"Best of" Meeting SoFFœt - 15 Octobre 2021

A case of advanced bone maturation with IUGR

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Clinical information

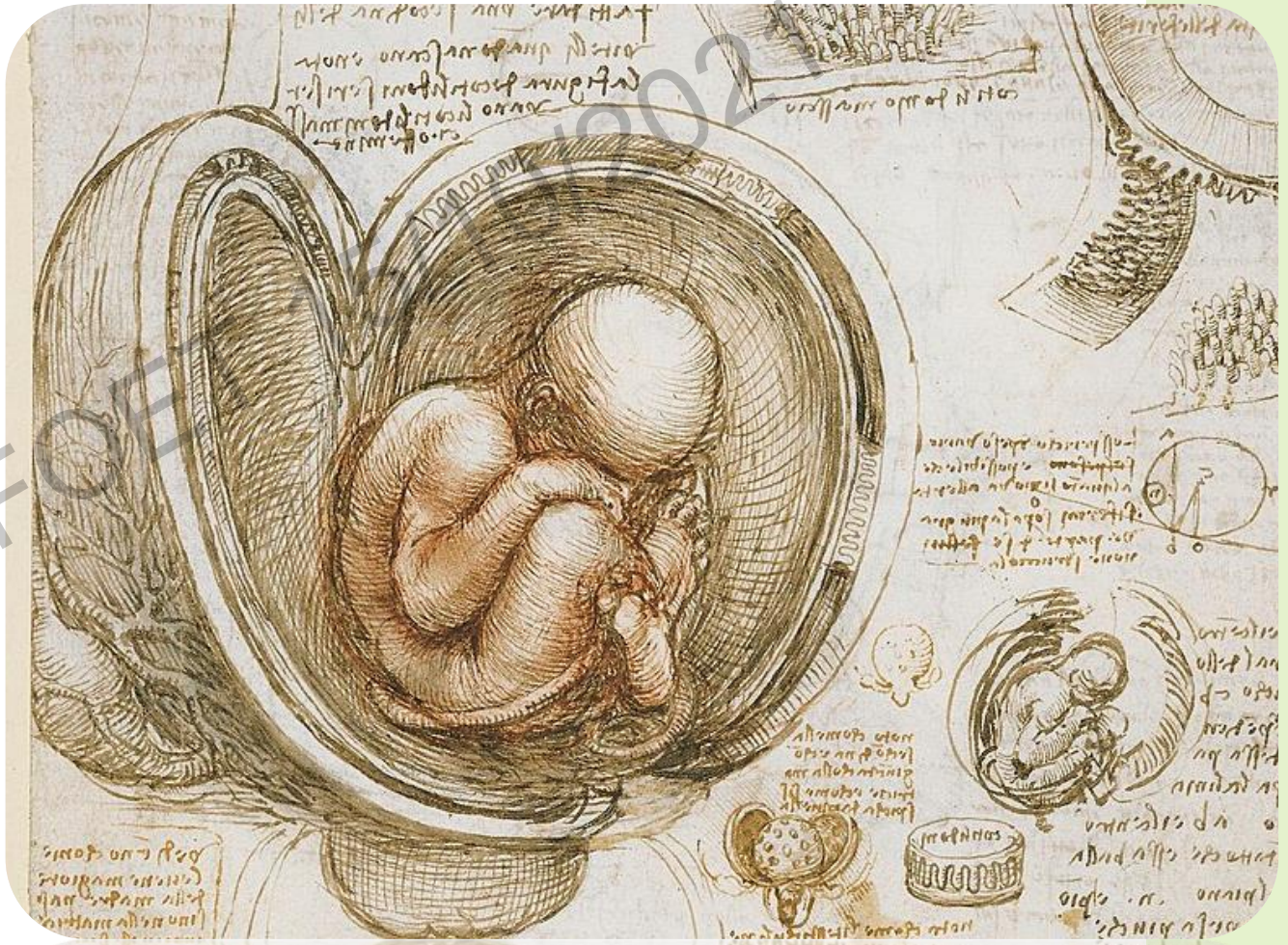
- Primiparous 33-year-old woman
- Prior history: Graves disease (thyroidectomy during infancy)
- Urgent caesarean at 35+2WG:

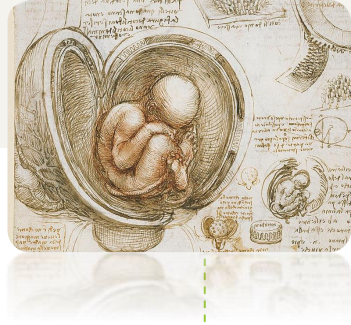
Due to →
- Extreme fetal bradycardia
- Retroplacental hematoma

→ Stillborn fetus

- Requested a clinical autopsy → performed in accordance with the protocol of the institution.

Macroscopic evaluation

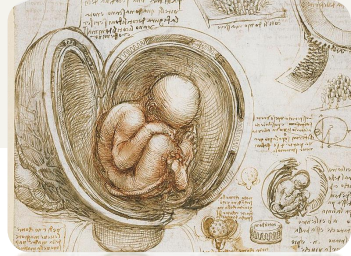




Macroscopic evaluation

- Measurements ≈ **31** WG → **IUGR**
- Organs weight:

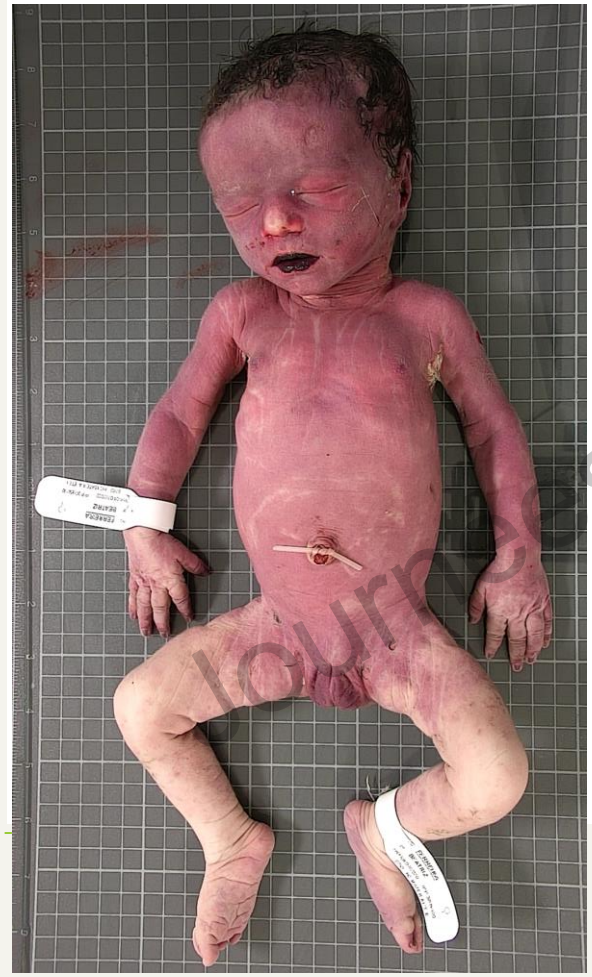
Organ	Weight	31 WG	
Liver	112,7 g	83,9 g ± 23,8 g	→ Hepatomegaly
Spleen	24,06 g	4,2 g ± 1,6 g	→ **Splenomegaly**
Duodenum + pancreas	6,68 g	3,1 g ± 2,9 g	
Kidney (R / L)	16,2 g (7,95 g / 8,25 g)	16,0 g ± 4,3 g	
Adrenal glands (R / L)	2,31 g (0,95 g / 1,36 g)	4,8 g ± 1,5 g	→ Adrenal hypoplasia
Lungs (R / L)	35,12 g (19,93 g / 15,19 g)	36,3 g ± 11,0 g	
Thymus	14,62 g	4,5 g ± 2,3 g	→ **Thymic hyperplasia**
Heart	19,3 g	9,6 g ± 2,4 g	→ **Cardiomegaly**

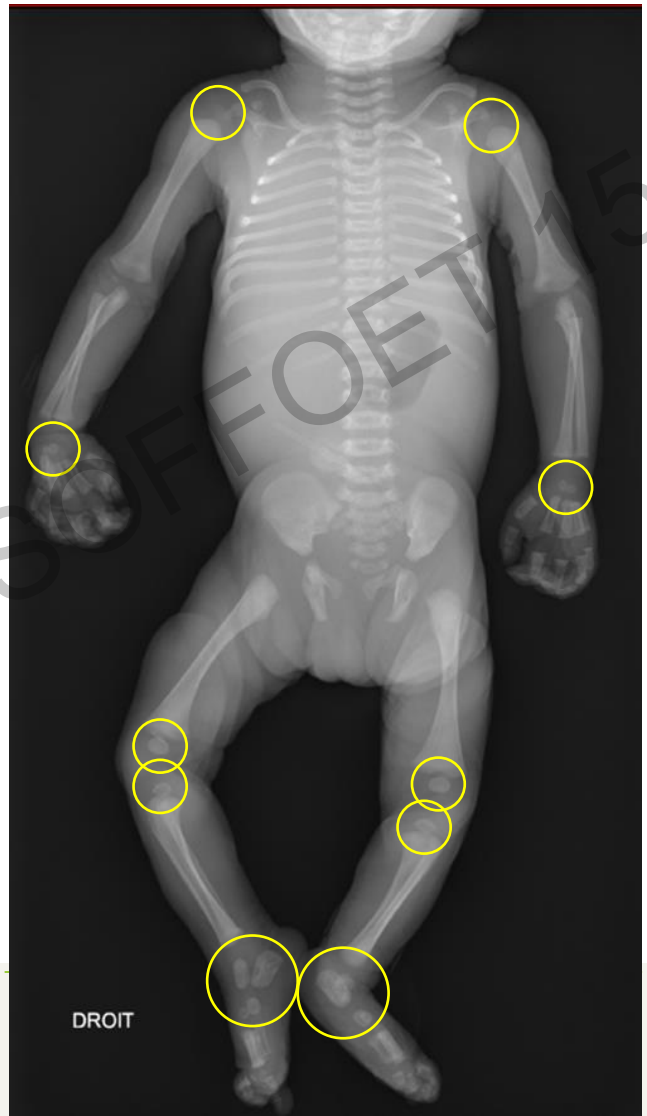


Macroscopic evaluation

Ø Congenital malformation

(extern & intern)





Radiographic evaluation

- premature ossification points -

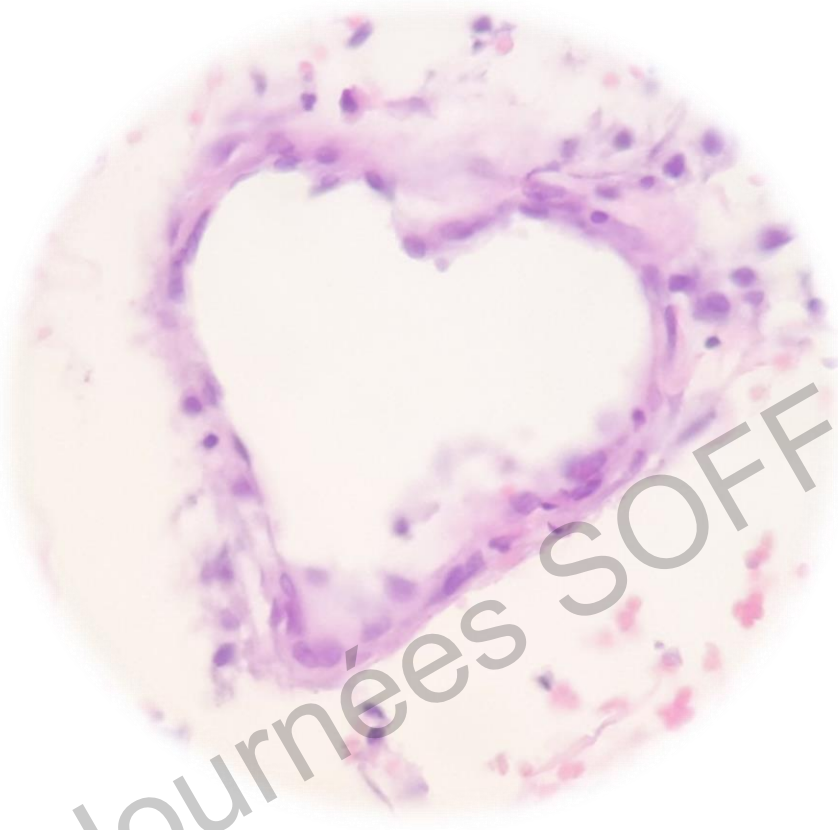
- Superior point of the humerus,
- Inferior point of the femurs
- Superior point of the tibia,
- Carpal bones,
- Calcaneus, astragal and cuboid bone.

Compatible with 3 months of life

Accelerated bone maturation

Macroscopic evaluation

- Liver:



Histologic examination

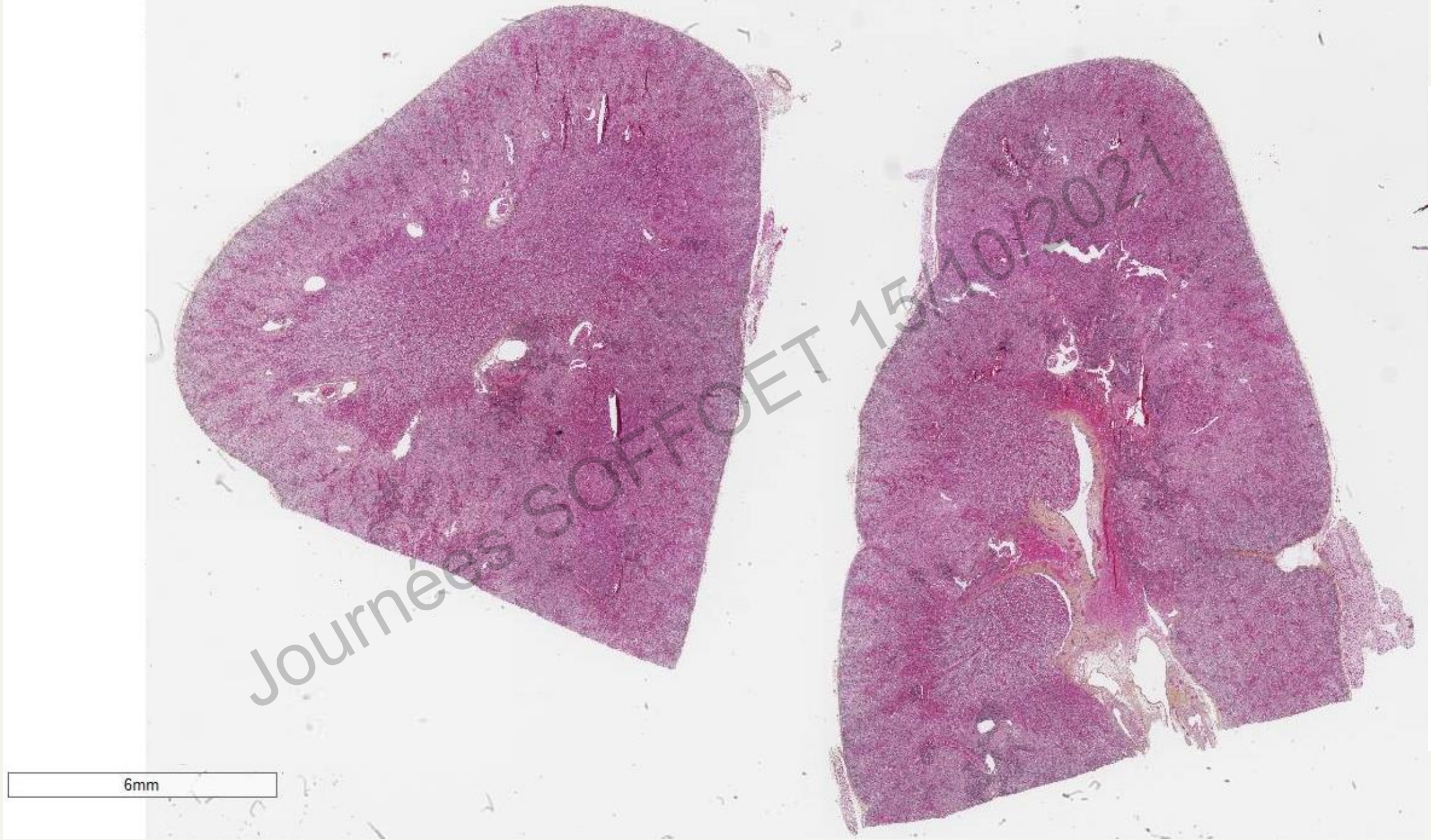
Histologic examination

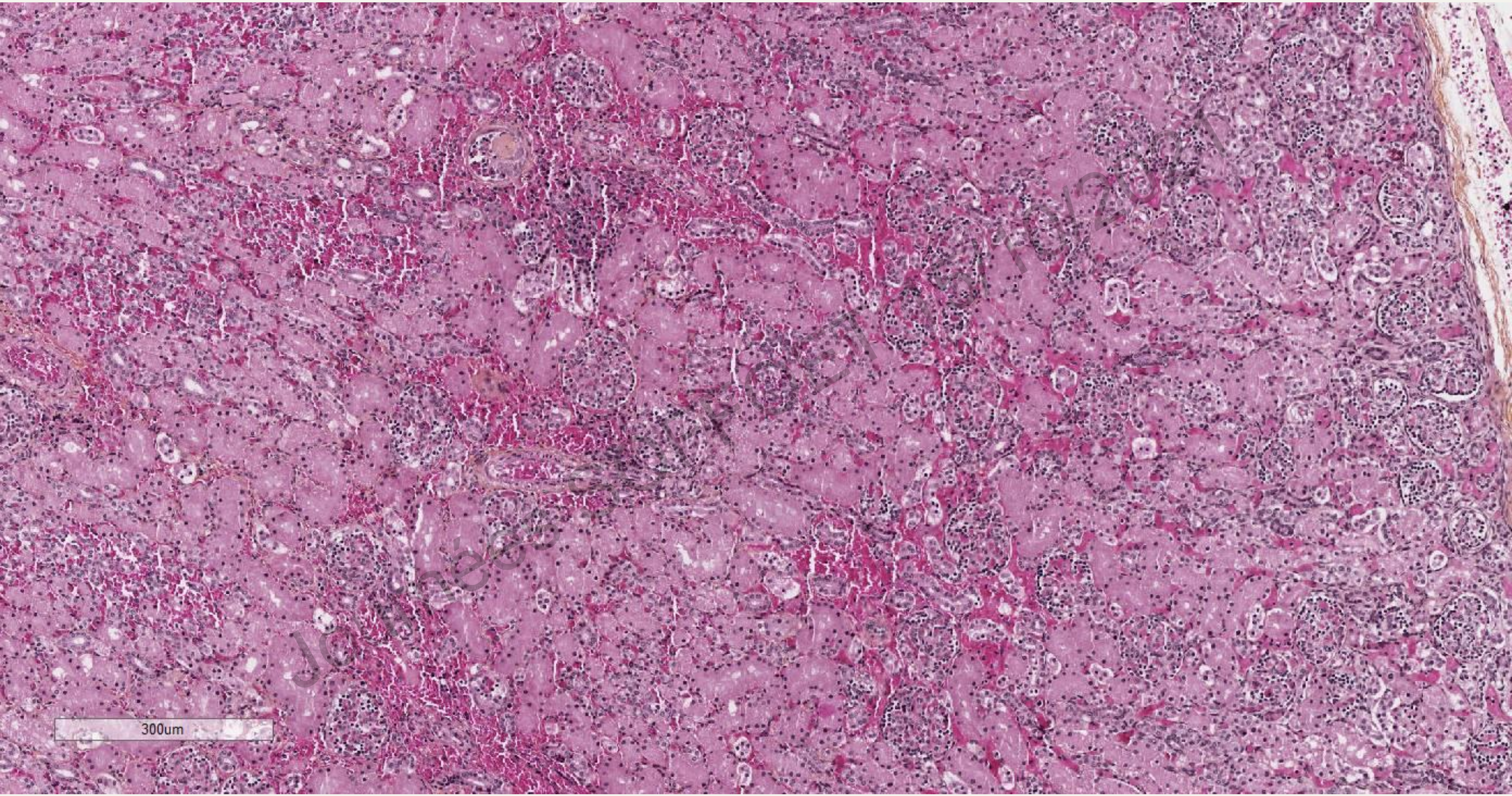
- Liver:
  - Exuberant hepatic cholestasis (Ø ductopenia or malformation of the biliary tree)
  - Anomalous hepatic **haematopoiesis** (erythroid & granulocytic lineage) for WG
  - Marked sinusoidal congestion + haematopoiesis → hepatomegaly
- Extrahepatic **haematopoiesis**:
  - Spleen (→ splenomegaly)
  - Kidneys
  - Striated muscle
  - Lymph nodes

Few megakaryocytes!

Histologic examination

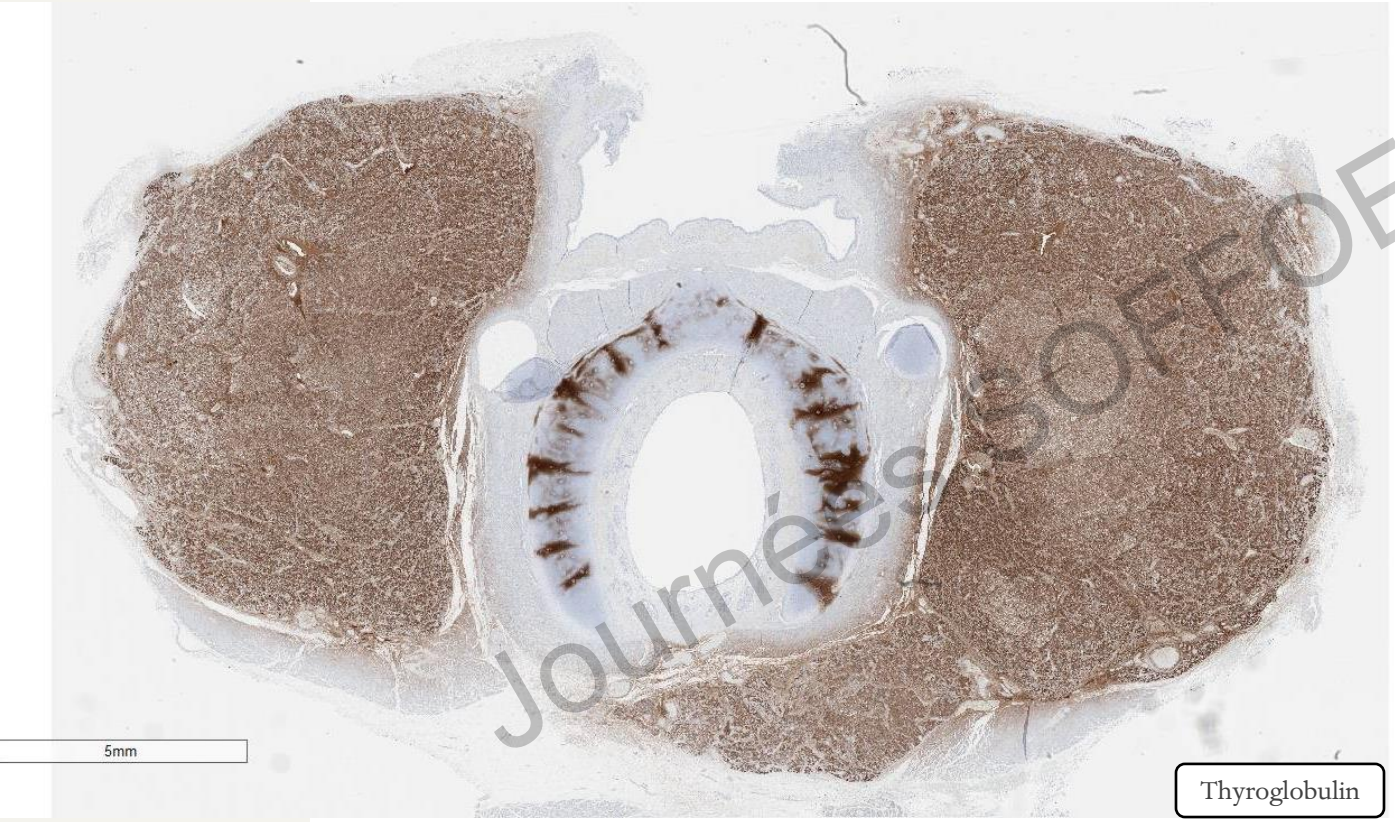
- Kidneys:
  - ↑ weight → haematopoiesis
  - Maturation → 35 WG (almost absence of nephrogenic remnants)
    - Nº of glomerulus is diminished for 35 WG → renal hypoplasia
  - ↑ nº sclerotic glomerulus

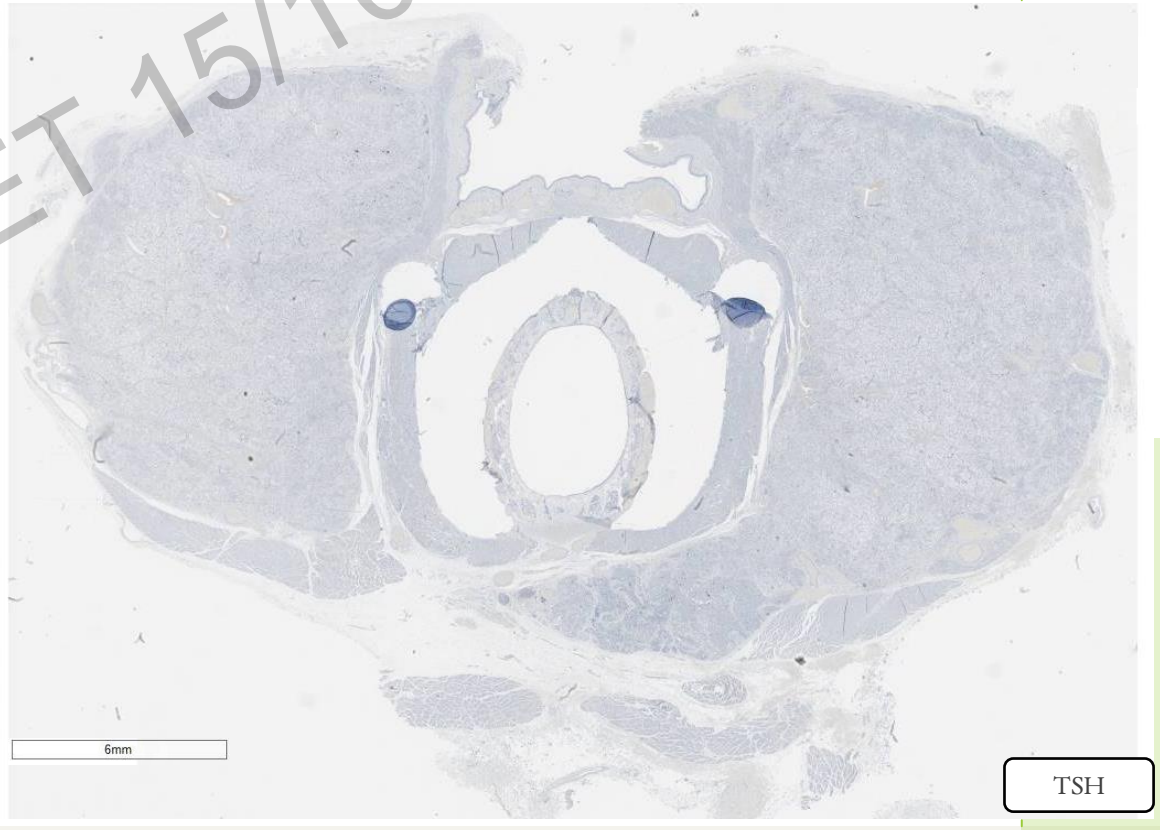



300um

Histologic examination

- Voluminous thyroid – normal histology





Histologic examination

- Heart – hypertrophic cardiomegaly
- Adrenal glands – slight congestion; normal histology
- Thymus - normal
- Brain:
  - Oedema and vacuolization of the neuropil → anoxic-ischemic lesions

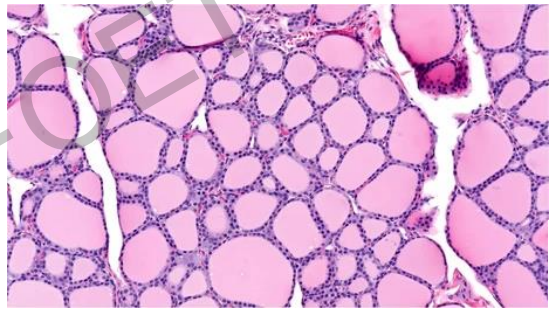
Conclusion

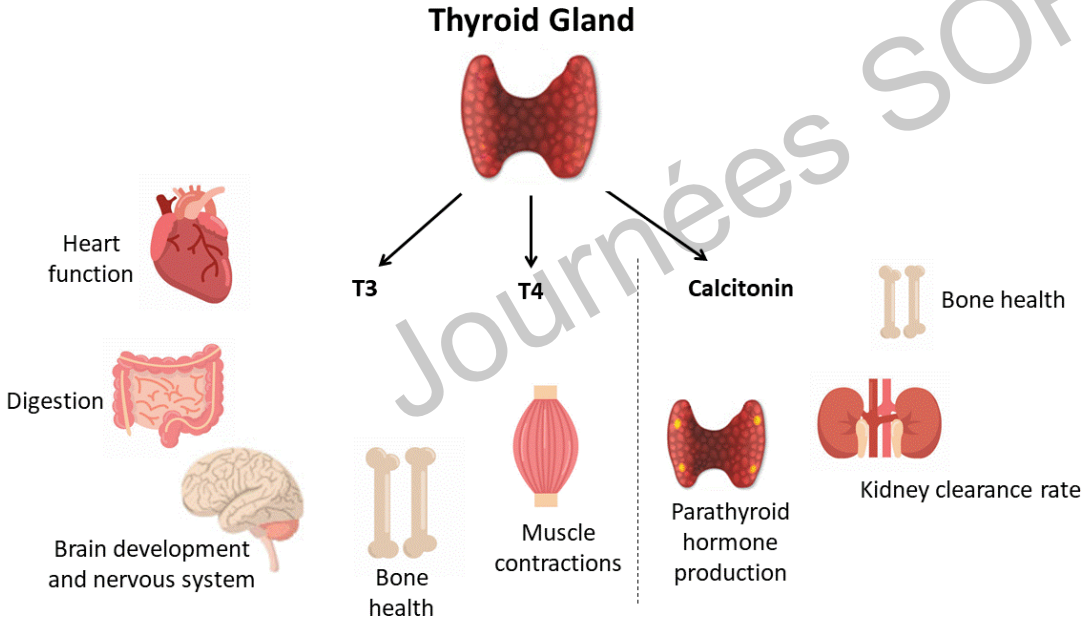
Congenital hyperthyroidism

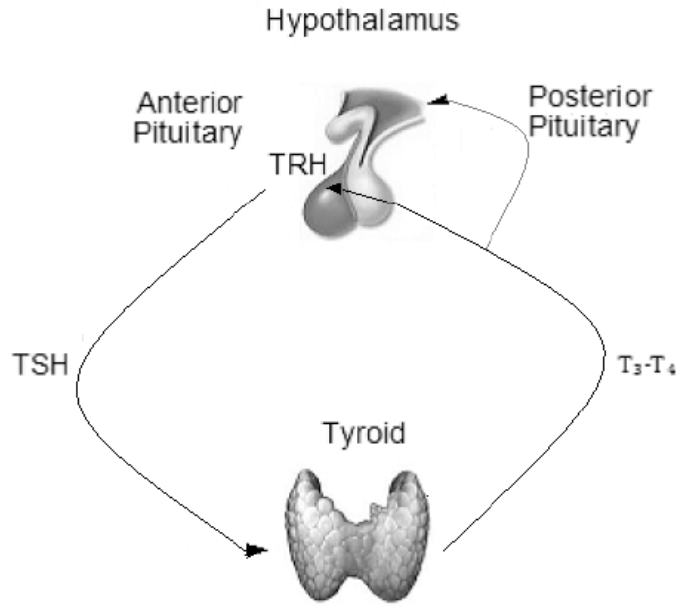
- Maternal prior history
- Advanced bone maturation
- Cardiomegaly + cardiac rhythm problems
- IUGR
- Intrahepatic cholestasis
- Haematopoiesis disarray
- Disturbances in renal development
- Signs of chronic hypoxia (augmented haematopoiesis, adrenal hypoplasia)

Thyroid Gland

- Develops from a midline thickening of the pharyngeal floor
- 7 weeks of development → fusion and migration to definitive position
- Composed of thyroid follicles







Thyroid Gland

10 weeks development

Thyroid hormone synthesis begins

Midgestation

Primary (thyroidal) and tertiary (hypothalamic) hypothyroidism

Final weeks of gestation

Mild tertiary hypothyroidism

Perinatal period

Fully mature thyroid function

Congenital hyperthyroidism

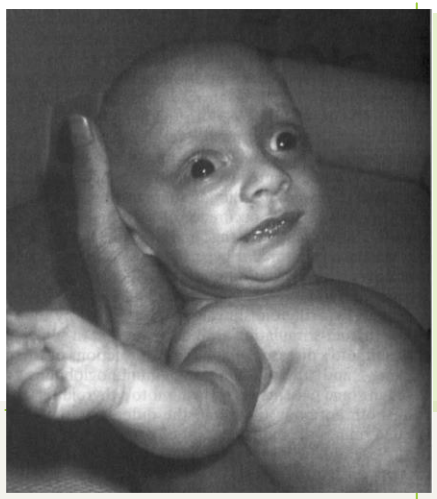
- Less frequent than congenital hypothyroidism

- Causes:
  - **Immune form** (transient hyperthyroidism):
    - Maternal Graves' disease (most common) → with transplacental passage of iodine and T4 from mother to fetus
  - **Hereditary form** (persistent hyperthyroidism) → inherited or de novo mutations:
    - Activating TSH receptor mutation
    - McCune-Albright syndrome

    } Less common

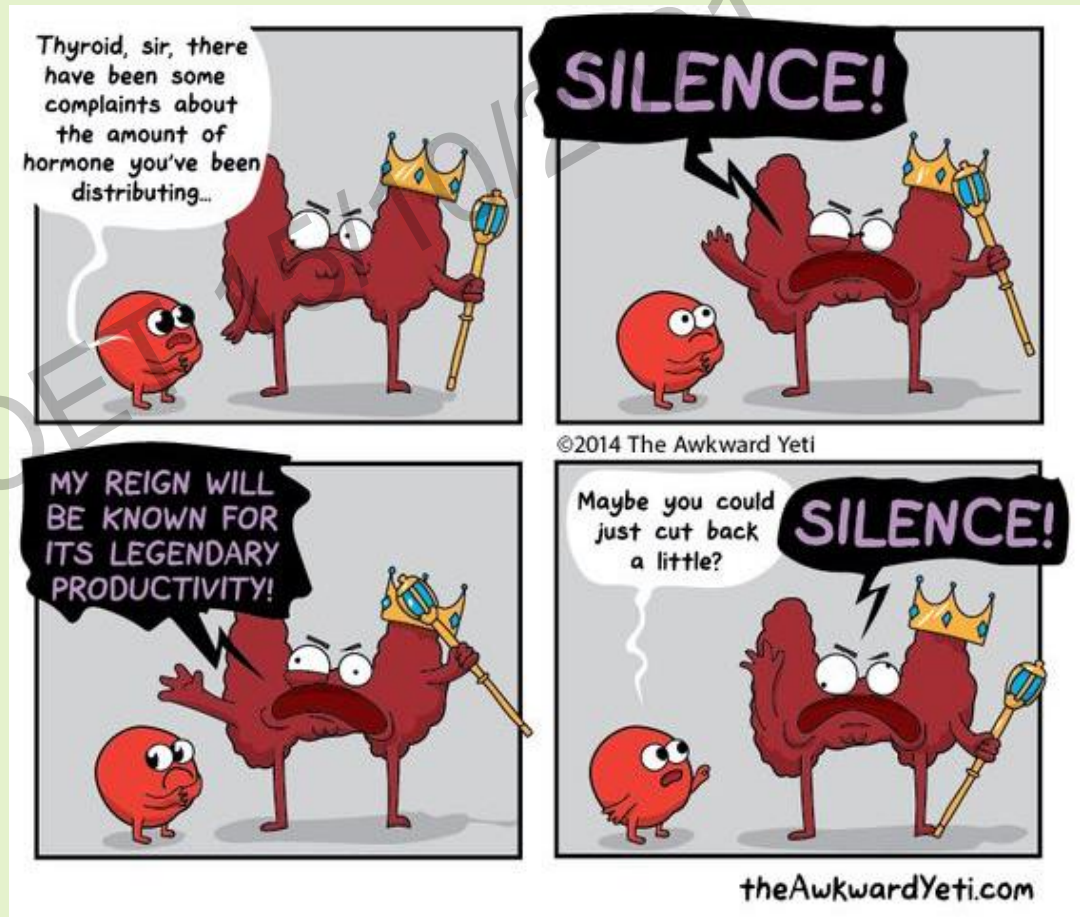
Congenital hyperthyroidism

- Tachycardia (→ heart failure) - Cardiac insufficiency	Tachypnea	- <u>Hepatomegaly and / or splenomegaly</u> - <u>Jaudice, cholestasis</u>	<u>Goiter</u> – present in ≈50% of cases
<u>Thrombocytopenia</u>	Bilateral gynecomastia	- <u>Advanced skeletal maturarion</u> - Small fontanels	- Poor weight gain (despite increased appetite) - <u>IUGR</u>
Premature birth	- Hyperexcitability - Stare and/or eyelid retraction	- Vomiting - Diarrhea	Fever



Source: **Congenital hyperthyroidism;** H. Krude, H. Biebermann, H. P. Krohn*, H. Dralle**, A. Grüters; Exp Clin Endocrinol Diabetes 1997; 105: 6-11

Thank you for your attention!



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