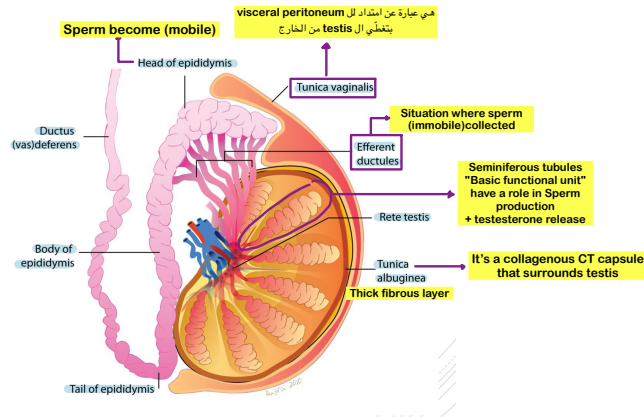
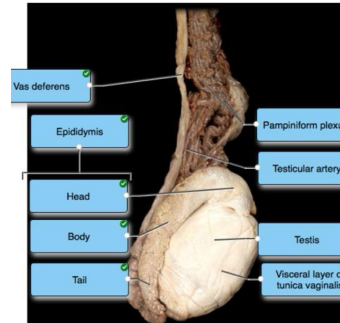


Pathology of male genital system -Testis

Testis anatomy



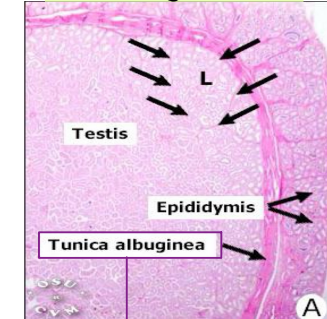
Grossly view of testis



Tunica vaginalis:
 هي عبارة عن امتداد للـ visceral peritoneum بتغطي الـ testis من الخارج

Tunica albuginea
 It's a collagenous CT capsule that surrounds testis

Histology of testis



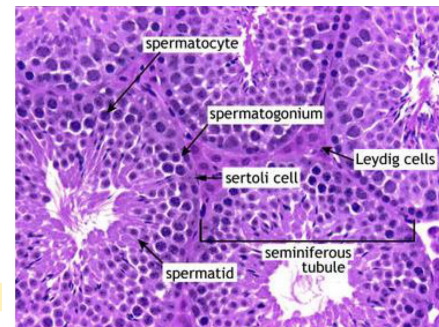
بتغطي الـ Testis من الداخل

Note: This movement is called " current flow movement "

Initially sperm immobile, then move by secreting large amount of fluid

التوضيح: في البداية يكون السائل المنوي غير متحرك، ثم يبدأ بالحركة عندما يتم إفراز كميات كبيرة من السائل المنوي (وهذا يوضح دور الـ seminal fluid) الذي تفرزه الغدة المساعدة مثل البروستات لمساعدة الحيوانات المنوية على الحركة و الخروج أثناء القذف

Seminiferous tubules → **Straight ends " Tubuli recti "** → **Rete testis** → **Epididymis** → **Vas deferens**



seminiferous tubules epithelium has 2 components:

- ① Sertoli cells (lines base of seminiferous)
- ② Spermatogenic cells (germ cells) for sperm production

Stages of Sperm production:

Spermatogonium -> spermatocyte -> spermatid

Basal immature

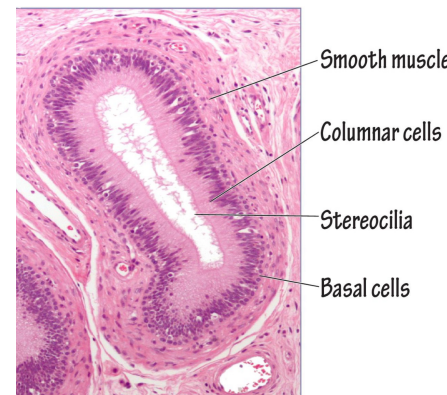
In center

Immobile move to epididymis by fluid

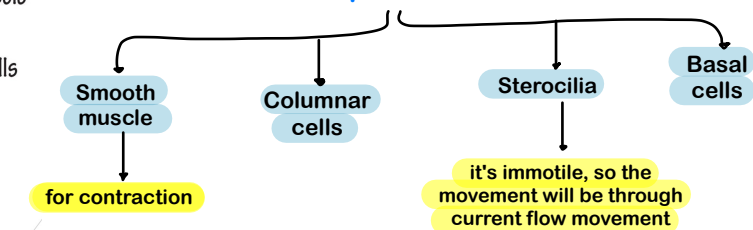
Note:

Testis are paired organ composed of seminiferous tubules, the site of spermatogenesis, also responsible for the secretion of male sex hormones

** The scrotum encases the testis and is connected to the abdominal wall via the spermatic cord



Epididymis Composed of



Cryptorchidism

(most common anomaly of urogenital tract in males)

Definition: It is a failure of testicular descent into the scrotum

Stages of descending :

Abdominal cavity → pelvis (3rd month of gestation) → scrotum
 (Last 2 months of intrauterine life)
 By passing through inguinal canal

General features:

- 1) affects 1% of males
- 2) Cause is unknown
- 3) Bilateral in nearly 10%
- 4) Undescended testes may become atrophic
 → if bilateral → sterility

5) 3-5 fold increase testicular cancer (in both testes) even in normally descended testis, suggesting intrinsic abnormality.

Diagnosis:

established after 1 year of age

خصوصاً في ال
premature babies

as refractile testis

Cause:

testicular descent into the scrotum is not always complete at birth

** إذا تجاوز الطفل عُمر السَّنة و لسا ال testis مش موجودة في مكانها هون لازم يصير في تدخل جراحي، و تسمى هاي العملية orchidopexy

Note:

Differential diagnosis of undescended testis:

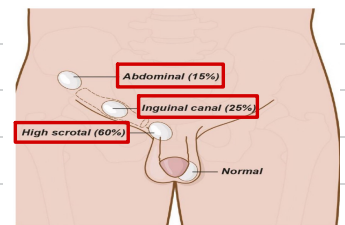
**** Refractile testis:**

Temporary displacement of testis in the inguinal canal by the cremasteric reflex

(Testis can be easily repositioned back to scrotum)

Residing places of testis: (تَنَازُلِيًّا)

- 1) high scrotal (60%)
- 2) Inguinal canal (25%)
- 3) Abdominal (15%)



Vascular Disturbances "Torsion"

(Sudden twisting after trauma)

Definition: twisting of the spermatic cord resulting in obstruction of testicular venous drainage

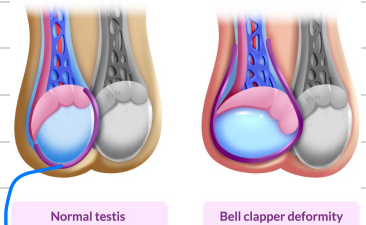
Contains: artery + vein

When twisting occurs: blood come from artery but doesn't flow through vein

Less affecting arteries because:
(thick-walled & more resilient arteries are left patent)

Results of twisting:

- 1) intense vascular engorgement → Due to increase in hydrostatic pressure
- 2) infarctions if not relieved



Torsion

Neonatal torsion
(first 30 days after birth)

occurs in utero or shortly after birth. No associated anatomic defect is present

Pathogenesis

In contrast with neonatal torsion, it results from bilateral congenital anomaly testis is abnormally anchored in the scrotal sac causing:
 ↑ mobility (bell clapper abnormality)

Bilateral congenital anomaly means:
 bell clapper exists in both testis but twisting will occur in one testis

Adult torsion
(during puberty 10-14 years)

Mostly under 18 years old

Require surgical emergency due to twisting of the testicle around the spermatic cord or vascular pedicle attachments

Presented with:
 1) Unilateral scrotal pain
 2) Nausea and vomiting

Any male come to emergency with unilateral scrotal pain we consider it torsion until proven otherwise

Normally tunica vaginalis is crescent in shape and not covering all testis

Here there will be high attachment for tunica vaginalis around testis and that increase risk for twisting after trauma.

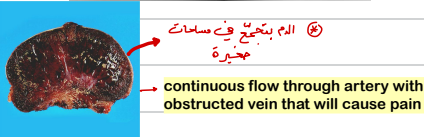
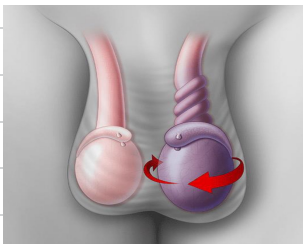
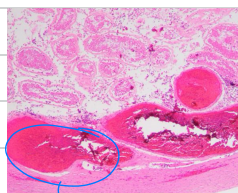
Treatment:

**If explored surgically & the cord is manually untwisted within ~ 6 hours, the testis will likely remain viable

**To prevent the catastrophic occurrence of another torsion in contralateral testis unaffected testis is surgically fixed within the scrotum (orchidopexy)

Microscopic:
 Damaged blood vessels with coagulative necrosis

هناك انكسار في جدار الأوعية الدموية
 مما يؤدي إلى موت الخلايا
 cause distribution in blood supply



Neoplasms

Risk factors:

- 1) isochromosome 12i (12p)
- 2) intersex syndromes
- 3) Genetics
- 4) Race
- 5) Height
- 6) Undescended testicle

General information:

- 1) **Most common tumors in men** (peak in incidence)
- 2) Heterogeneous groups include:

-Germ cell tumors:
95% (all are malignant)

-Sex cord-stromal tumors:

- uncommon
- usually benign
- derived from Sertoli or Leydig cells

3) The cause of testicular neoplasms is **poorly understood**

Clinical features:

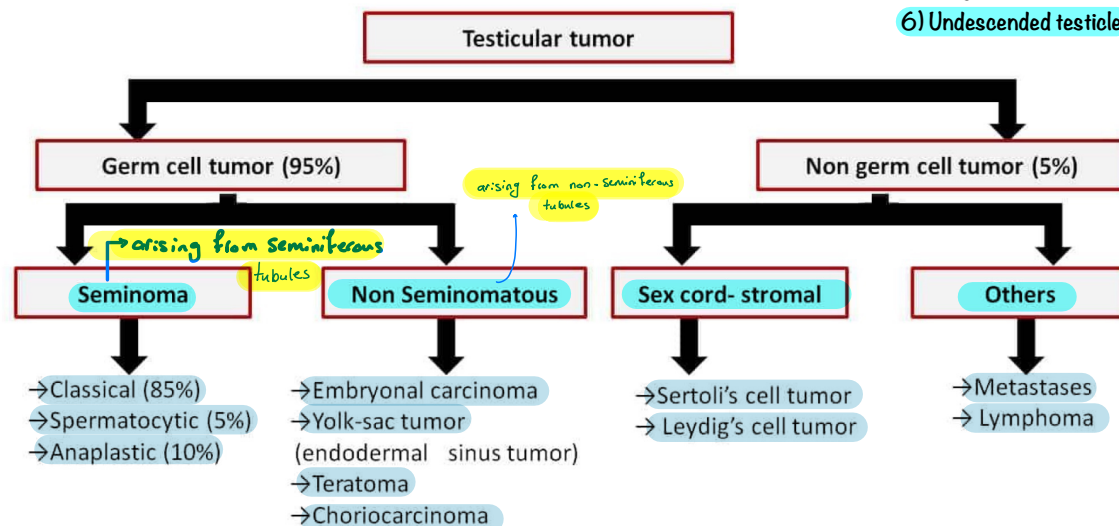
Presentation: mostly as a **painless testicular mass**

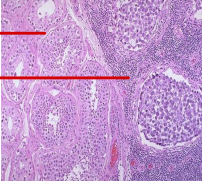
Biopsy of a testicular neoplasm is associated with a risk of **tumor spillage** (contraindicated)

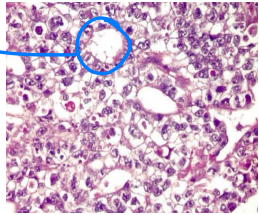
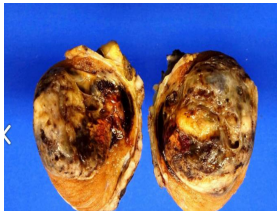
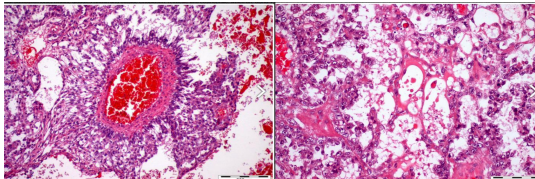
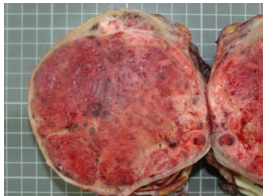
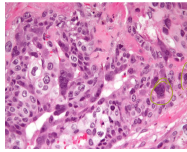
Standard management of a solid testicular mass is **radical orchiectomy**, based on the **presumption of malignancy**

لما تدخل تاخذ **biopsy** أنت هيك بتكون بتزيد فرصة انتشار ال **cancer**

بما انه ممنوع ناخذ **biopsy** فبكون الحل عن طريق انه أعمل استئصال للخصية وبعدين بعملها **histological picture** عشان أتأكد من وجود الورم، طيب افرض طلع ما في ورم !! هيك بكون ال **patient** خسر وحدة من **testis**



Neoplasm	General features	Morphology	Microscopic
Seminoma Most common malignant tumor in testis that has slow growth and late Mets	■ Third decade of life – never in infants ■ Histologically identical tumors • dysgerminomas (in the ovary) • germinomas (of the CNS) ■ Presentation: progressive painless enlargement of the testis	1) soft 2) well-demarcated 3) gray-white 4) usually without hemorrhage 	1) Large, uniform cells with clear, glycogen-rich cytoplasm, round nuclei, and conspicuous nucleoli 2) Intervening fibrous septa with dense lymphocytic infiltrate 3) Granulomatous reaction & syncytiotrophoblasts (15%) لما هاي الخلايا هي نفس ال الموجودة في placenta التي تعمل على إنتاج ال CG we consider it as a tumor marker.  Normal Abnormal: 1) high cellularity 2) hyperchromatic cells 3) large cells 4) space filled with lymphocytes

Disease	General features	Morphology	Microscopic
Embryonal carcinoma (malignant, aggressive, early mets)	1) malignant germ cell tumor (GCT) resembling undifferentiated stem cells during embryonic development 2) Second most common type of testicular pure GCT 3) Average age of presentation 25 - 35 years old, ~10 years younger than seminoma 4) Can occur in Anterior mediastinum and retroperitoneum	1) ill-defined 2) invasive masses containing foci of hemorrhage and necrosis 	1) large cells 2) basophilic cytoplasm 3) undifferentiated & may form primitive glands  Poorly diagnosis *polymorphism
Yolk sac tumor	1) The most common primary testicular neoplasm in children younger than 3 years old 2) In this age group, it has a very good prognosis (pure tumor) 3) In adults, yolk sac tumors most often are seen admixed with embryonal carcinoma (incidence of yolk sac elements is 80% in mixed)	1) Poorly circumscribed 2) nonencapsulated 3) predominantly solid 4) Gray to white to yellow to tan, gelatinous surface 	1) composed of low cuboidal to columnar epithelial cells that form microcysts, lacelike (reticular) patterns 2) distinctive feature is the presence of structures resembling primitive glomeruli, the so-called Schiller-Duval bodies Central BV surrounded by tumor cells Perivascular glomeruloid structure 3) eosinophilic globules containing α1-anti- trypsin and alpha fetoprotein (AFP – can be detected in the serum) 
Chorio-carcinoma Most aggressive	Malignant germ cell tumor composed of: 1) Syncytiotrophoblast 2) Cytotrophoblast 3) Intermediate trophoblast May present initially with metastases (liver, lung, mediastinum, retroperitoneum) with normal testis or small tumor but with increased serum hCG	may be small lesions (even those with extensive systemic metastases) May show total necrosis & extensive hemorrhage 	(1) Cytotrophoblast: - Sheets of small cuboidal cells - irregularly intermingled with syncytiotrophoblast  (2) Syncytiotrophoblast: - large - eosinophilic cells - multiple dark pleomorphic nuclei Syncytiotrophoblast is considered to be multiple cytotrophoblast joined together, so we can call them multinucleated giant cells

Teratoma (Typically benign, but may be malignant in adults)

General features:

- 1) Neoplastic germ cells differentiate along **multiple somatic cell lineages**
 - endoderm
 - ectoderm
 - mesoderm
- 2) Pure forms of teratoma are common in infants and children (2nd in frequency only to yolk sac tumors)
- 3) In adults it is seen in combination with other histologic types (mixed) (pure forms are rare)

Morphology:

1) Elements may be:

mature:

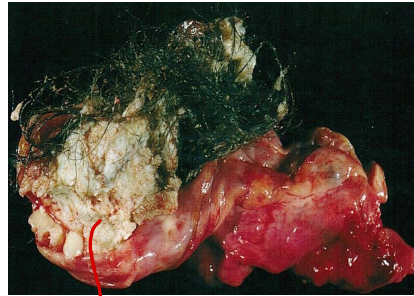
(resembling various tissues within the adult)

immature:

(sharing features with fetal or embryonal tissues)

2) In prepubertal males, teratomas are benign

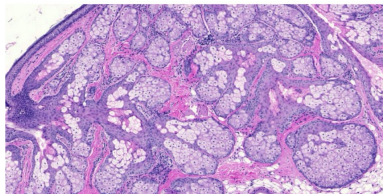
3) The majority of teratomas in postpubertal males are malignant whether they have mature or immature elements



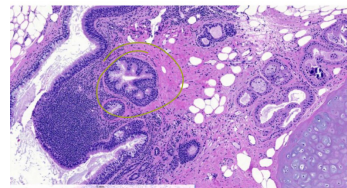
إذا أخذنا عينات كثيرة
extensive sampling
حتى نأخذ نسيج كل شيء

mature or immature

so we do splicing for every 1 cm



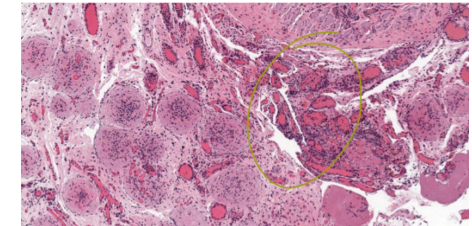
Salivary gland → ectoderm



Neural tissue → neural ectoderm



Gastric gland → endoderm



Cartilage → mesoderm

Serum tumor markers secreted by germ cell tumors is important in two ways:

- 1) **diagnostically**
- 2) **following the response to therapy after the diagnosis**

Tumor markers

✓ **Human chorionic gonadotropin (hCG):** ^{associated with Syncytiotrophoblast}
always elevated in **Choriocarcinoma + 15% of seminoma**

✓ **Alpha fetoprotein (AFP):**
when elevated in **testicular neoplasm**, indicates a **yolk sac tumor component**

✓ **Lactate dehydrogenase (LDH):**
correlate with the **tumor burden**

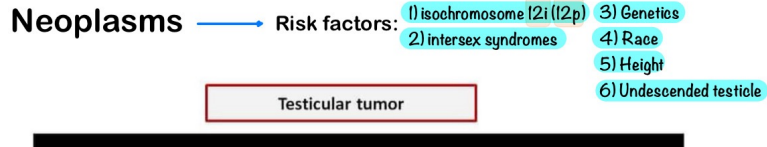
Refers to:
the number of cancer cells
size of tumor or the amount of
cancer in body
Also called "tumor load"

- ① help decide treatment strategy
- ② Prognosis
- ③ Monitor response to treatment

1. Which of the following is specifically associated with seminoma?

Select one:

- a. Bell-clapper deformity
- b. Obesity
- c. Undescended testis
- d. i(12p)
- e. Short stature



Ans: d

2. Which of the following is false about yolk sac tumor?

Select one:

- a. Common in children
- b. Schiller-Duval bodies are characteristic
- c. Elevated alpha-fetoprotein (AFP)
- d. High β -hCG
- e. Malignant germ cell tumor

Ans: d

3. A 34 -year-old man has had heaviness in testis for 6 months. Examination reveals enlargement left testis. Laboratory revealed normal serum HCG and alpha-fetoprotein (AFP). Left testis is excised through orchietomy and on sectioning showed soft, well-demarcated white mass, no hemorrhage or necrosis. He receives radiation therapy with good response. Which of the following neoplasms he is most likely to have? Select one:

- a. Seminoma.
- b. Yolk sac tumor.
- c. Leydig cell tumor.
- d. Embryonal carcinoma
- e. Choriocarcinoma

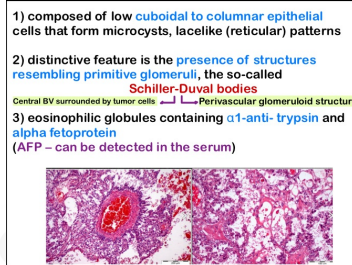
- 1) soft
- 2) well-demarcated
- 3) gray-white
- 4) usually without hemorrhage

* أما بالنسبة لـ HCG فهي مرتفعة
شخصاً لم يتبع .

Ans: a

4. A mother brought her 18 month old child to the pediatric clinic worried about a recent asymmetric enlargement of his scrotum. Physical examination revealed a well (?) circumscribed, 2cm mass in the left testis. Laboratory revealed normal serum HCG and high serum alpha-fetoprotein (AFP). Histologic examination of this mass after orchiectomy shows low cuboidal to columnar epithelial cells that form microcysts, some of which contain eosinophilic hyaline globules structures resemble primitive glomeruli. What is the most likely diagnosis?

- a. Seminoma.
- b. Yolk sac tumor**
- c. Leydig cell tumor.
- d. Embryonal carcinoma.
- e. Choriocarcinoma.



Ans: b

5. In the pediatric population, which of the following germ cell tumor when present in its pure form. is considered to be a benign tumor?

- a. Choriocarcinoma.
- b. Embryonal carcinoma.
- c. Seminoma.
- d. Yolk sac tumor.
- e. Teratoma.**

Ans: e

6. Choose the correct statement concerning yolk sac tumor of testis:

- a. The second most common primary testicular tumor in children
- b. Treated by orchiectomy among children
- c. In adults, yolk sac tumor occurs as a pure tumor
- d. α 1-antitrypsin is a biomarker**

Ans: d

7. which of these tumor markers correlate with tumor burden?

- a. LDH**
- b. B HCG
- c. AFB

✓ Lactate dehydrogenase (LDH):
correlate with the tumor burden

Ans: a

8. Which of the following statements is wrong regarding Seminoma ?

- a. **benign before puberty** (Most common malignant tumor in testis, has slow growth and late Mets)
- b. glycogen-rich cytoplasm, round nuclei and consipicous nuceoli
- c. B HCG levels may be elevated
- d. Resemble germinomas of the CNS

Ans: a

