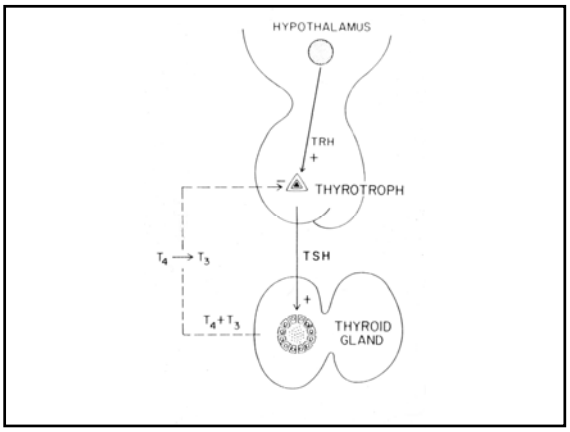
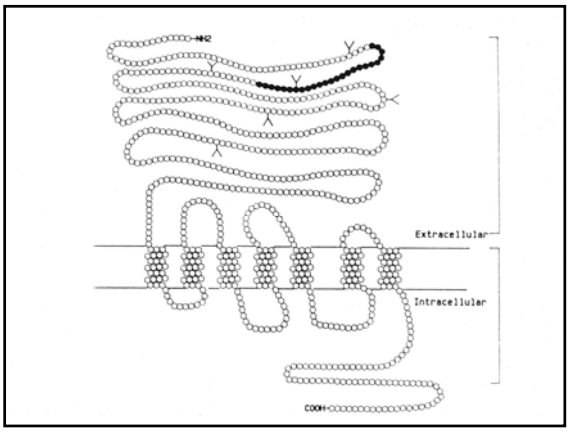
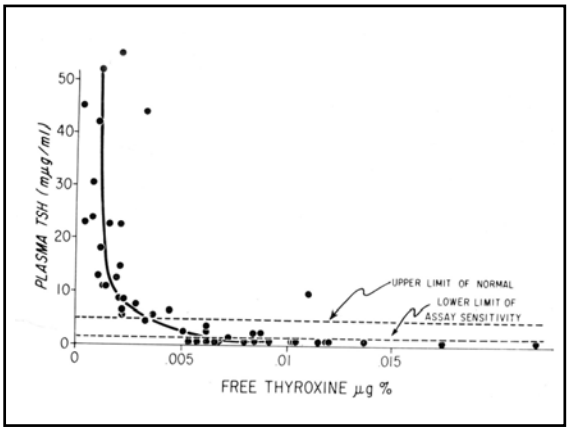
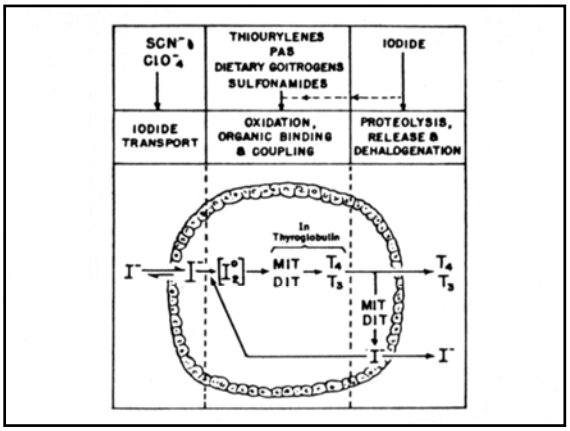
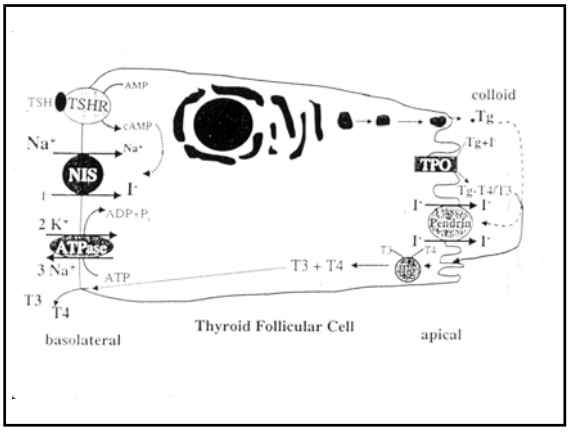
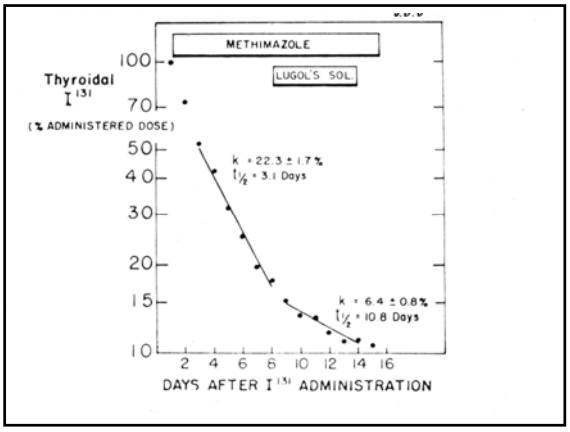

HYPOTHALAMUS
TRH
+
THYROTROPH
TSH
+
THYROID GLAND
T4 → T3
T4+T3

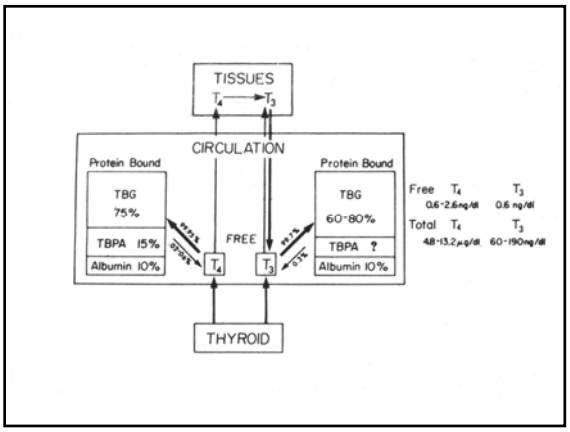

NH2
Extracellular
Intracellular
COOH


PLASMA TSH (mμg/ml)
50
40
30
20
10
0
0
.005
.01
.015
FREE THYROXINE μg %
UPPER LIMIT OF NORMAL
LOWER LIMIT OF ASSAY SENSITIVITY


SCN⁻ & ClO⁻4
THIOURYLENES PAS DIETARY GOITROGENS SULFONAMIDES
IODIDE
IODIDE TRANSPORT
OXIDATION, ORGANIC BINDING & COUPLING
PROTEOLYSIS, RELEASE & DEHALOGENATION
In Thyroglobulin
I⁻
[I°2]
MIT
DIT
T4
T3
MIT
DIT
I⁻


TSH
TSHR
AMP
cAMP
Na⁺
NIS
I⁻
2 K⁺
ADP+Pi
ATPase
3 Na⁺
ATP
T3
T4
colloid
Tg
Tg+I⁻
TPO
Tg-T4/T3
Pendrin
T3 + T4
basolateral
Thyroid Follicular Cell
apical


METHIMAZOLE
LUGOL'S SOL
Thyroidal I131
(% ADMINISTERED DOSE)
100
70
50
40
30
20
15
10
k = 22.3 ± 1.7%
t½ = 3.1 Days
k = 6.4 ± 0.8%
t½ = 10.8 Days
2
4
6
8
10
12
14
16
DAYS AFTER I131 ADMINISTRATION



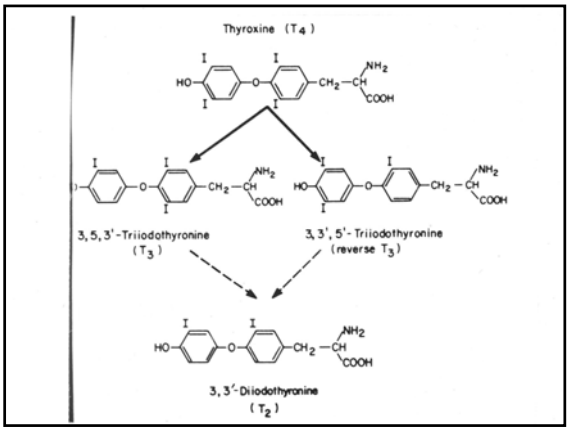
THYROID FUNCTION TESTS

Total T_4 measurements are elevated in:

1. Hyperthyroidism-increased total and free T_4
2. Elevated TBG-increased total T_4 and normal free T_4
   a. Congenital: X-linked dominant
   b. Pregnancy
   c. Liver diseases
   d. Drugs: estrogens, tamoxifen, raloxifene
3. Acute medical or psychiatric illness-uncommon
4. Thyroid hormone resistance (Refetoff syndrome)
   a. Generalized resistance
   b. Pituitary resistance

Total T_4 measurements are decreased in:

1. Hypothyroidism-decreased total and free T_4
2. Decreased TBG-decreased total and normal free T_4
   a. Congenital: X-linked
   b. Acromegaly
   c. Nephrotic syndrome
   d. Chronic liver disease
   e. Drugs: androgens, glucocorticoids
3. Inhibition of thyroidal T_4 release without hypothyroidism-exogenous T_4 administration
4. Acute medical illness-free T_4 high, normal, or low



FREE T4 = TOTAL T4 X % FREE

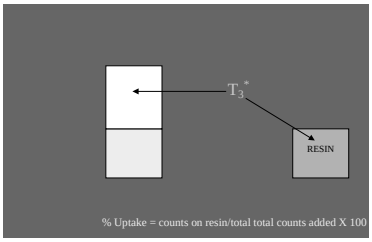
FREE T4 INDEX = TOTAL T4 X THBR

REDUCED PERIPHERAL CONVERSION OF T_4 TO T_3

PHYSIOLOGIC
- fetus and early neonate
- ? elderly

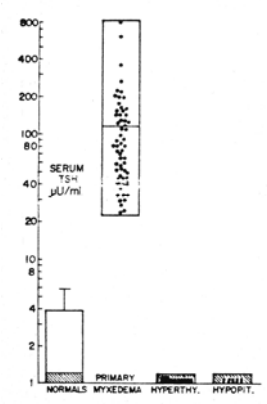
PATHOLOGIC
- starvation
- major systemic illness
- postoperative

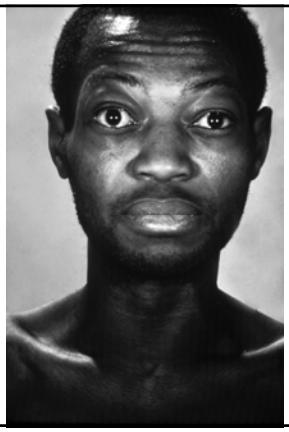
PHARMACOLOGIC
- propylthiouracil
- glucocorticoids
- propranolol
- contrast agents
- amiodarone



% Uptake = counts on resin/total total counts added X 100

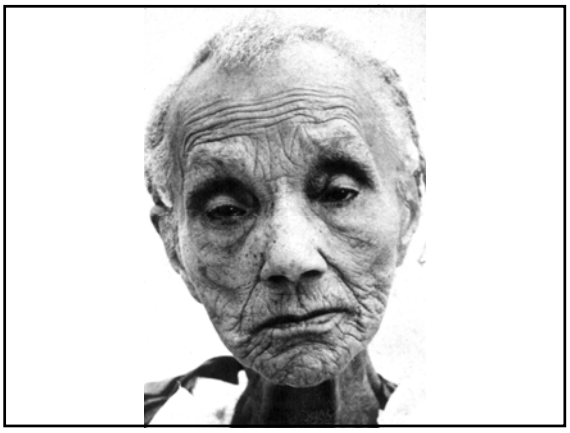
Thyroid Binding Proteins	Normal	Normal	Normal	Low	High
T4 Binding Sites					
Total T4	Normal	High	Low	Low	High
X					
T3 RU	Normal	High	Low	High	Low
Free T4 Index	Normal	High	Low	Normal	Normal

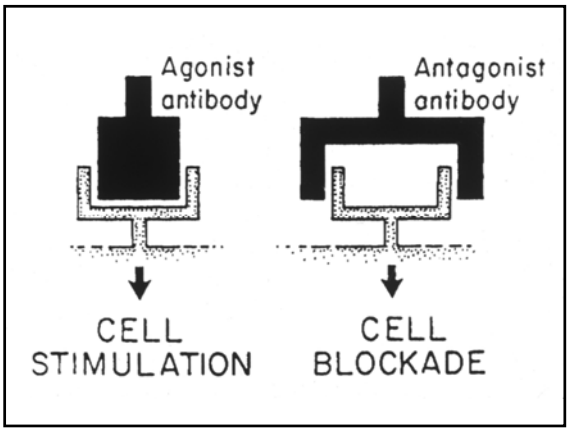


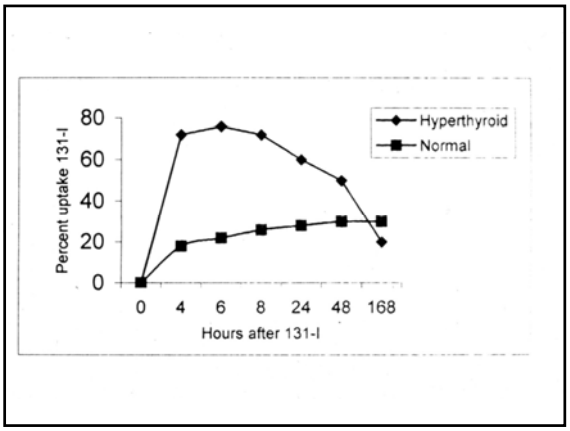


A lady, aged twenty, became affected with some symptoms which were supposed to be hysterical. Her pulse had become singularly rapid, she complained of weakness on exertion, and began to look pale and thin. It was observed that the eyes assumed a singular appearance, for the eyeballs were apparently enlarged. In a few months, a tumour, of horseshoe shape, appeared on the front of the throat and exactly in the situation of the thyroid gland.

Robert J. Graves, M.D.
1835







AUTOANTIBODIES FOUND IN PATIENTS WITH AUTOIMMUNE THYROID DISEASE

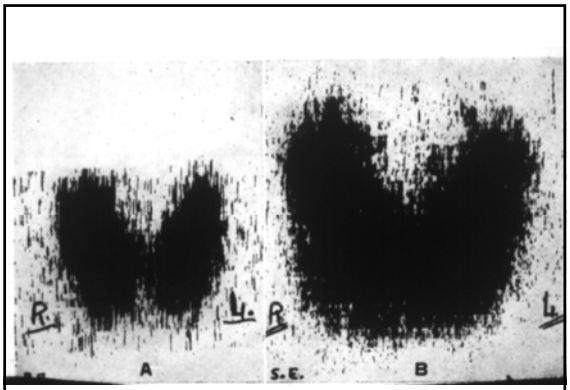
Antithyroglobulin

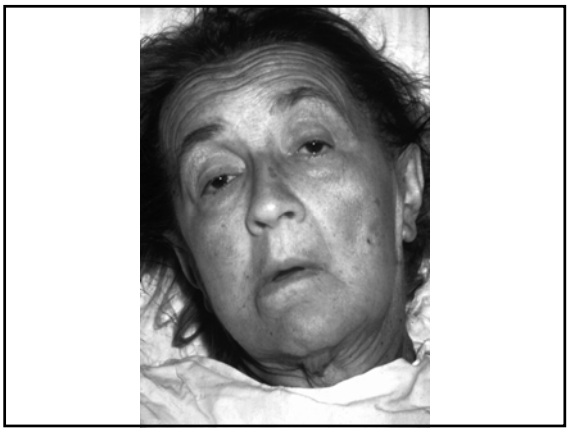
Antimicrosomal/thyroid peroxidase

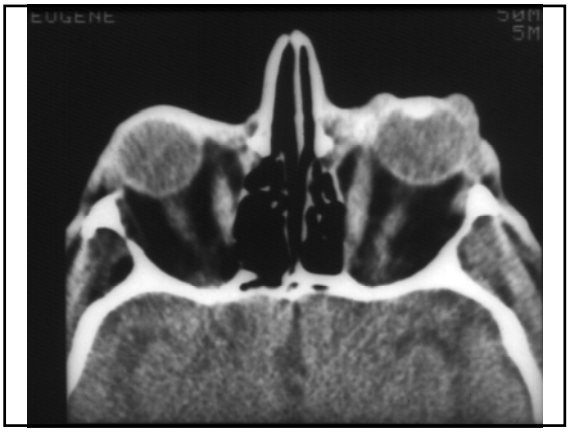
Anti-TSH receptor
- Thyroid- stimulating (TSAb)
- TSH-binding inhibiting (TBII)

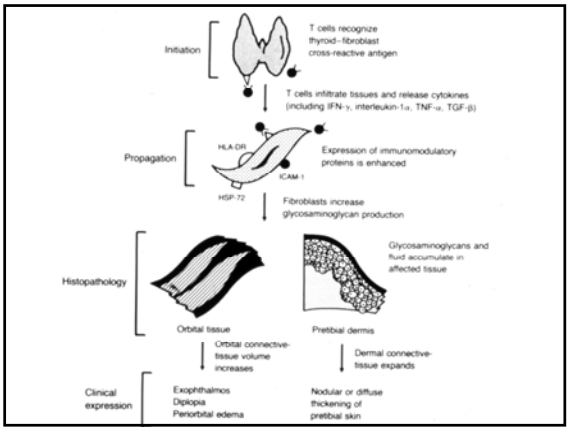
Anti-T_4 or T_3

Anti-TSH






EUGENE


Initiation
T cells recognize thyroid-fibroblast cross-reactive antigen
T cells infiltrate tissues and release cytokines (including IFN-γ, interleukin-1α, TNF-α, TGF-β)
Propagation
HLA-DR
ICAM-1
HSP-72
Expression of immunomodulatory proteins is enhanced
Fibroblasts increase glycosaminoglycan production
Histopathology
Glycosaminoglycans and fluid accumulate in affected tissue
Orbital tissue
Pretibial dermis
Orbital connective-tissue volume increases
Dermal connective-tissue expands
Clinical expression
Exophthalmos
Diplopia
Periorbital edema
Nodular or diffuse thickening of pretibial skin