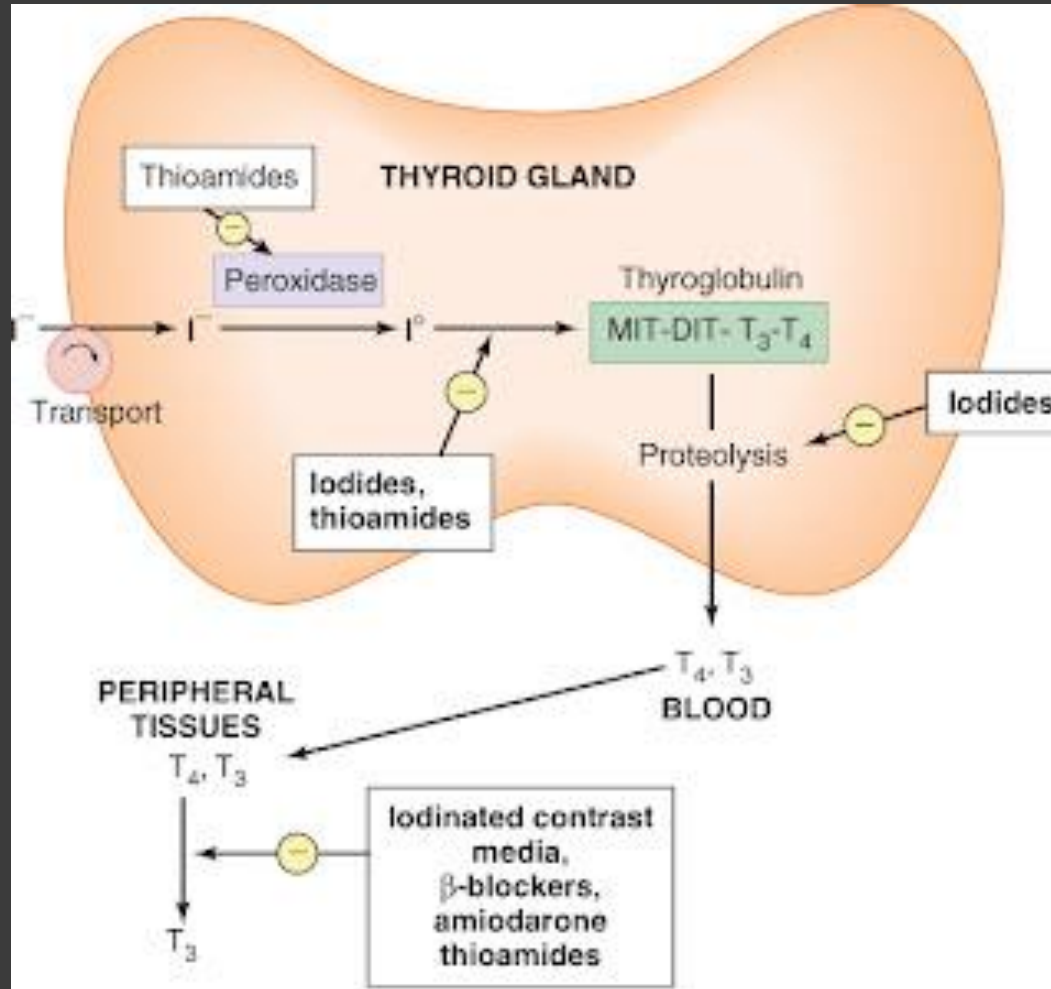
Mechanism of action

- ⦿ Inhibits organification
- ⦿ Inhibits hormone release
- ⦿ Decrease size and vascularity of gland
- ⦿ Improvement in thyrotoxic symptoms occurs rapidly within 2-7days

Clinical uses

- Used in thyroid storm & pre op preparation





RADIOACTIVE IODINE

Radioactive iodine

- ⦿ ^{131}I used for treatment of thyrotoxicosis
- ⦿ Orally given
- ⦿ Rapidly absorbed concentrated in thyroid gland
- ⦿ Emits β rays & Effective Half life is 5days
- ⦿ In few weeks destroys thyroid parenchyma

cautions

- ⦿ Should not be given to pregnant and lactating mothers
- ⦿ Crosses placenta or breast milk and destroy fetal thyroid gland



**Sodium Iodide [¹³¹I]
Therapy Capsule**

Batch: **123456-999**

Activity: 5000 MBq

±10% at 0900 hrs Sydney

Cal. Date: **3-Jun-04**



Mat 10233



Sodi
The

Batch:

Activity

Cal. Date

ARI, Ltd

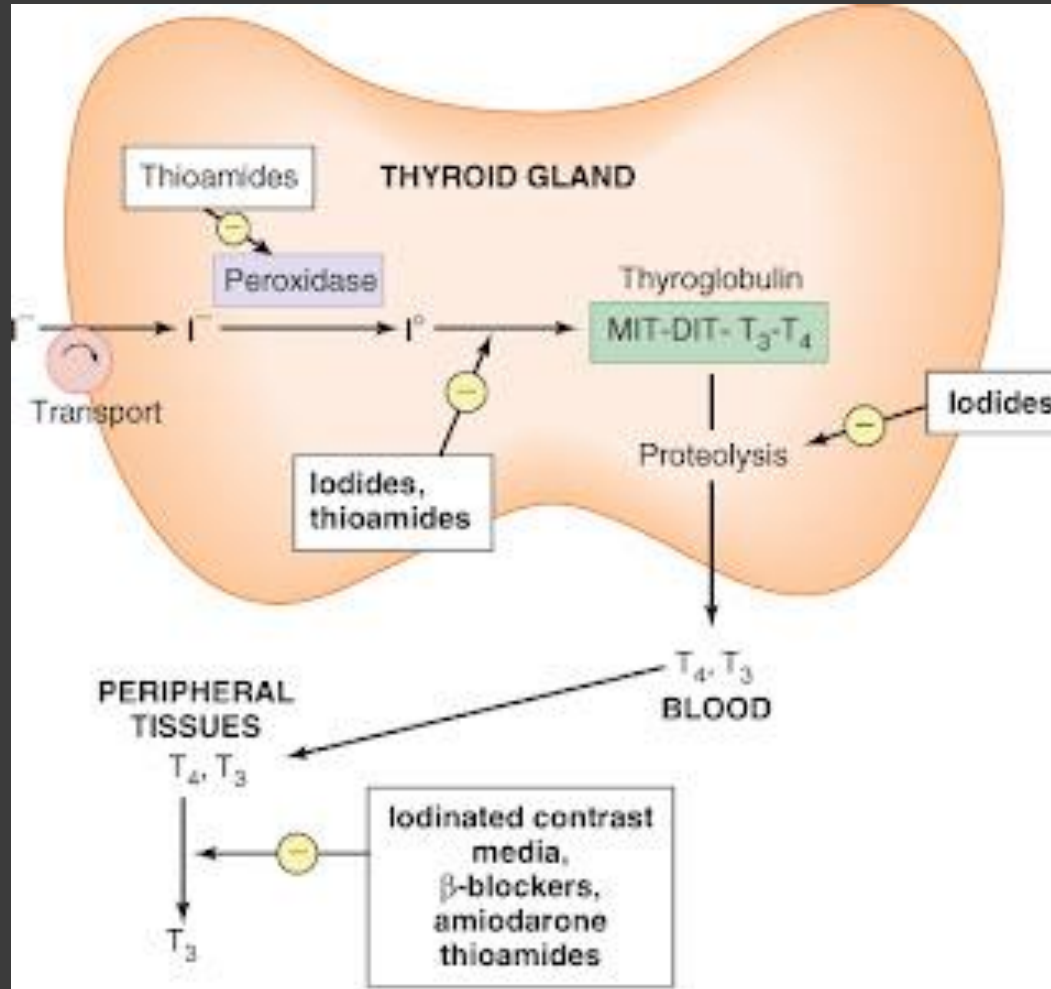


β - BLOCKERS

Without intrinsic sympathomimetic activity
(Propranolol, metoprolol, atenolol)

β - blockers

- ⦿ Do not alter thyroid hormone levels
- ⦿ Improves symptoms rapidly, **why?**
- ⦿ Propranolol at dose 160mg/day inhibits peripheral conversion of T4 to T3.



THANKS

