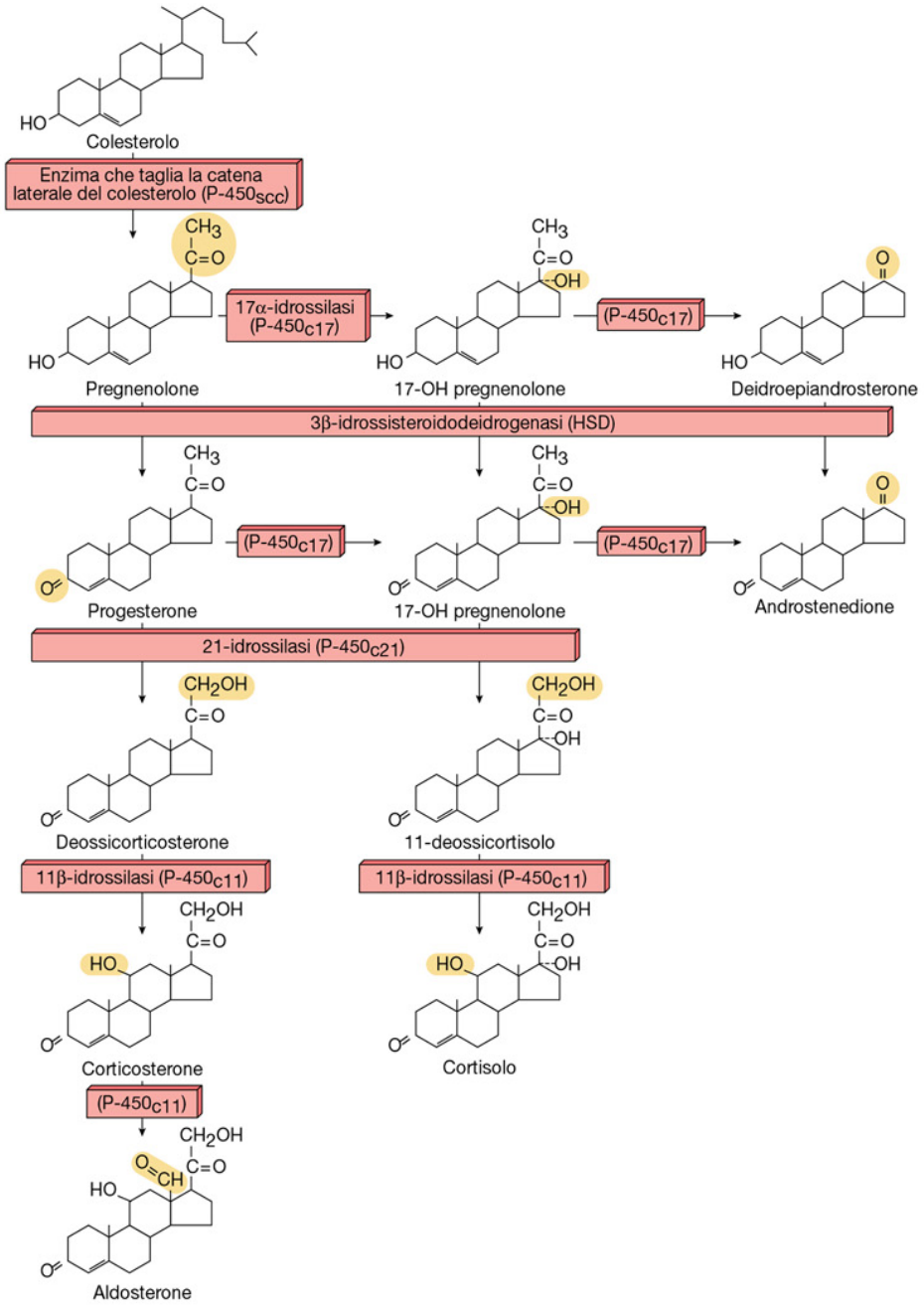
Adrenal Gland

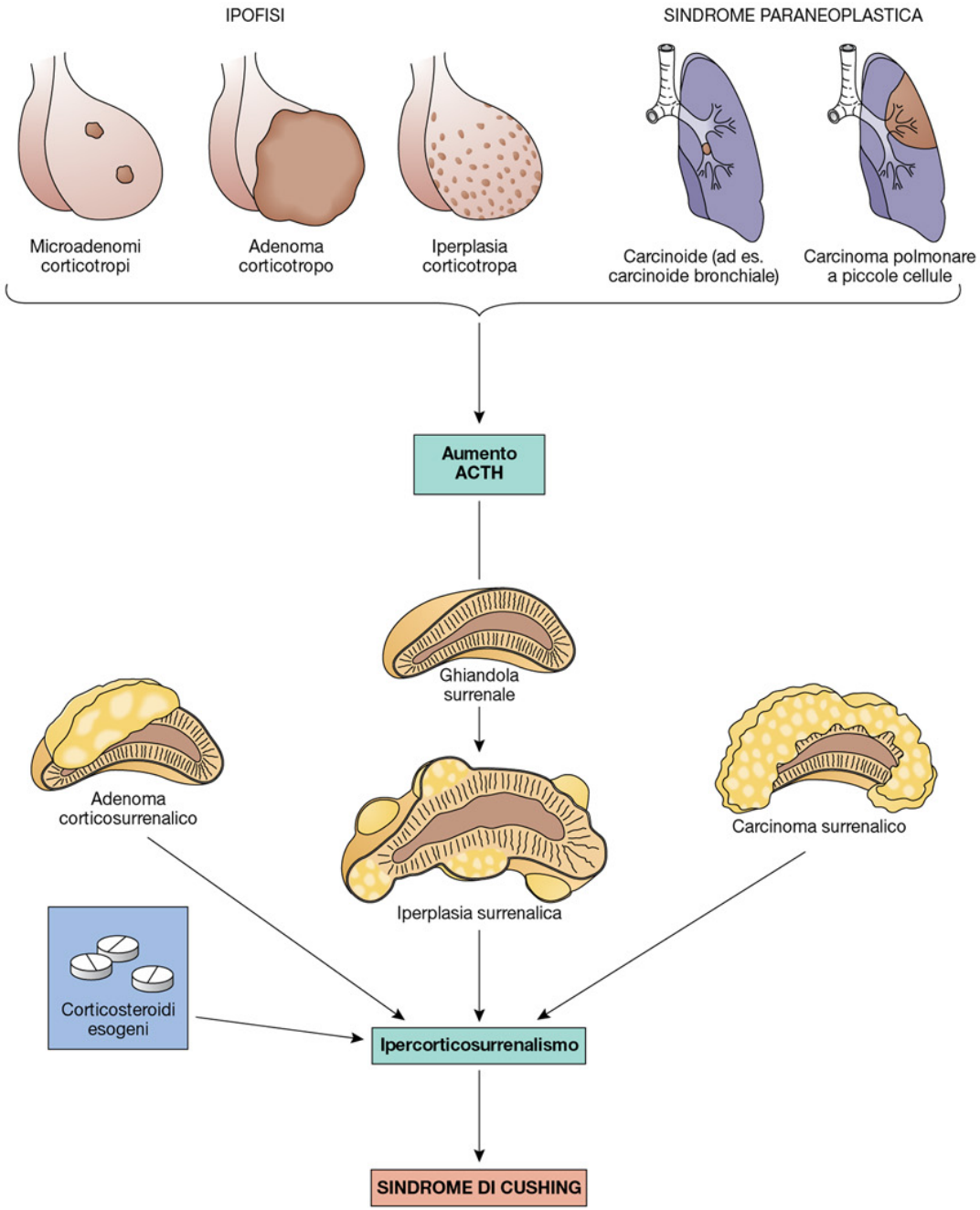
- **Cortex**
  - Zona Glomerulosa (mineralcorticoids)
  - Zona Fasciculata (glucocorticoids)
  - Zona Reticularis (sexual hormones)
- **Medulla**
  - Adrenaline and noradrenaline



Rubin, Patologia

Adrenal Gland

- ***Adrenocortical Hyperfunction***
  - Hyperaldosteronism
  - Hypercortisolism
  - Adreno-genital syndrome



Rubin, Patologia

Adrenal Gland

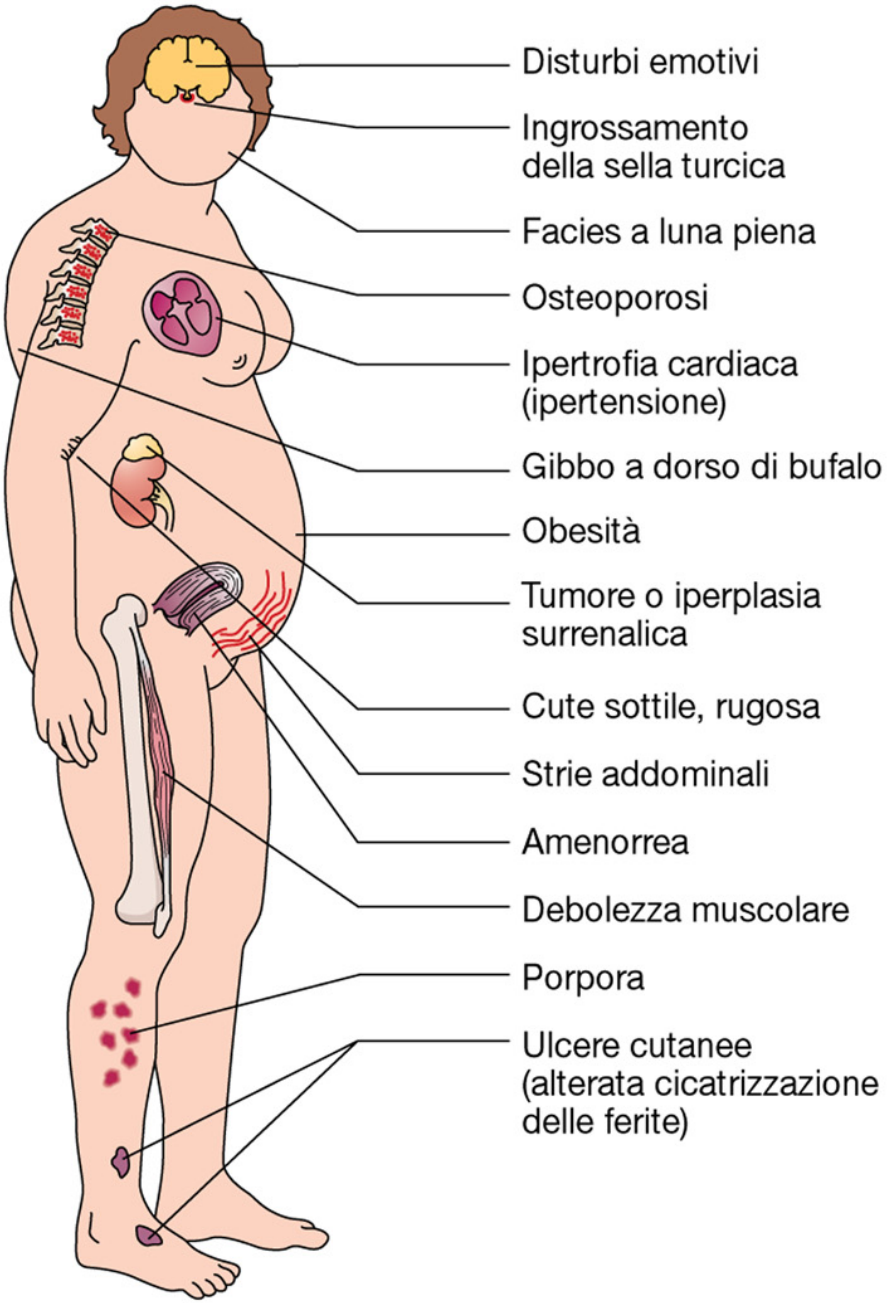
- Prymary Hypercortisolism (50%) or **Cushing's Syndrome**
  - ACTH-secreting Pituitary Microadenoma
  - Females (5/1), 20-30 years old
  - Yellowish-coloured Bilateral global cortical hyperplasia, with prevalence in the zona fasciculata
  - Crooke's hyaline degeneration of the pituitary gland (build-up of cytoplasmic cytokeratins)

Adrenal Gland

- Ectopic incretion of ACTH
  - carcinoids
  - small-cell lung cancer
  - Medullary thyroid cancer
- Symmetric bilateral hypertrophy

Adrenal Gland

- Diffuse/nodular hyperplasia (multiple,diffuse, 0.5-2 cm)
- Adenoma (2-4 cm., 20-30 g.)
- Cortical carcinoma (2-20 cm., 200-300 g.) (**Cushing's syndrome**) (15-30%)
  - Children and adults (40-50 years old)
  - Unilateral with controlateral atrophy
- Therapeutic administration of cortisone (exogenous Cushing Syndrome)
  - Bilateral cortical atrophy



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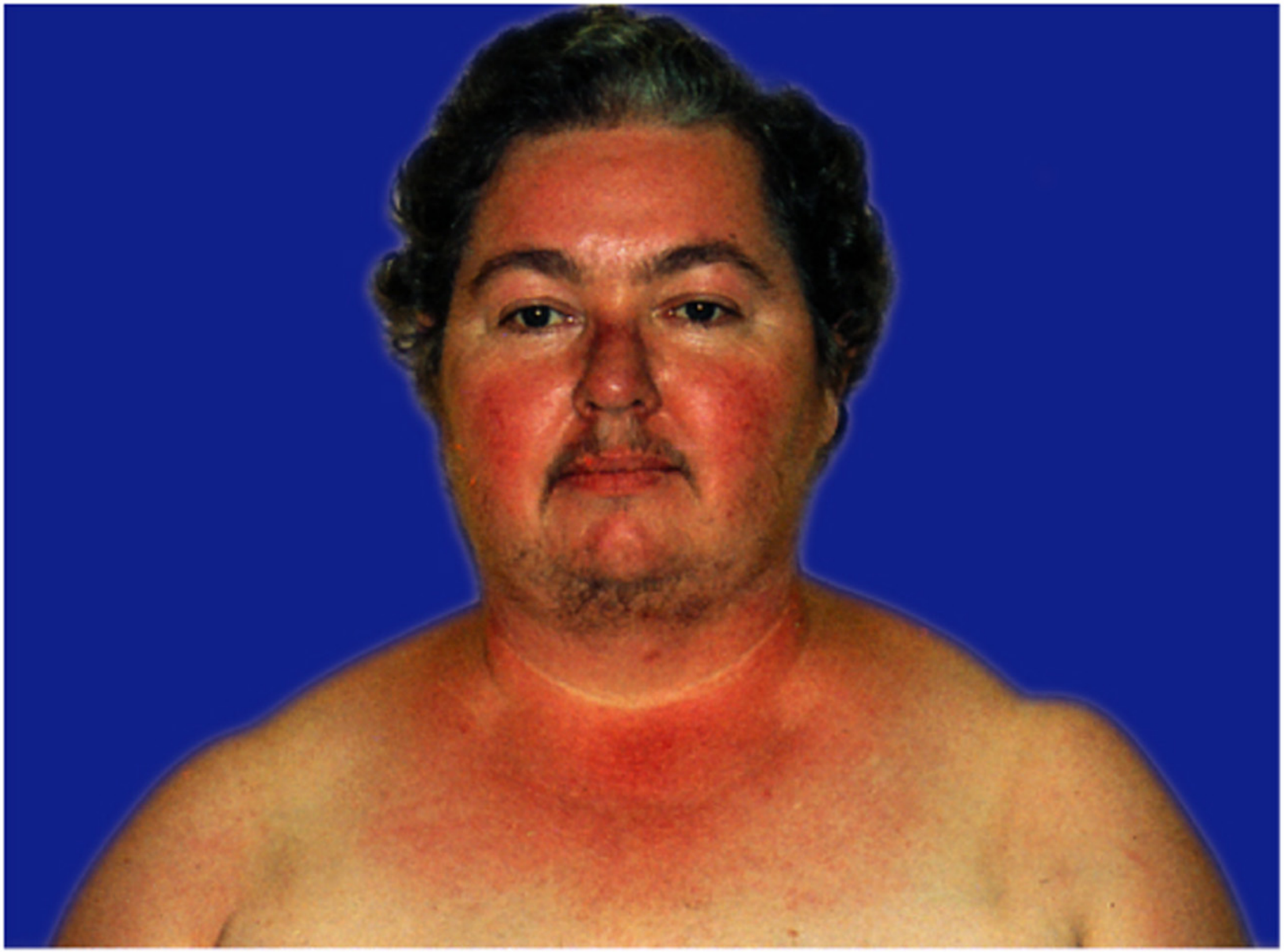

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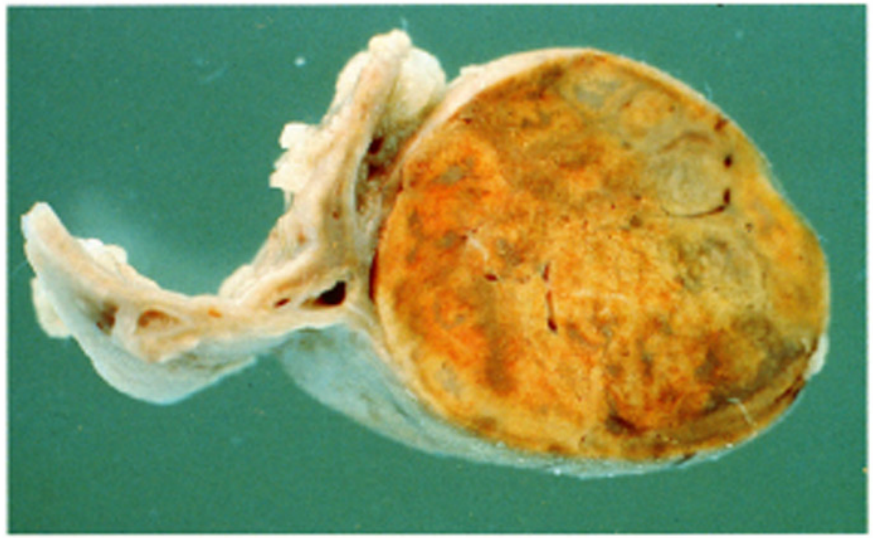

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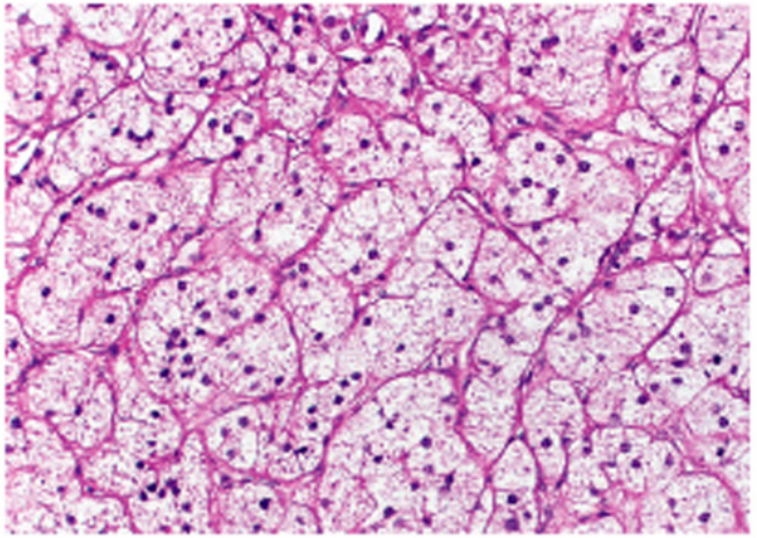

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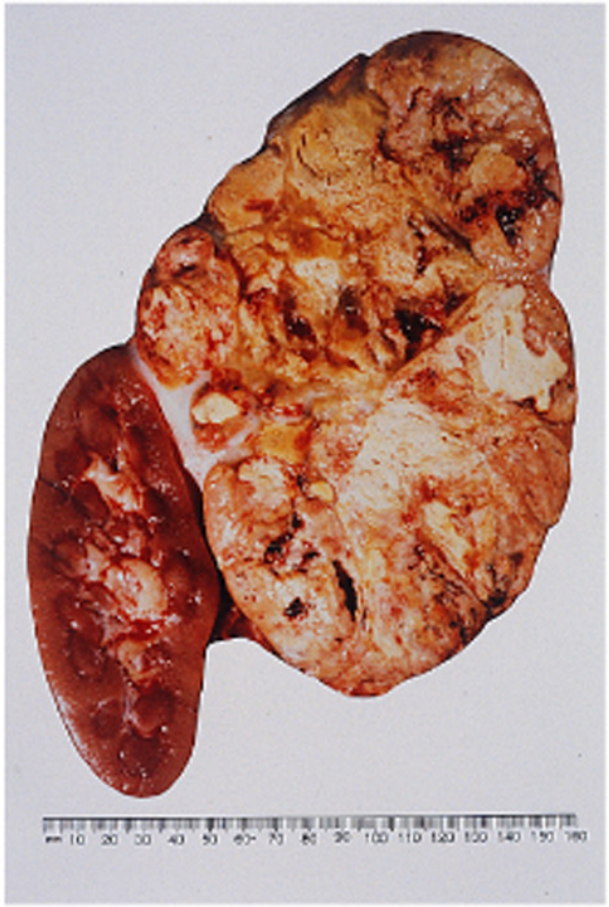

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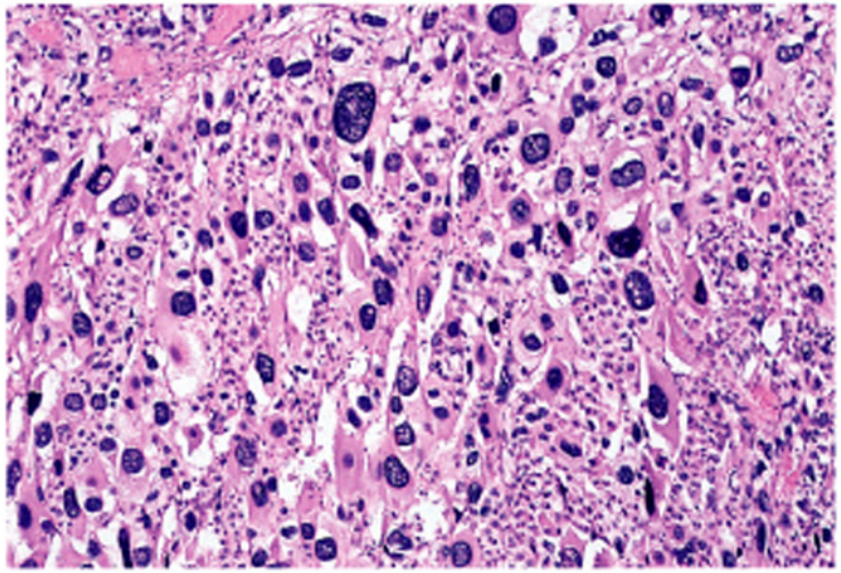


B

Adrenal Gland

- **Hyperaldosteronism**
  - Hypertension
  - Asthenia, paresthesias, visual impairment
  - Hypernatremia and increase in extracellular volume
  - ECG alterations and heart failure

Adrenal Gland

- **Prymary hyperaldosteronism (Conn's syndrome)**
  - Retention of Na^+ and loss of K^+
  - Hypertension and hypokalemia
  - Renin/angiotensin system inhibition
  - Mostly caused by aldosterone-secreting **adenoma**
    - females > males, 30-50 years old
    - isolated, capsulated
    - Sulfur-yellow coloured
    - Lipidized cells

Adrenal Gland

- **Secondary hyperaldosteronism**
  - Due to hyperactivation of the renin/angiotensin system
  - Secondary to congestive heart failure
  - nephroangiosclerosis
  - Hypoalbuminemia and pregnancy

Adrenal Gland

Acute adrenocortical insufficiency

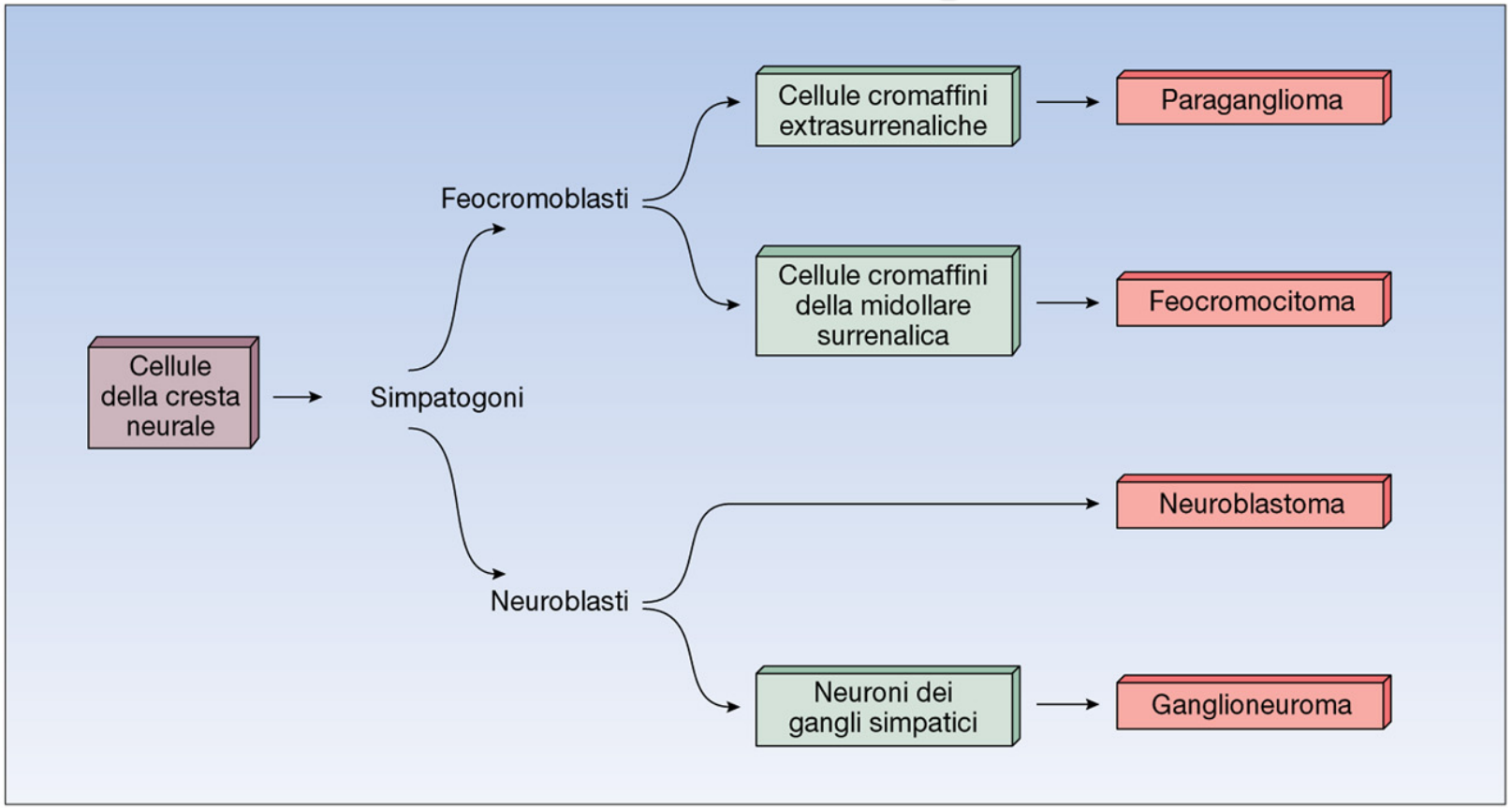
- Due to stress in patients with hypoadrenalism
- Caused by post-therapeutic deprivation
- Bilateral adrenal haemorrhage:
  - Premature newborns
  - In anticoagulated patients
  - Secondary to D.I.C.
  - Due to Waterhouse-Friderichsen's syndrome
    - Meningococcal sepsis
    - Pseudomonas or Haemophilus
    - Worsening hypotension= shock

Adrenal Gland
Chronic adrenocortical insufficiency

Progressive destruction of the cortex (>90%)

- *Fatigue, weakness*
- *Anorexia, nausea, vomit, weigth loss*
- *ACTH hypersecretion and melanodermia*
- *Hyperkalemia, hyponatremia, hypotension, hypoglicemia*
  - Autoimmune (60-70%), associated with Hashimoto, Atrophic gastritis, type-I Diabetes Mellitus
  - Post-infective (Tbc, fungi, HIV)
  - Amiloidosis or sarcoidosis-related
  - Metastases

Adrenal Gland
Medulla - neoplasms



Adrenal Gland
Medulla - neoplasms

Pheochromocytoma

- Females > males, age: 40-60
- 10% extra-adrenal (paraganglíar)
- 10% malignant
- 10% symptomatic (autosomal dominant)
  - MEN II A (CMT + parathyroid hyperplasia)
  - MEN II B (CMT + neurofibromas)
  - Sturge-Weber (Angiomatosis encephalo-trigeminal)
  - Von Hippel-Lindau (renal carcinoma, angiomas, cerebellar hemangioblastoma)

Adrenal Gland
Medulla - neoplasms

Pheochromocytoma

- *Worsening paroximal hypertension*
- *Tachycardia, cephalea, sweating*
- *Abdominal pain and vomit*
- *Cathecolamines-induced cardiomyopathy*
- *> VMA and OVA in urine*

Adrenal Gland
Medulla - neoplasms

Pheochromocytoma

- Well demarcated by a dark-yellow pseudocapsule, till to 1 Kg.
- Lobulated, vascularized (sinusoids)
- Chromaffin cells (Potassium dichromate)
- Polygonal or fusiform cells, in nests or cords
- Sustentacular cells
- Mitosis and pleomorphism are not indicative for malignancy

PHEOCHROMOCYTOMA

Location →

Adrenal medulla 90% (bilaterals 10%)

Extradrenal: 10% (thoracic gangliar e paragangliar, bladder wall)

Organ of Zuckerkandl (tissue which is paragangliar preaortic at the bifurcation and paraortic)

Symptomatology →

Constant hypertension
Constant hypertension with paroxysms
Intermittent hypertension

→ Caused by:
-Stress
-Exercise
-Abdominal compression

Hyperglicemia in 2/3 of cases

Criteria for diagnosis of malignant Pheochromocytoma

Weight > gr 500
Invasion of the capsule
Infiltration of adrenal cortex
Hypercellularity
IM>
Confluent necrotic foci
Fusiform shape of cells
Vascular invasion

None of these criteria can singularly predict the clinical behaviour of the neoplasia and of its aggressiveness

The definitive diagnosis of malignity is exclusively based on the presence of **metastasis**

METASTASI

Regional Limph nodes
Liver
Lungs
Bones

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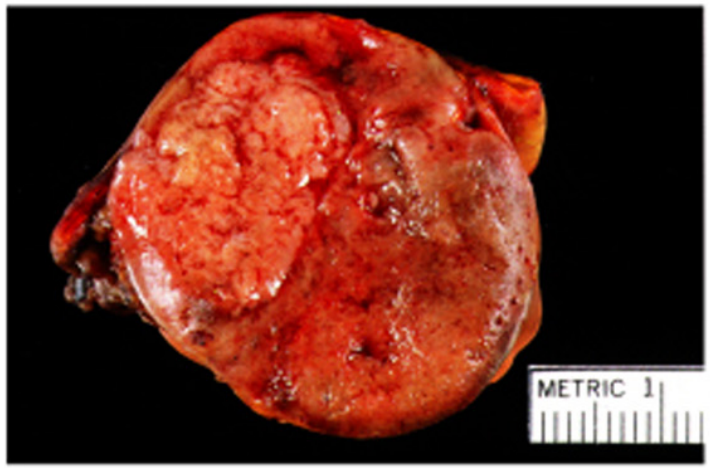

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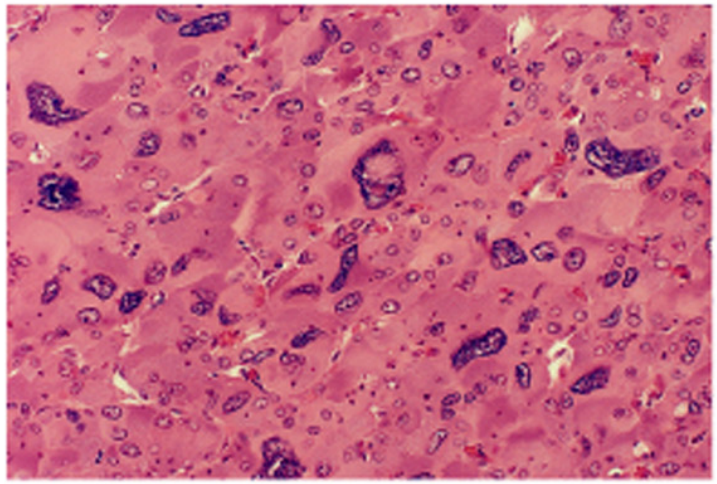

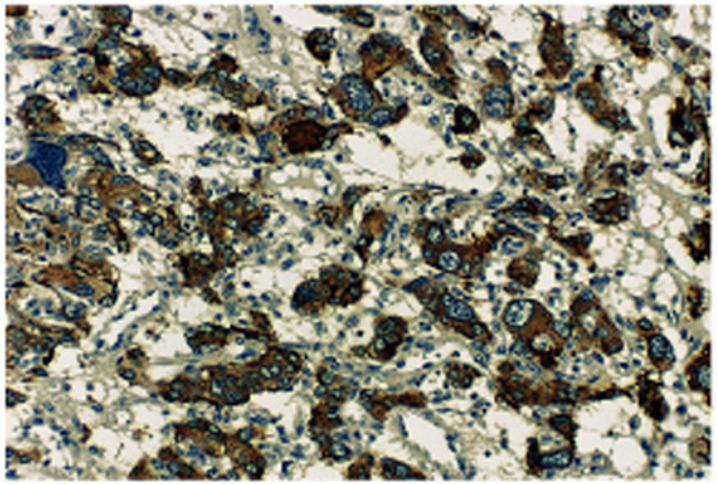

C

Adrenal Gland
Medulla - neoplasia

Neuroblastoma

- Aggressive neoplasia, typical of children (2-3 years old) or also congenital, as a space-occupying lump or with secretion of VMA and OVA.
- Rarely it can be extra-adrenal or intra-cranial.
- The lump is soft, mottled, widly hemorrhagic. It can involve the whole abdomen.

Adrenal Gland
Medulla - neoplasia

Neuroblastoma

- Made of small round cells, with a central bluish nucleus and and thin barely-clear cytoplasmatic border.
  - Embryonic sympathetic gangliar cells
  - Heterologous differentiation (rabdomioblasts)
  - Gangliar differentiation (ganglioneuroblastoma)
  - Extremely chemosensitive
- Drug-induced differentiation

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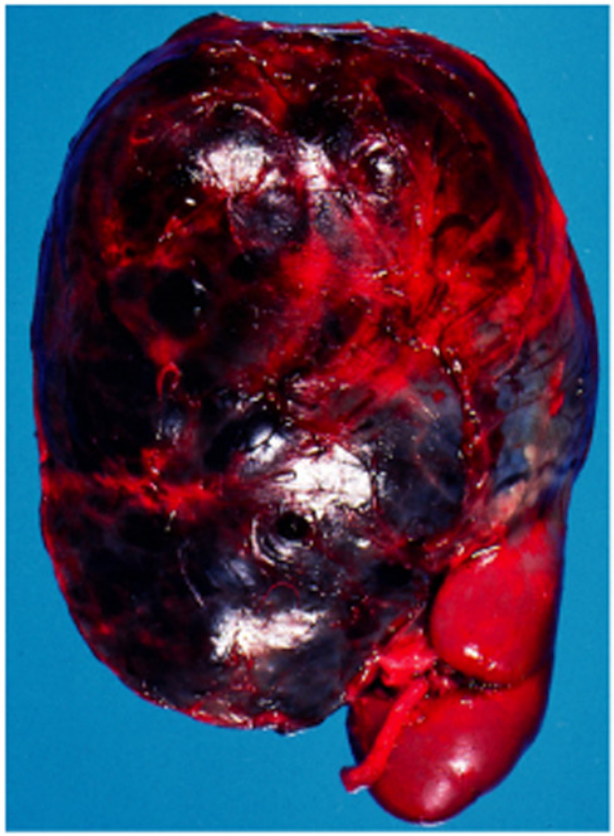

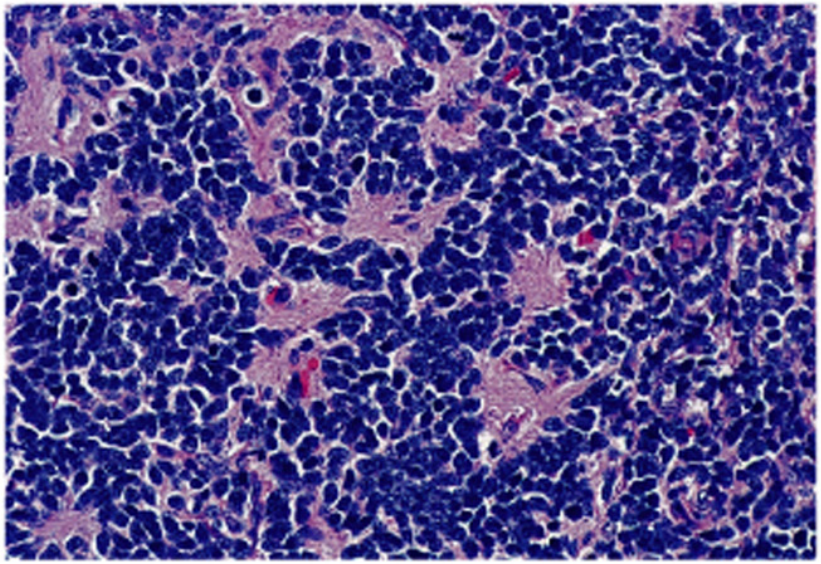

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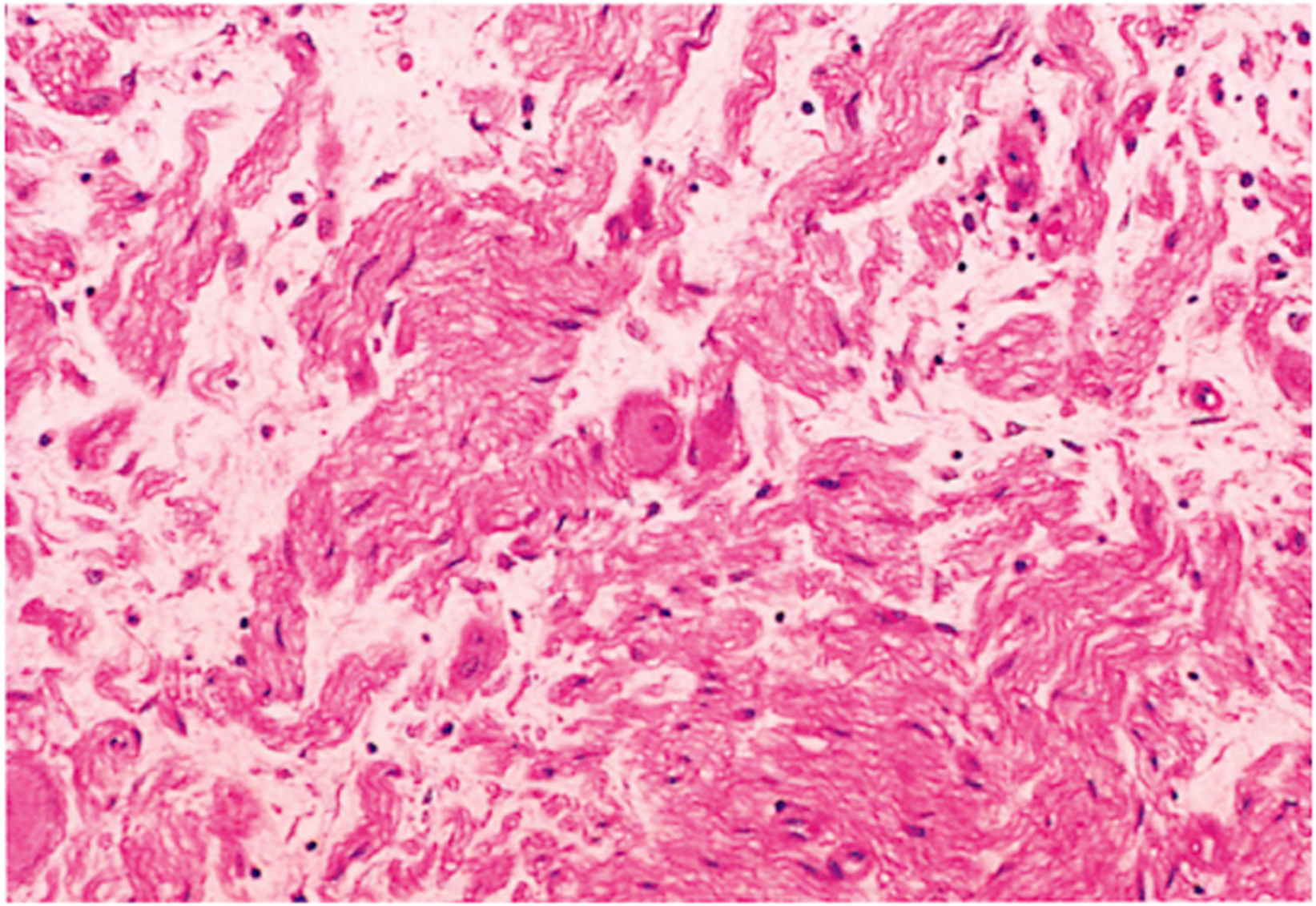

Adrenal Gland
Medulla - neoplasia

Neuroblastoma

- Differential diagnosis:
  - Lymphoblastic lymphoma (ALL)
  - Rhabdomyosarcoma
  - Wilms' tumor
  - Ewing's sarcoma