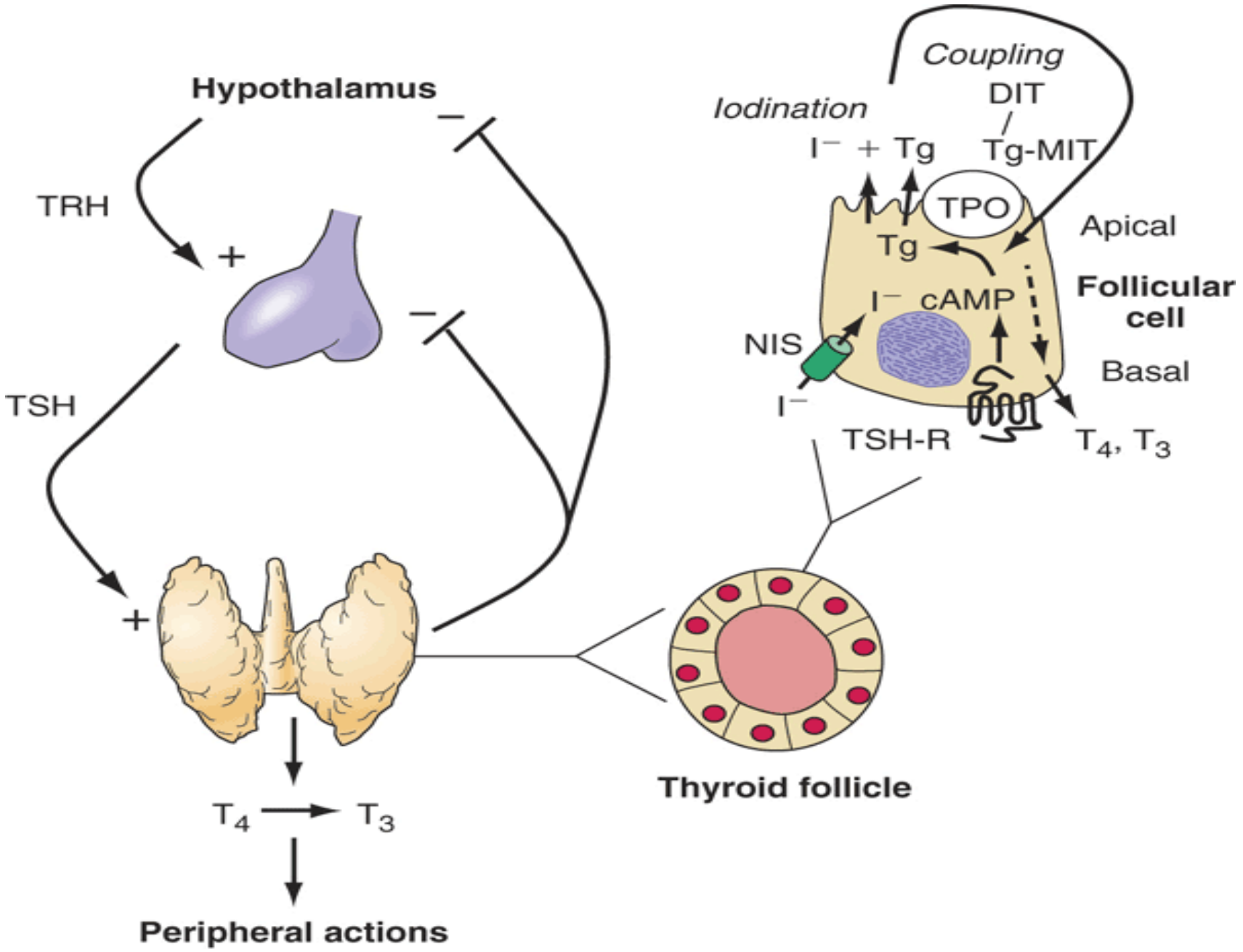
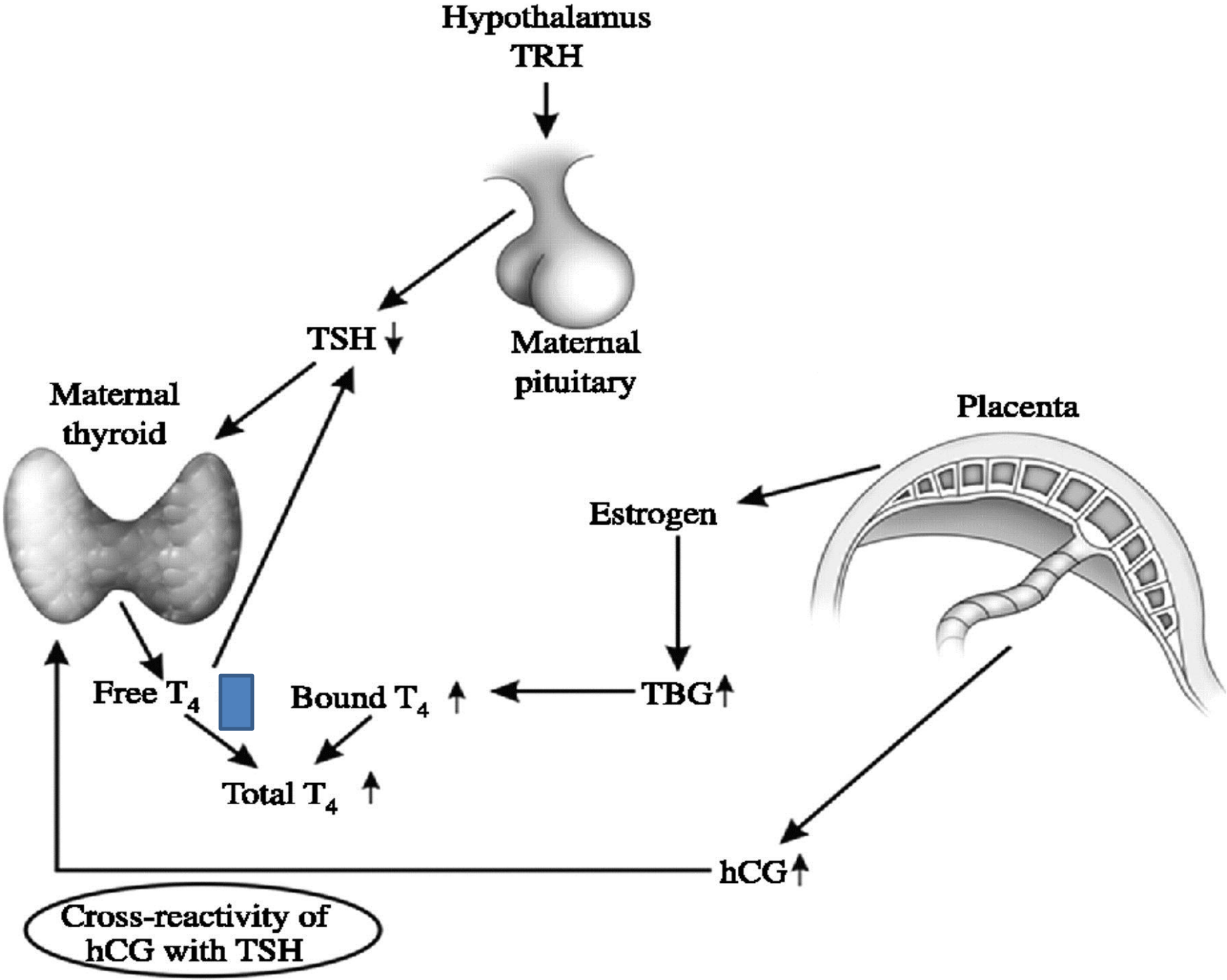
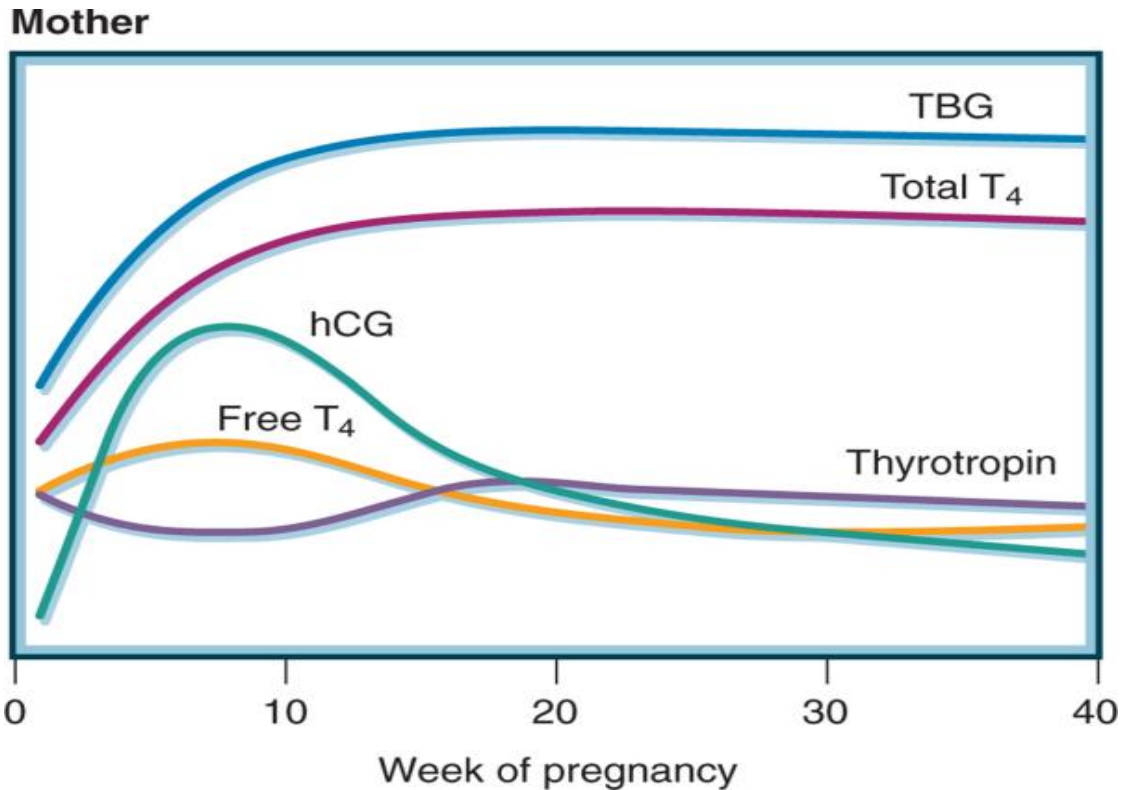
Thyroid Disease in Pregnancy


Hypothalamus
TRH
+
−
TSH
+
T_4 → T_3
Peripheral actions
Thyroid follicle
Coupling
Iodination
DIT / Tg-MIT
I^- + Tg
TPO
Apical
Tg
I^- cAMP
Follicular cell
NIS
I^-
Basal
TSH-R
T_4, T_3


Hypothalamus
TRH
TSH ↓
Maternal
pituitary
Maternal
thyroid
Placenta
Estrogen
Free T_4
Bound T_4 ↑
TBG ↑
Total T_4 ↑
hCG ↑
Cross-reactivity of
hCG with TSH

Thyroid Function in normal pregnancy:

- increased Thyroid Binding Globulin production. This leads to an increase in total T4 and T3, but not the free circulating thyroid hormones.



- iodine deficiency in pregnancy:
  - increased glomerular filtration
  - fetal thyroid activity.

This results in increased uptake by the thyroid gland which enlarge and goitre appears.

- As human chorionic gonadotrophin (hCG) and TSH share a common alpha subunit and have similar beta subunits, TSH receptors are prone to stimulation by hCG.

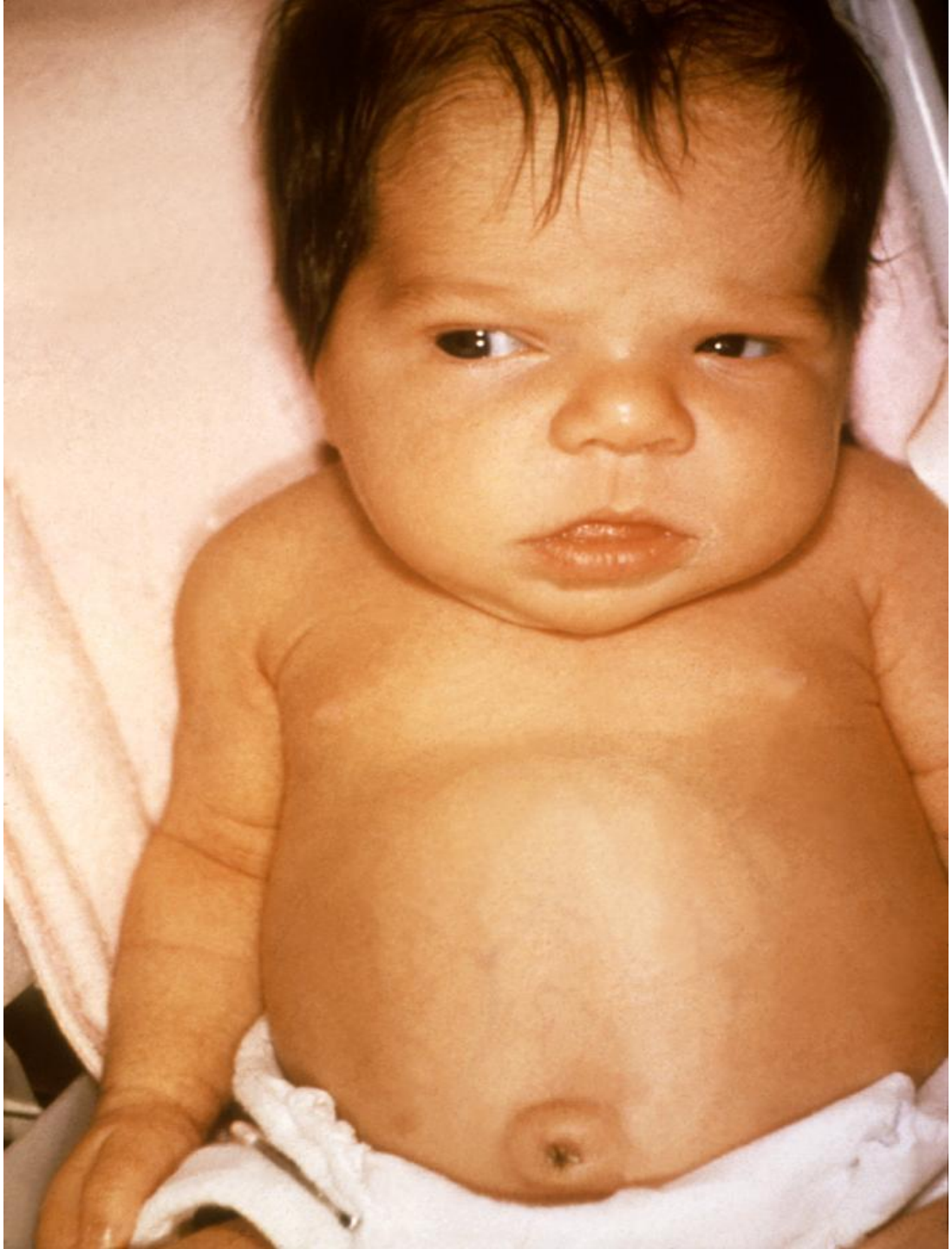
Fetal thyroid function:

- From 10 weeks' gestation, the fetal thyroid gland produces both T4 and T3 Fetal levels reach those of the adult at 16 weeks' gestation.
- Congenital hyperthyroidism can occur through TSH receptor stimulating antibodies which cross the placenta.

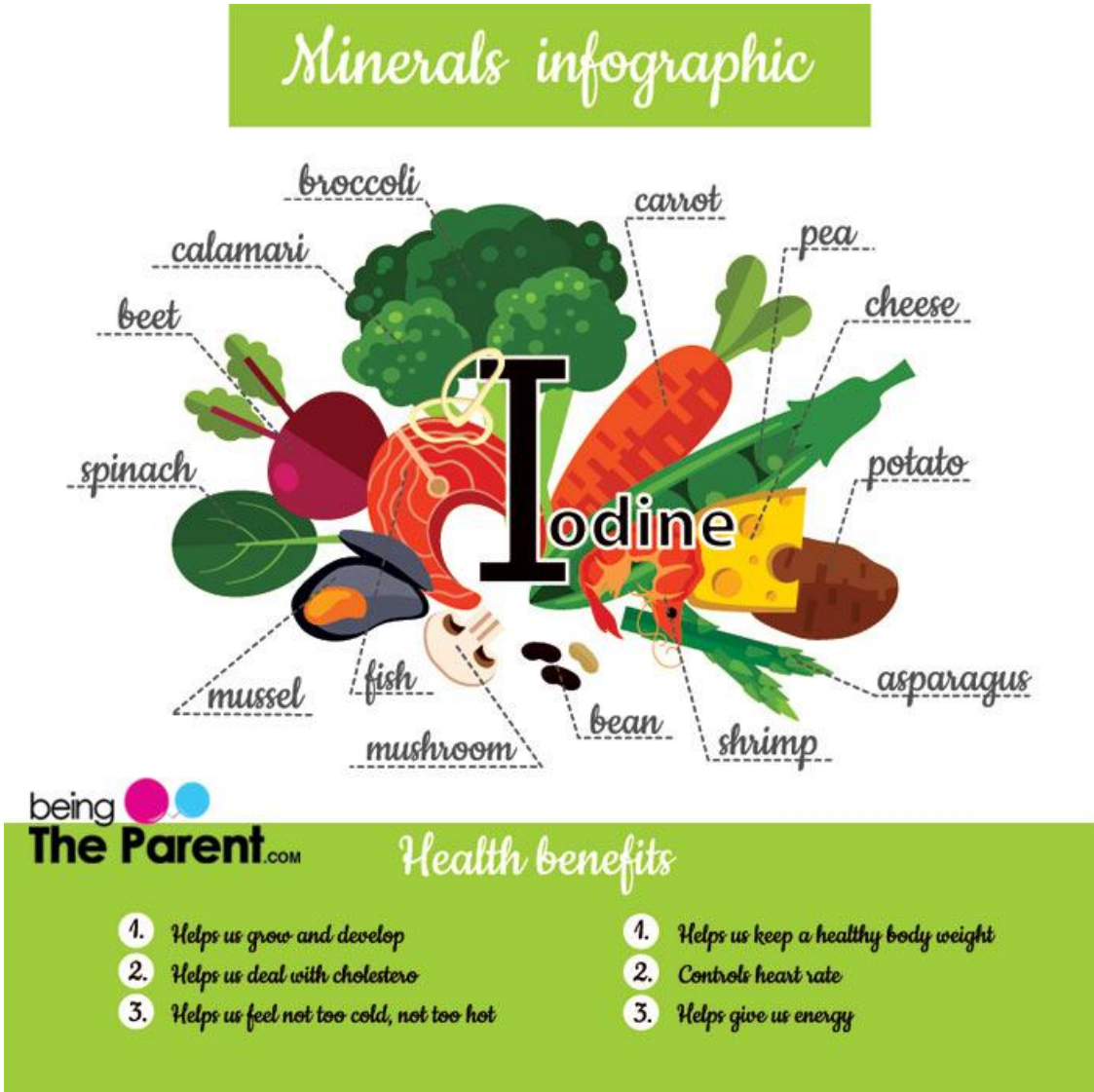
Iodine Deficiency:

- In iodine deficiency, the maternal thyroid gland has a greater affinity for iodide than the placenta and the fetuses are thus prone to cretinism, the leading preventable cause of mental retardation worldwide.

- The fetal cochlea, cerebral neocortex and basal ganglia are particularly sensitive to iodine deficiency.

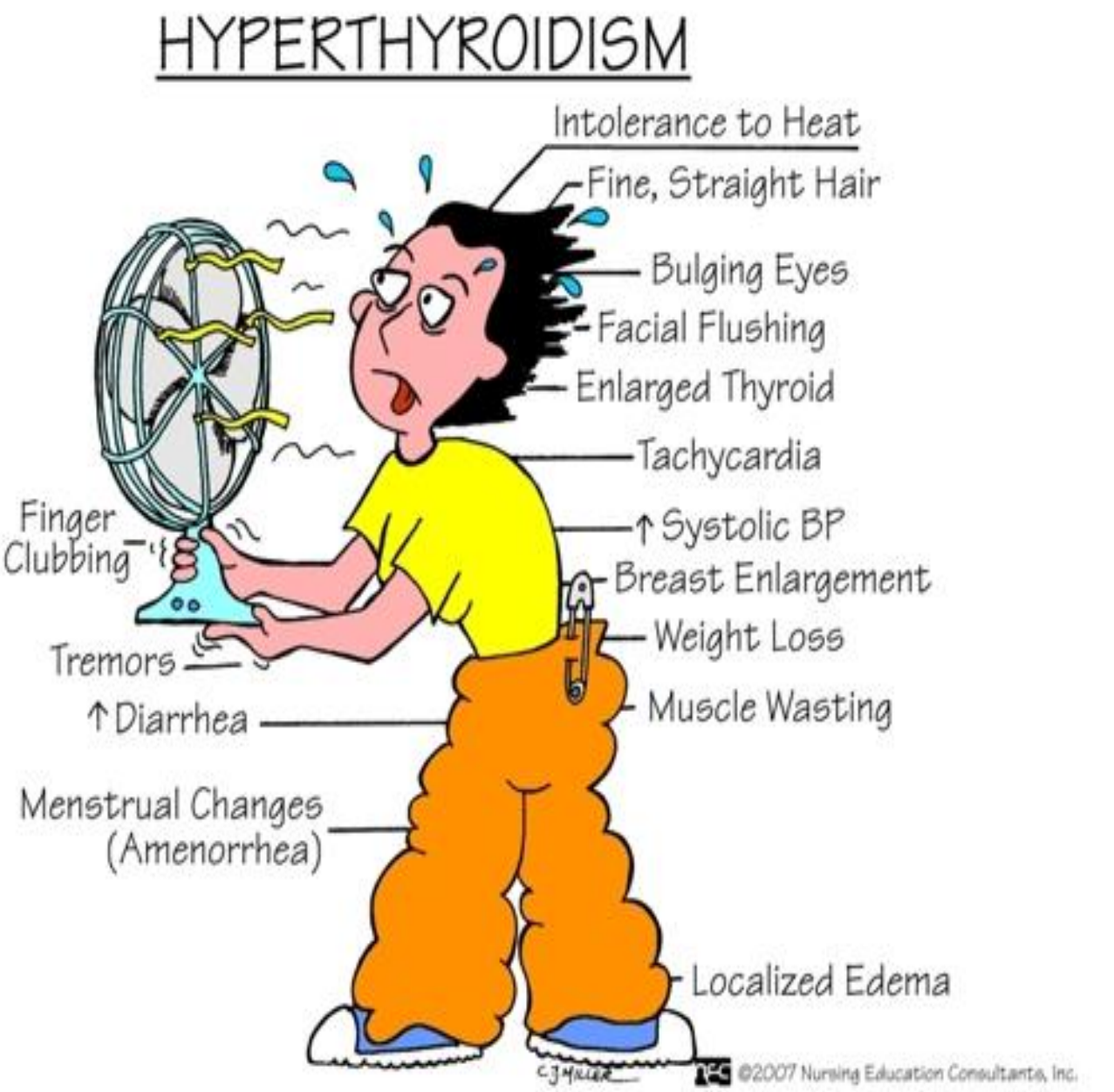


- Iodine administration prior to conception and up to the 2nd trimester will improve neurological outcome by protecting the fetal brain. Iodination of water, salt or flour can easily achieve this.



Hyperthyroidism

PHOTO RESEARCHERS/BIOPHOTO ASSOCIATES



- occurs in approximately 1 in 500 pregnancies and is usually due to Graves' disease
- Disease severity is correlated to IgG thyrotropin receptor stimulating antibody levels.
- Typical signs of hyperthyroidism are difficult to elicit in pregnancy, but poor weight gain in the presence of a good appetite or a tachycardia can aid Dx.

- **Maternal and fetal complications** include thyroid storm, heart failure and maternal hypertension. Also increased rates of premature labour, intrauterine growth restriction and stillbirth.

Treatment:

- radioactive iodine must not be given.
- Surgery may be considered if medical treatment fails or there is a clinical suspicion of cancer or compressive symptoms due to a goitre.

- Medical treatment involves **propylthiouracil PTU and carbimazole.** Both drugs cross the placenta in the same proportion & are equally beneficial and the dose of either can be titrated against maternal well-being and biochemical status.
- Neither PTU nor carbimazole is thought to be teratogenic.
- It is recommended that thyroid function tests be performed every 4-6 weeks.

Fetal hyperthyroidism

- When maternal thyrotropin receptor stimulating antibodies cross the placenta, they can cause fetal or neonatal thyrotoxicosis. The fetal thyroid is capable of responding to these antibodies after 20 weeks' gestation.

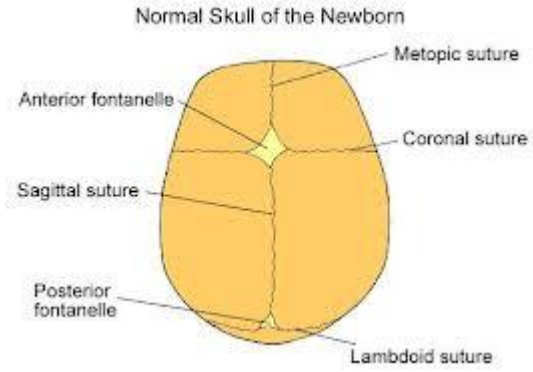
Figura 1:
Exoftalmos bilateral en recién nacido hijo de madre hipertiroidea.

Figura 2:
El mismo paciente a los 3.5 meses de edad

- Assessment include maternal perception of fetal movements and measurement of the fetal heart rate, which is >160 bpm. An ultrasound scan used to exclude a fetal goitre or fetal growth restriction.

- In suspected cases cordocentesis for free T4 & TSH estimation can be performed.

- Complications include Premature delivery, hydrops fetalis and death.
- fetal goitre can cause polyhydramnios and an obstructed delivery.
- The condition is also associated with craniosynostosis and, intellectual impairment.



- The fetus can be effectively treated by maternal administration of antithyroid agents, which cross the placenta. The fetal heart rate can be used to titrate the dose of antithyroid drugs

Hypothyroidism:

- Incidence: **1%** of pregnant women and is usually due to autoimmune Hashimoto's thyroiditis or idiopathic myxoedema.
- There is a reduced IQ in babies of women with hypothyroidism that are not adequately treated, or that goes unrecognized. The insult is likely to occur in the first trimester, and therefore pre-conceptual optimization of T4 therapy is important

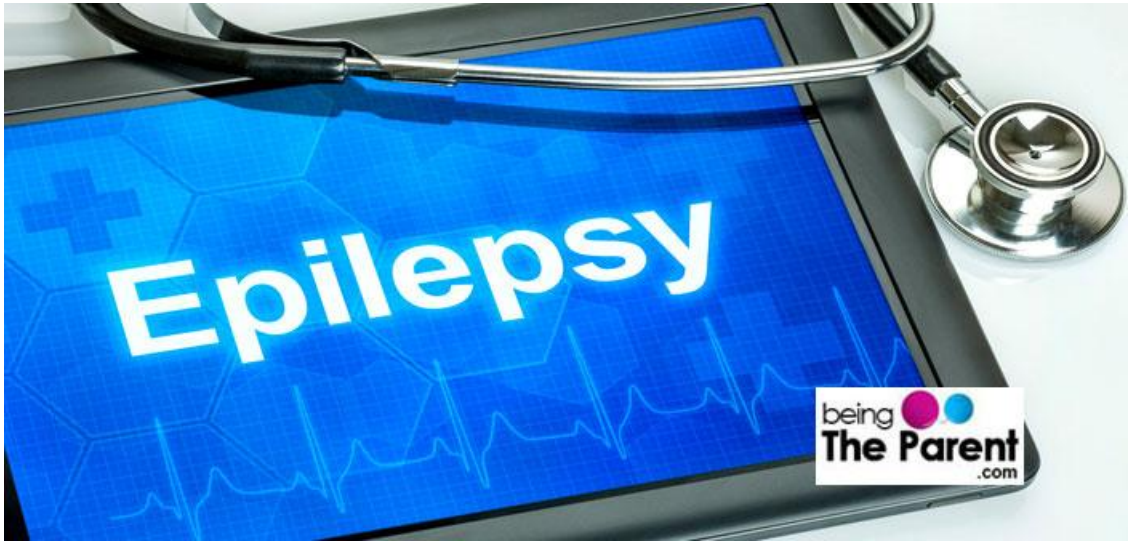
- The classical symptoms of hypothyroidism are common to pregnancy and cannot be relied upon to discriminate onset or worsening of the disease. The management is therefore based principally on biochemical measures.
- Thyroxine is titrated against biochemical results and is safe in pregnancy and lactation. As long as the patient is clinically euthyroid, thyroid function test should be performed every 2-3 months.

Postpartum thyroiditis:

- occur up to a year following delivery and can manifest as high or low T4 levels.
- Associated with thyroid antiperoxidase antibodies. Histology suggests a chronic thyroiditis with lymphocytic infiltration.
- The disease may present initially between 1 and 3 months postpartum with thyrotoxicosis and later with hypothyroidism.

- Hyperthyroidism is due to destruction of thyroid follicles & release of preformed hormones. The destruction of thyroid follicles ultimately leads to hypothyroid phase. A course of T4 may be necessary.
- The period of hypothyroid state is variable, and permanent hypothyroidism can result.
- The condition may recur in future pregnancies and follow up is needed to ensure that permanent hypothyroidism does not occur.

Epilepsy in pregnancy



- Incidence : 1 in 200 pregnancies
- **Pre-pregnancy counselling**
- Alter medication according to seizure frequency
- Reduce to monotherapy where possible & ensure compliance
- Pre-conceptional folic acid 5 mg

- Explain risk of congenital malformation: anticonvulsant medications are associated with a two- to three-fold increased risk of fetal abnormality
- Explain risk from recurrent seizures

- Many factors contribute to altered drug metabolism in pregnancy and result in a fall in anticonvulsant drug levels.
- The reasons for increased fit frequency in

pregnancy therefore include:

- ❖ the effect of pregnancy on the metabolism of anticonvulsant drugs
- ❖ sleep deprivation or stress
- ❖ poor compliance with medication.

- Delivery mode and timing is largely unaltered by epilepsy
- Anticonvulsant medication should be continued during labour.
- Breastfeeding can be encouraged, feeding is best avoided for a few hours after taking medication.
- Information on safe handling of the neonate should be given to all epileptic mothers.

Causes of seizures in pregnancy

- Epilepsy
- Eclampsia
- Encephalitis or meningitis
- Space-occupying lesions (e.g. tumour, tuberculoma)
- Cerebral vascular accident
- Cerebral malaria or toxoplasmosis
- Thrombotic thrombocytopenic purpura
- Drug and alcohol withdrawal
- Toxic overdose
- Metabolic abnormalities (e.g. hypoglycaemia

Thank You