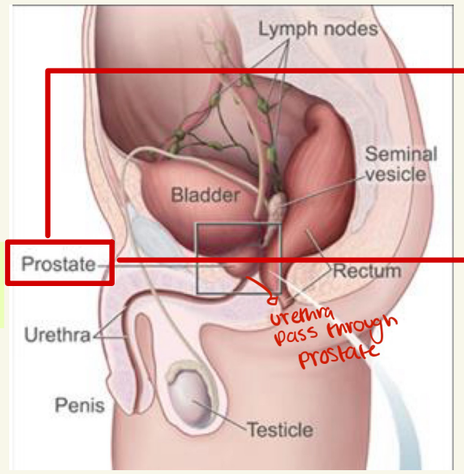
Male pathology: Prostate

Done by: Kareem obeidallah

Prostate anatomy

exist within the pelvis under the bladder



Accessory exocrine gland

It's weight nearly 11 gram
(And that increase with increasing age)

Description of prostate:

1) Reverse pyrimidal structure.
2) exist within the pelvis under the bladder
3) It's an accessory gland of the male reproductive system

Prostate
can be divided into biologically distinct regions, the most important of which are the peripheral and transition zones

Gross anatomical classification
- Anterior
- Posterior
- Left
- Right
- Middle/ medial

Functional classification
- Peripheral zone
- Transitional zone

Why these zones is important?
Answer: To help distinguish malignancy and from where it arises

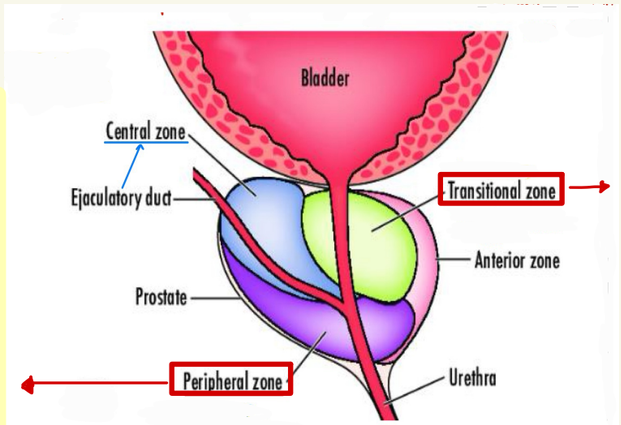
1) exist at the back of the gland

2) encircling distal part of the urethra

3) 70% of prostate cancer arise from peripheral zone

(cancers arises from it are hard to diagnose)

** 70-80% of carcinomas arise from this zone and detected by rectal examination
(since its posterior of the gland)



1) encircling proximal part of the urethra

2) it's existence under the bladder neck can cause obstruction if there is enlargement

(20% of cancers arises from it and they are easier to diagnose because they would constrict bladder)

** Hyperplastic lesions most commonly arise from this zone (inner part) and causing urinary obstruction

Note:
increase number of cells, benign, that will compress neck of urethra
(leading to distension of bladder "painful condition "

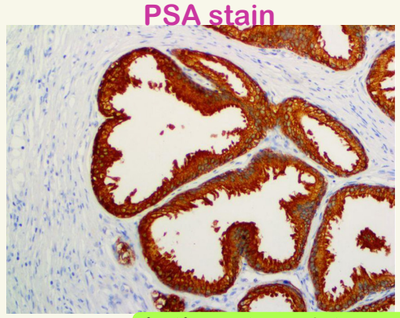
**obstruction increase risk for infections

Prostate histology

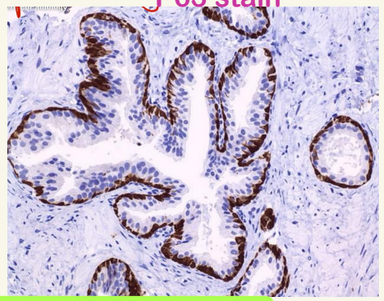
Prostate
(Exocrine gland)

- **Glandular tissue (epithelium)**
  - Center (overlying): secretory/columnar epithelium
    - Stained with PSA stain:
      1) Highlights columnar epithelium
      2) Used with Mets in secretory malignant cancers
      **It's specific for prostatic tissue
  - Base: flat basal cell layer
    - When cancer becomes malignant this layer will disappear But in benign cancers its intact
    - Stained with P63 stain (benign cancers)
- **Supporting stroma** — Containing mixture of
  - Smooth muscles
  - Fibrous tissue

PSA stain



P63 stain

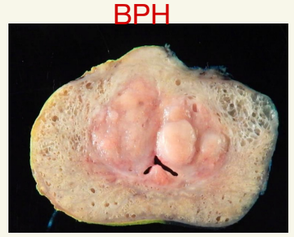
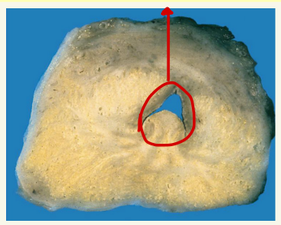
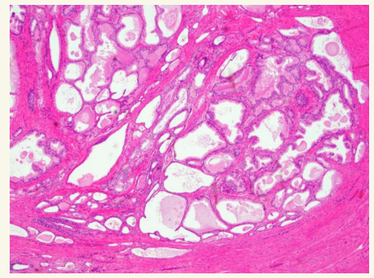
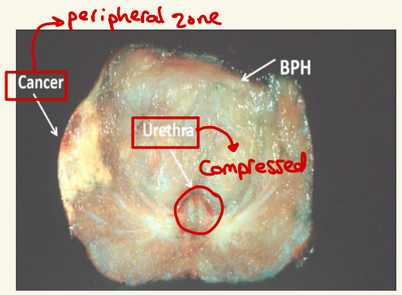
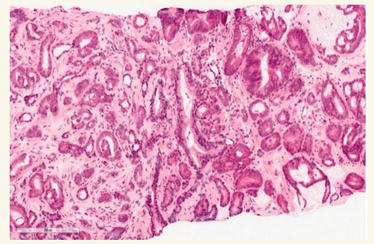


In these two pictures we have used immunostains

مثال حكته الدكتورة 👍

في عندي مريض كبير في العمر أجا عندي عالطوارئ، صورته صورة **x-ray** و شفت إنه في **mass** موجودة على **lung**، في جماعة حكوا إنها **malignant mass** و بتخوّف، أنا هون ايش ممكن أعمل ؟؟

We have to take biopsy to confirm that this mass has prostatic origin by stating it with PSA stain

Disease	General features	Pathogenesis	Macroscopic	Microscopic	Clinical features
Cells are not malignant ↑ **Benign Prostatic Hyperplasia** Often considered a normal part of aging	1) Extremely common cause of prostatic enlargement by the age of 40 years 2) Important cause of urinary obstruction 3) The cause of BPH is incompletely understood, excessive androgen-dependent growth of stromal and glandular elements has a central role 4) Does not occur in males castrated before the onset of puberty ↓ Removed testicle	DHT(Dihydrotestosterone) induced growth factors act by: 1) Increasing the proliferation of stromal cells ↳ Control apoptosis 2) Decreasing the death of epithelial cells Circulating Testosterone ↓ 5 alpha reductase (Type 2) DHT ↓ Bind to nuclear androgen receptors ↓ Regulate the expression of genes which aid in growth and survival of epithelium and stroma	BPH nodules around the urethra bulge above the cut surface in a cross section of the prostate gland BPH  There is compression to the urethra in BPH 	Epithelial hyperplasia is characterized by: (nodular lesions) composed of: variably sized glandular structures lined by basal and secretory cells 	(occur in only 10% of cases) include: • urgency (sudden need to pee) • frequency • Nocturia (with increased risk of urinary tract infections) Cause: increase bacteria constricted in urine ** Treatment: • Initial pharmacologic: agents inhibit formation of DHT • Surgical treatment for : 1) severely symptomatic cases 2) resistant to medical treatment (Transurethral resection of the prostate (TURP))
Carcinoma of the Prostate	1) Adenocarcinoma of prostate is the most common form of cancer in men 2) Age: older than 50 3) Significant drop in prostate cancer mortality → increase detection of disease through screening Diagnosed by: PSA stain first + Colonoscopy **P63 not used first cuz it's expensive **Colonoscopy: due to increase risk of colon cancer with increasing age	• Androgens are of central importance; evident by: • Cancer of the prostate doesn't develop in males castrated before puberty ↳ إزالة الخصية • Cancers often regress for a time in response to surgical or chemical castration •Heredity • Environment: تتابع أيضًا للوجود genetic background **geographical variations that may be due to dietary variations • Acquired somatic mutations: ** + TMPRSS2-ETS fusion genes are found in ~ 50% of cases.	GROSS: 1) firm 2) gray-white lesions 3) ill-defined margins • Most tumors are multifocal (so radiotherapy is needed) • 75 - 80% are posterior / posterolateral peripheral zone 	1) well-defined glands 2) smaller than benign glands 3) lined by a single uniform layer of cuboidal epithelium (lacking basal cell layer seen in benign glands)  P63 stain will give a negative result	1) Generally asymptomatic unless locally advanced or metastatic 2) Often discovered following investigation of nonspecific lower urinary tract symptoms 3) Serum screening tests: elevated prostate-specific antigen (PSA) level 4) Digital rectal examination (DRE): prostate may feel normal or may be enlarged / asymmetrical 5) Bone metastases, particularly to the axial skeleton, are frequent late in the disease and typically cause osteoblastic (bone-producing) lesions

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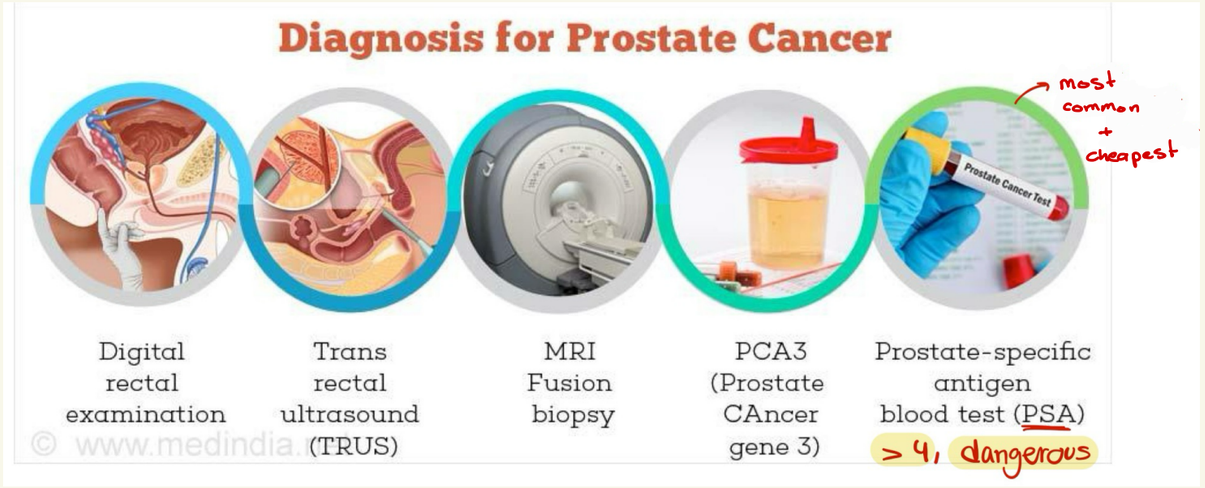
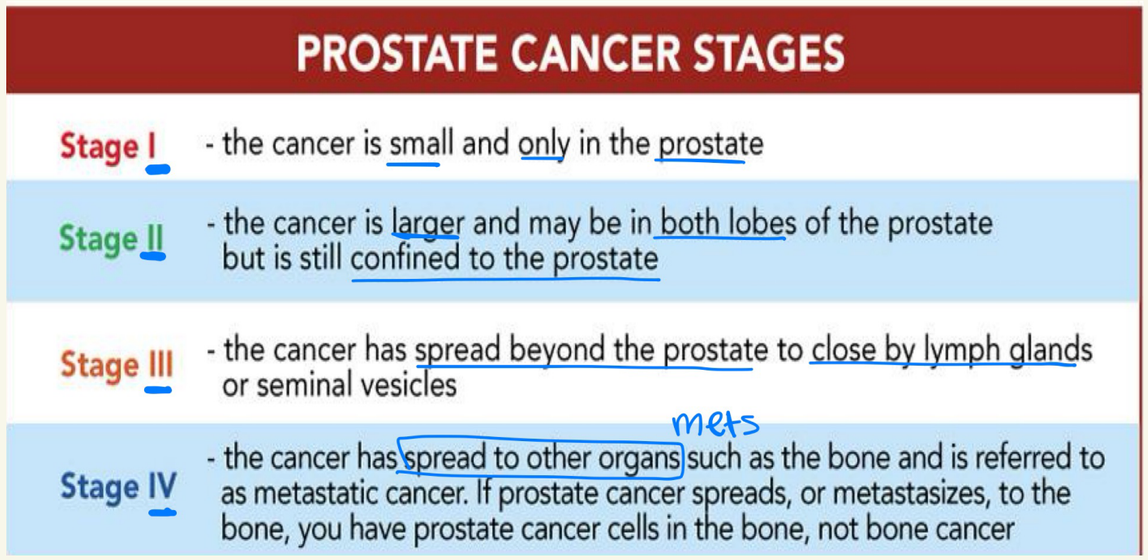


Risk factors of prostate cancer:

1) Family history
2) Diet
3) Chemicals
4) Hormones
5) Aging
6) Race/ ethnicity
7) geography
8) Gene changes



Treatment of prostate cancer

** The most common treatments for clinically localized prostate cancer are radical prostatectomy and radiotherapy
→ for multifocal lesions

** The prognosis after radical prostatectomy is based on:

- the pathologic stage
- the margins of the resected specimens are free of tumor or not.
- Gleason grade
(grading system on the basis of glandular patterns of differentiation)

Well differentiated → Moderately differentiated → Poorly differentiated (Anaplastic)

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UGS-Pathology Lecture 3

1.The genetic mutation that is highly related to prostate cancer is:

A. TMPRSS2-ETS
B. P53
C. RB
D. KRAS
E. BRCA

• Acquired somatic mutations:
** + TMPRSS2-ETS fusion genes are found in ~ 50% of cases.

Answer:a

2. Which of the following statements is wrong about prostate cancer?

A. May have vascular invasion
B. PSA stain is positive in malignant prostatic carcinoma
C. In , it shows well defined small glands with patent lobules inside them
D. Tends for bone metastatsis
E. After metastasis, PSA immunostain becomes negative for the metastatic mass

Answer:e

3.which of the following is the most common primary site of Metastatic carcinoma ine tstes?

A-bladder
B-kidney
C-prostate
D-lung
E-colon

Ans: C

4.one is false about prostate cancer:

on pathological stage

A)The prognosis after radical prostatectomy is based on the clincal stage
B)Gleason grade(grading system on the basis of glandular patterns of differentiation)
Cserum level of PSA most commonly wide screening test
Dit's bone producing mets
E)Cancer of the prostate doesn't develop in males castrated before puberty

Ans:A