

Reproductive

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Prostatic hyperplasia and cancer of prostate

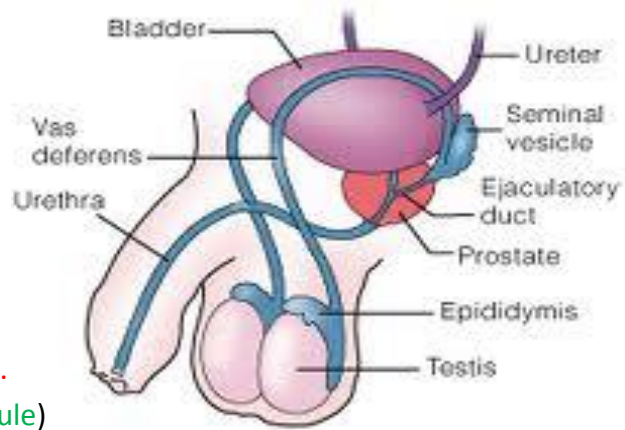


2<sup>nd</sup> Lecture

Boxes: Orange (Male)/Pink (Female): for the extra infos. in the comments of lecturer slides and talks.

Blue: for the infos. quoted from Robbins.

Red font: important infos.



## Prostate gland :

- Prostate weighs 20 grams in normal adult
- Retroperitoneal organ .
- encircling the neck of bladder and urethra.
- Devoid of a distinct capsule (no clear capsule)
- Divided into four biologically and anatomically distinct zones or regions: the peripheral, central, and transitional zones, and the region of the anterior fibromuscular stroma
- Histologically the prostate is composed of glands lined by two layers of cells: a basal layer of low cuboidal epithelium covered by a layer of columnar secretory cells

## Zones of the Prostate

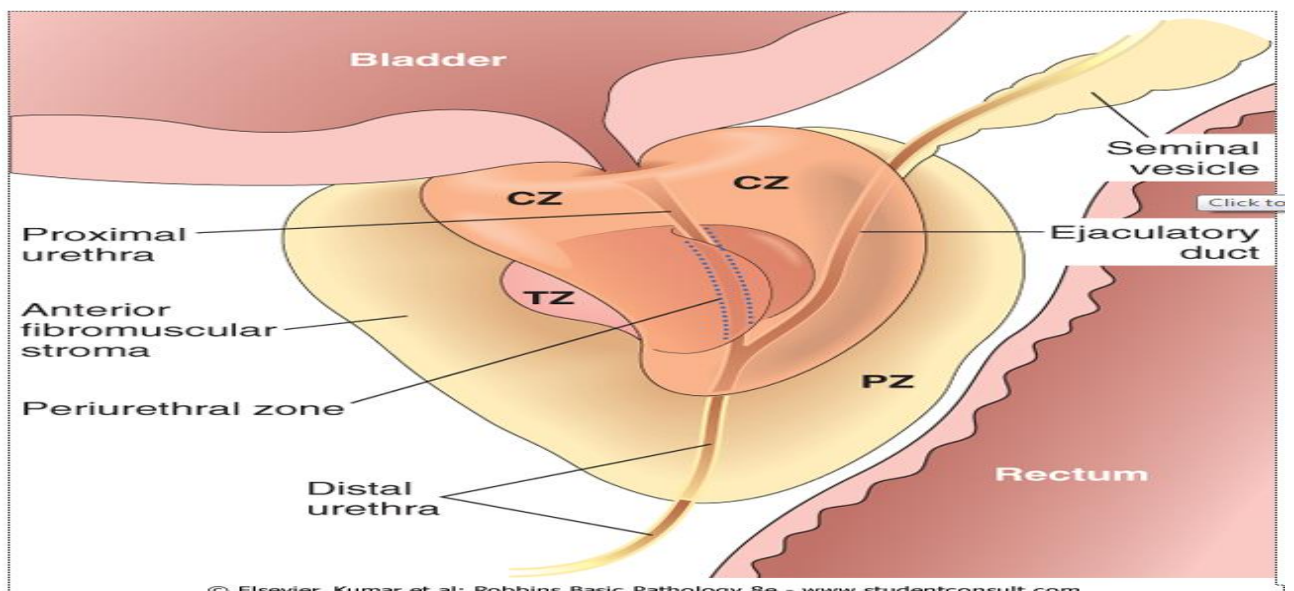
- Peripheral
- Central
- Transitional

In the BPH we have both types of cells (basal and secretory) while in prostatic adenocarcinoma we don't have the basal cells.

- ✚ Most hyperplasias arise in the transitional zone, whereas most carcinomas originate in the peripheral zone.

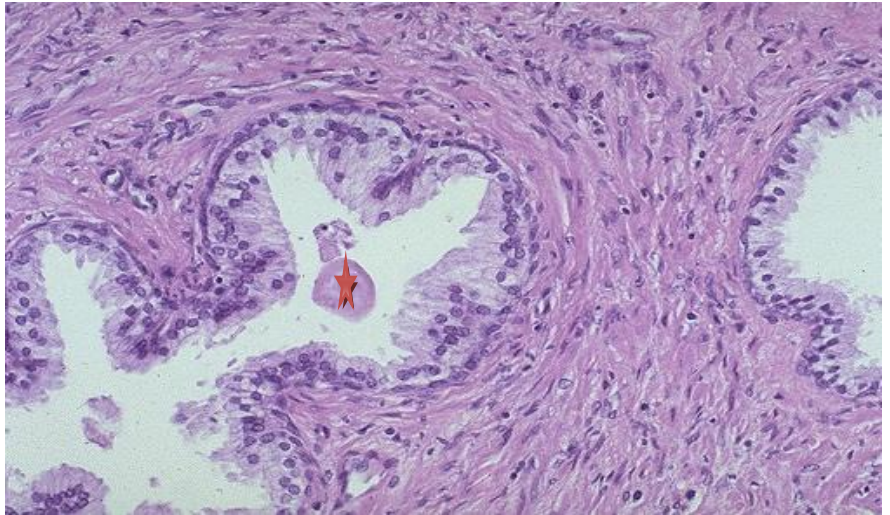
### The prostate includes three zones:

- 1- The peripheral zone is the outer part of the prostate, and the lower peripheral zone is fairly close to the rectal wall. The peripheral zone is the most common site for prostatic adenocarcinoma.
- 2- The central zone is in the center of the prostate and cancer does not originate there often.
- 3- The transitional zone is above the central zone and is a common site for benign prostatic hypertrophy, a non-malignant condition of the prostate, but cancer may originate there as well but not as often as in the peripheral zone.





This is the normal histologic appearance of prostate glands and surrounding fibromuscular stroma



- 1- A small pink concretion (typical of the corpora \*amylacea seen in benign prostatic glands) appears in the gland just to the left of center.
- 2- Note the well-differentiated glands with tall columnar epithelial lining cells.
- 3- These cells do not have prominent nucleoli.

## Benign Prostatic Hyperplasia (BPH)

- Extremely common lesion in men over age 50  
(20% in men over age 40, up to 70% by age 60, and 90% by age 70).
- **Hyperplasia** of **glands and stroma**
- Fairly large, **well defined nodules**
- **Related to the action of androgen**
- DHT, Dihydrotestosterone is the ultimate mediator for prostatic growth
- **Prepubertal castration prevents BPH** (removal of prostate gland)

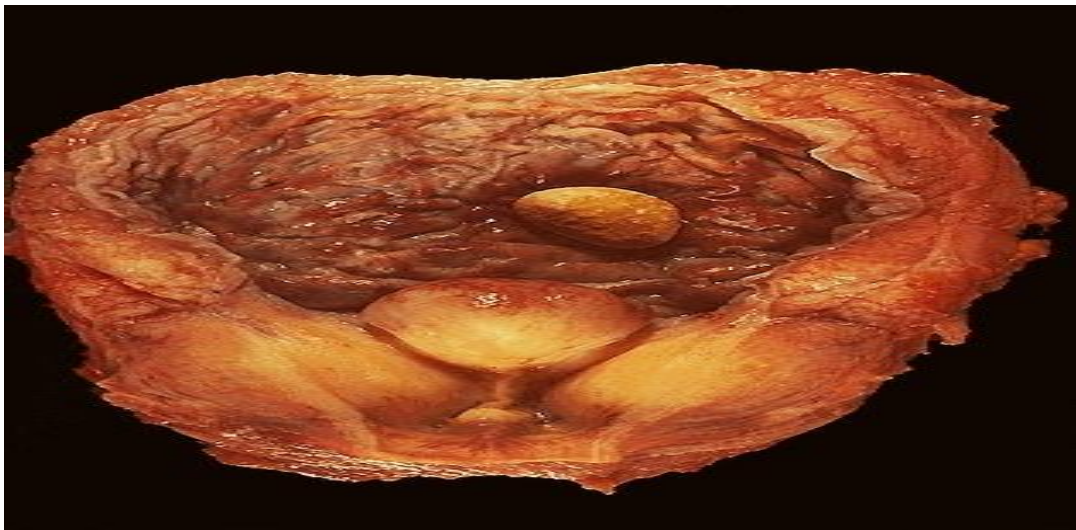
## Clinical features of BPH :

- **Occur in only about 10% of men with the disease.**
- **lower urinary tract obstruction.**
- **Difficulty in starting the stream of urine (hesitancy) and intermittent interruption of the urinary stream while voiding.**
- **Some men may develop complete urinary obstruction, with resultant painful distention of the bladder and, if neglected, hydronephrosis**
- **Symptoms of obstruction are frequently accompanied by urinary urgency, frequency, and nocturia, all indicative of bladder irritation.**
- **The combination of residual urine in the bladder and chronic obstruction increases the risk of urinary tract infections.**

**hydronephrosis** : refers to distension and dilation of the renal pelvis and calyces, usually caused by obstruction of the free flow of urine from the kidney.

## Morphology Of BPH :

- The prostate weighs **between 60 and 100 grams**
- ( normal 20 gm)
- **Almost exclusively in the transitional zone** of the prostate gland
- **Nodules ,vary in color** and consistency
- The hallmark of BPH is **nodularity** due to glandular proliferation or dilation and to fibrous or muscular proliferation
- Aggregation of small to large to cystically dilated glands
- Needle biopsy doesn't sample the transitional zone where BPH occur



Nodules appear mainly in the lateral lobes. Such an enlarged prostate can **obstruct urinary outflow** from the bladder and lead to an obstructive uropathy

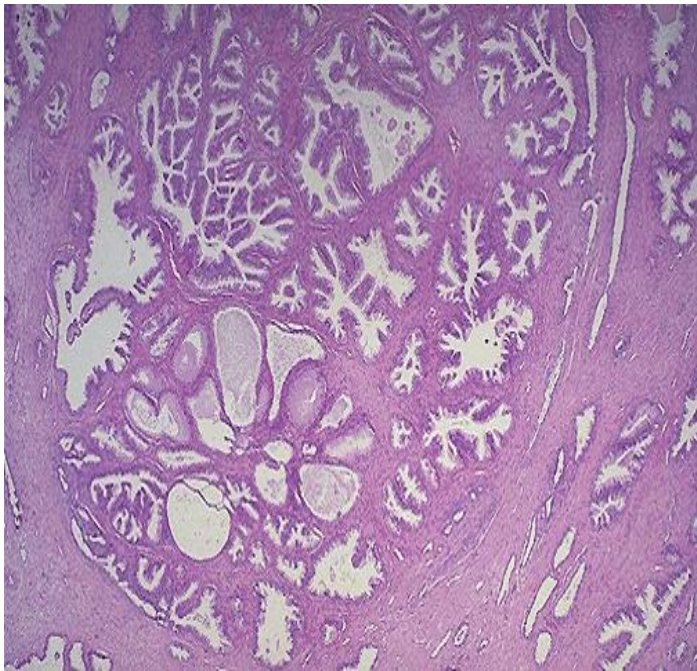
A normal prostate gland is about 3 to 4 cm in diameter. This prostate is enlarged due to prostatic hyperplasia, which appears **nodular**. Thus, this condition is termed either BPH (benign prostatic hyperplasia) or **nodular prostatic hyperplasia**



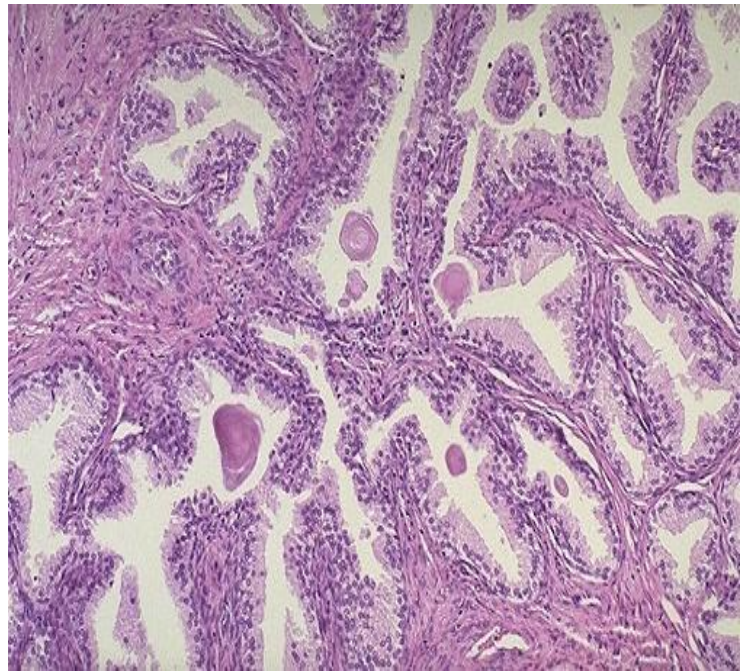
- The enlarged prostate gland seen here not only has enlarged lateral lobes, but also a greatly enlarged median lobe that obstructs the **prostatic urethra**.
- This led to obstruction with **bladder hypertrophy**, as evidenced by the prominent trabeculation of the bladder wall seen here from the mucosal surface.
- Obstruction with stasis also led to the formation of the yellow-brown calculus (stone).

**trabeculation of the bladder :**

To overcome the obstruction the bladder muscles become hypertrophic (thicker) and they may be seen through the bladder mucosa. The result is the trabecular appearance of the bladder inner wall: thick strings of intertwined muscle fibers (trabeculae).

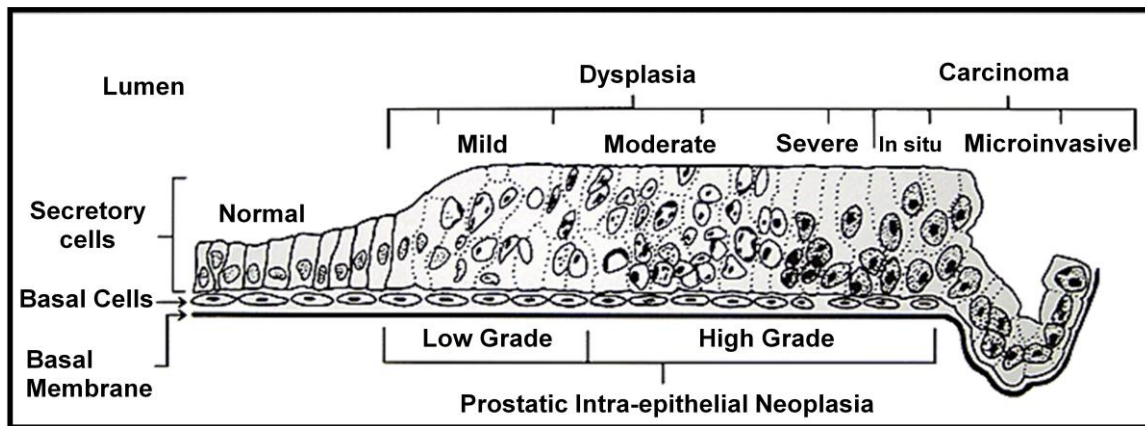


BPH can involve **both glands and stroma**, though the former is usually more prominent. Here, a large **hyperplastic nodule** of glands is seen.



The glands are **well-differentiated** and still have **some intervening stroma**. The small laminated pink concretions within the glandular lumens are known as **corpora amylacea**.

## Prostatic Intraepithelial Neoplasia (PIN)



PIN consists of architecturally benign prostatic acini lined by cytologically atypical cells with prominent nucleoli

PIN is an intermediate lesion between normal and invasive cancer and is considered as predisposing factor and precursor of prostatic adenocarcinoma.

The difference between the mild moderate and (in situ ) dysplasia is

The layer affected in: mild just one layer (the basal layer) in moderate 2 layers in

In situ all layers are affected and is pre-CA



**For Your  
Information**

# Prostatic Adenocarcinoma :

- Adenocarcinoma of the prostate is the most common form of cancer in men
- Second leading cause of cancer death (first is lung CA)
- Disease of men over age 50
- More prevalent among blacks in the USA

The patient of prostatic adenocarcinoma may present late because there is no direct obstruction of the urethra as in BPH . (it's a peripheral zone disease )

## Etiology :

Several risk factors :

- Age , race, family history ,hormone level ,and environmental influences .
- **Androgen** are believed to play a role in the pathogenesis

## Morphology of Prostatic Adenocarcinoma :

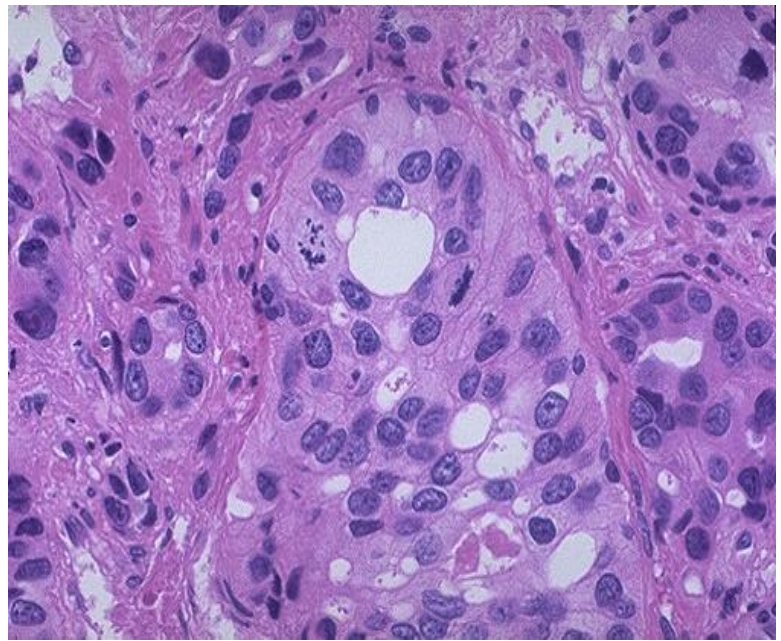
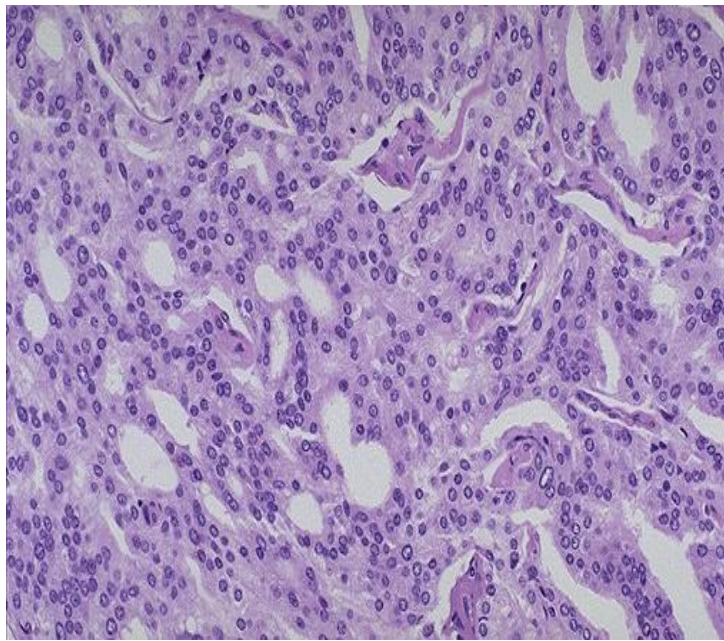
- 70% arises in the **peripheral zone** of the gland
- **Palpable in rectal exam**
- cross-section of the prostate the neoplastic tissue is (**gritty**) and firm. (**rigid**)
- It's difficult to detect the cancer .



### **Prostatic adenocarcinoma.**

- Irregular **yellowish nodules.**
- Prostate glands containing adenocarcinoma are not necessarily enlarged.
- Adenocarcinoma may also coexist with hyperplasia.
- However, prostatic hyperplasia is **not** a premalignant lesion





At high magnification, the neoplastic glands of prostatic adenocarcinoma are still recognizable as glands, but there is no intervening stroma and the nuclei are hyperchromatic.

Poorly differentiated prostatic adenocarcinoma demonstrates cells with nucleoli and mitotic figures.

### Microscopic features of Prostatic Adenocarcinoma :

- The glands are typically **smaller than benign glands** and are lined by a **single** uniform layer of cuboidal or low columnar epithelium.
- In contrast to benign glands, prostate cancer glands are more crowded, and characteristically lack branching and papillary infolding.
- **The outer basal cell layer typical of benign glands is absent.**
- Nuclei are large and often contain one or more large nucleoli (**macronucleoli**)
- **Peri-neural invasion is common and typical**( it has the ability to invade the nerves )

### Spread of prostatic Adenocarcinoma :

- By direct local invasion and through blood stream and lymph
- Local extension most commonly involves the seminal vesicles and the base of the urinary bladder
- Hematogenous extension occurs **chiefly to the bones**.
- The bony metastasis are typically osteoblastic.(screen for bone metastasize)



## Grading and Staging of Prostatic Adenocarcinoma :

- **Gleason grading system** is the best known for grading
- **Five grades** on the basis of glandular pattern and degree of differentiation as seen under low magnification
- **Grading** is of particular important in prostate cancer ,because it is the best marker ,along with the stage ,for predicting prognosis
- **Staging** in prostate cancer depends on the **TNM system**

Grading means the differentiation of the cancer ( well differentiated or poorly differentiated )..by microscope

Staging means where is the cancer now (in the lymph node or in the liver or at its place) ..clinically

## Clinical Course of Prostatic Adenocarcinoma :

- Microscopic cancers are **asymptomatic**, discovered incidentally
- Patients with clinically localized disease do not have urinary symptoms
- Most arise peripherally ,away from urethra ,therefore ,**urinary symptoms occur late**
- Careful digital exam may detect some early cancers
- **PSA** (Prostate Specific Antigen) has been used in the diagnosis and management of prostate cancer
- **PSA is organ specific but not cancer specific** (it doesn't always mean cancer)
- Could be increased in BPH

## Treatment :

- Surgery ,radiotherapy ,and hormonal therapy
- 90% of treated patients expected to live for 15 years
- Currently the most acceptable treatment for clinically localized cancer is **radical surgery**
- Locally advanced cancers can be treated by radiotherapy
- Hormonal therapy (**Anti-androgen therapy**) could induce remission .

## Nodular hyperplasia of prostate

- Nodular hyperplasia of prostate is characterized by benign proliferation of stromal and glandular elements DHT an androgen derived from testosterone is the major hormonal stimulus for proliferation
- Nodular hyperplasia most commonly affect the inner periurethral zone of prostate and nodules compress the prostatic urethra microscopically the nodules have variable proportions of stroma glands hyperplastic glands are lined by two cell layers an inner columnar layer and outer flattened basal cells
- Clinical symptoms are seen in 10% of affected pt and include hesitancy ,urgency, nocturia and poor urinary stream chronic obstruction predisposes to recurrent urinary tract infections acute obstruction may occur



## Carcinoma of the prostate

- Carcinoma of prostate is common cancer of older men than 65-75 years of old it is more common in American black .
- Carcinomas of the prostate arise most commonly in outer ,peripheral glands and may be palpable by rectal exam microscopically they are adenocarcinomas with variable differentiation and anaplasia neoplastic glands are lined by a single layer of cells. grading of prostate cancer by the Gleason system correlates with anatomic stage and prognosis
- Most localized cancer are clinically silent and are detected by routine monitoring of PSA concentration in older men advanced present with metastases frequently to the bones
- Serum PSA con. Under 4ng/ml are considered normal and values over 10 ng/ml are suggestive of prostate cancer PSA level may also be elevated above 4 in non-neoplastic condition such as nodular hyperplasia and prostatitis hence biopsy is required for diagnosis evaluation of PSA con. After treatment has great value in monitoring progressive or recurrent disease .



## Questions:



1-what is the marker in prostatic carcinomas :

PSA

AFP

CEA

2-we take a biopsy from prostate under microscope it's appear as no stroma and single layer of cuboidal cells form glands :

Prostatic adenocarcinoma

Nodular hyperplasia of prostate

Testicular neoplasms

3-common site for benign prostatic hyperplasia in:

Peripheral zone

transitional zone