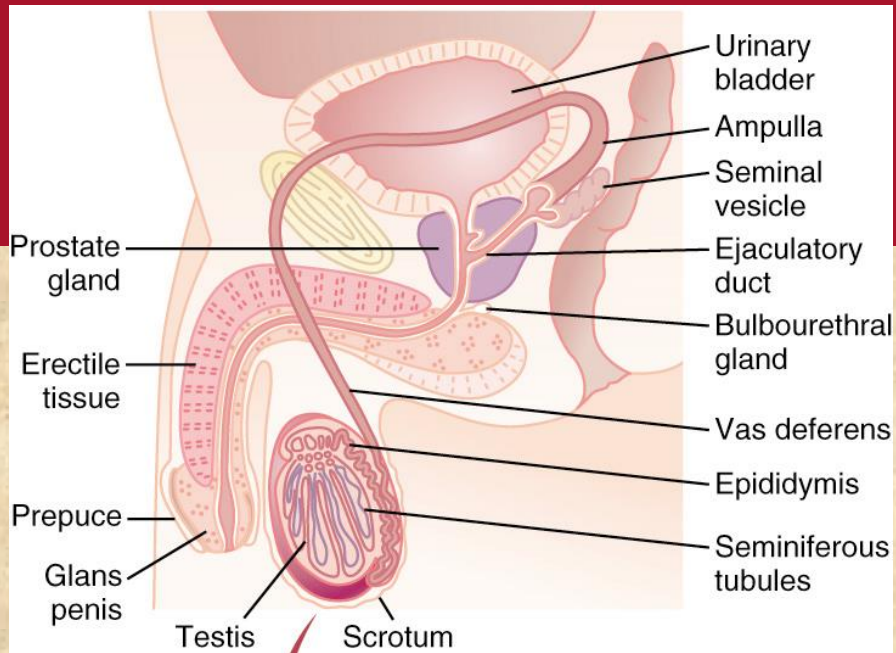
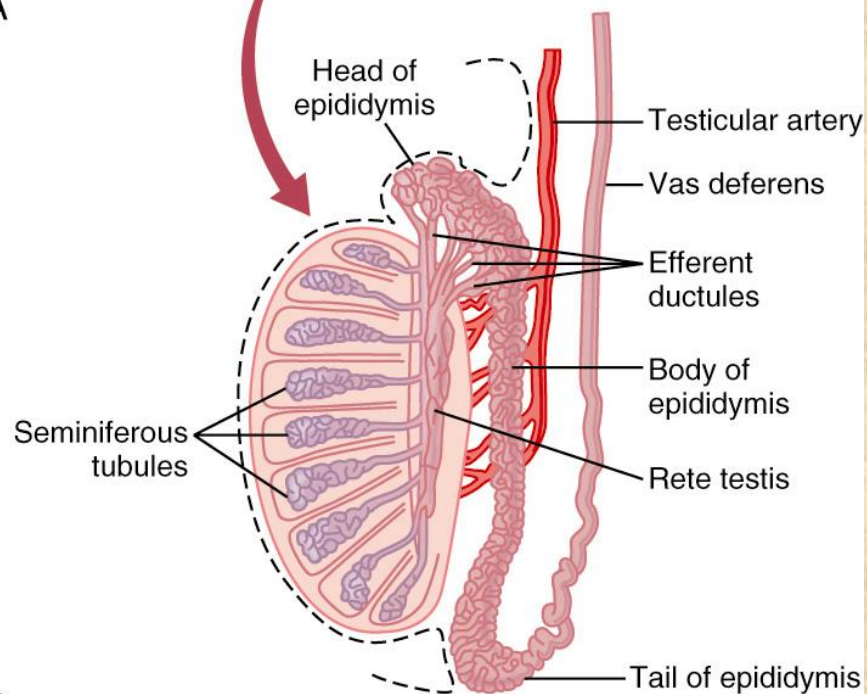




Male reproductive system, spermatogenesis, testosterone



A



B

Male Reproductive System

Figure 80-1
Guyton & Hall



- 1.The glands:

Pair of testis, seminal vesicle, Cowper's glands and one prostate gland.

- 2.Ducts:

A pair of epididymis, vas deference, ejaculatory ducts and one urethra

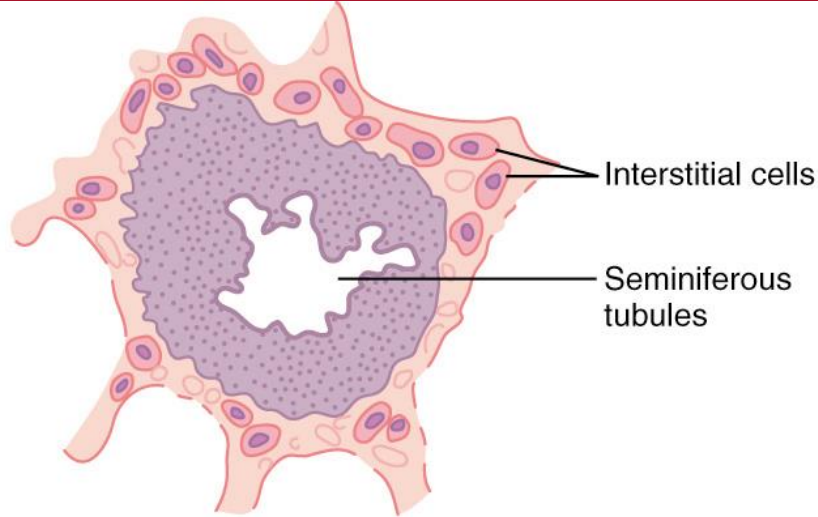
- 3.Supporting structures:

Spermatic cords, srotum and penis.

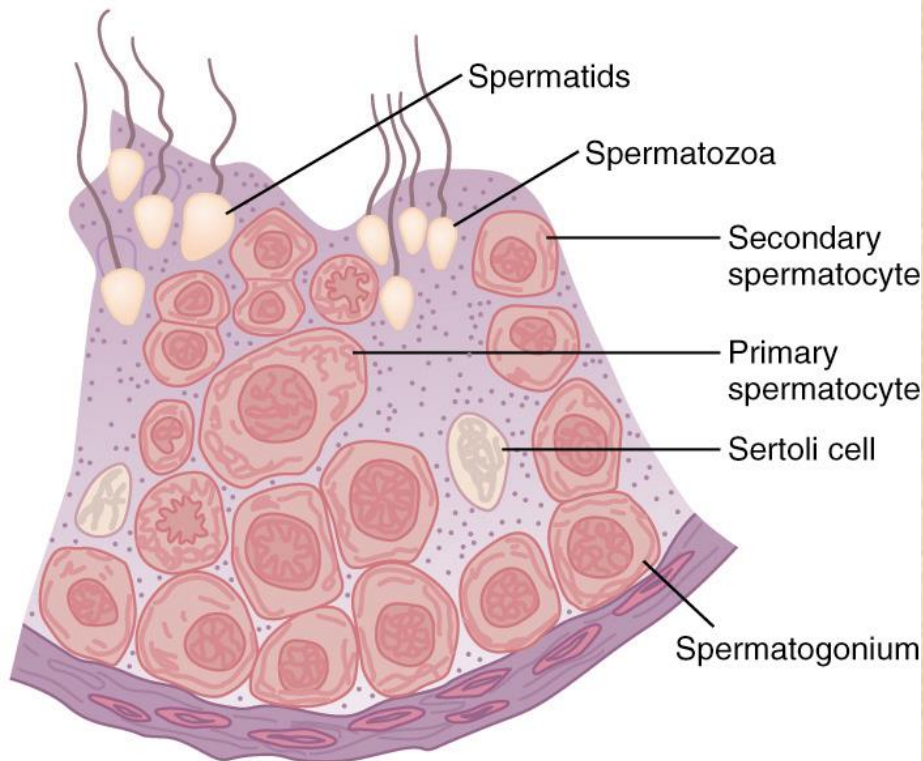
The testis



- Pair of testis weighing 10-40 gms each.
- Highly vascular; capillaries not fenestrated, arteries and veins run parallel to each other allowing **countercurrent exchange of heat**.
- Leydig cells - secrete testosterone at the time of puberty
- Sertoli cells - nourish sperms, secrete ABP, inhibin B and MRF.



A



B

Cross section of the seminiferous tubule and stages of sperm development

Figure 80-2
Guyton & Hall

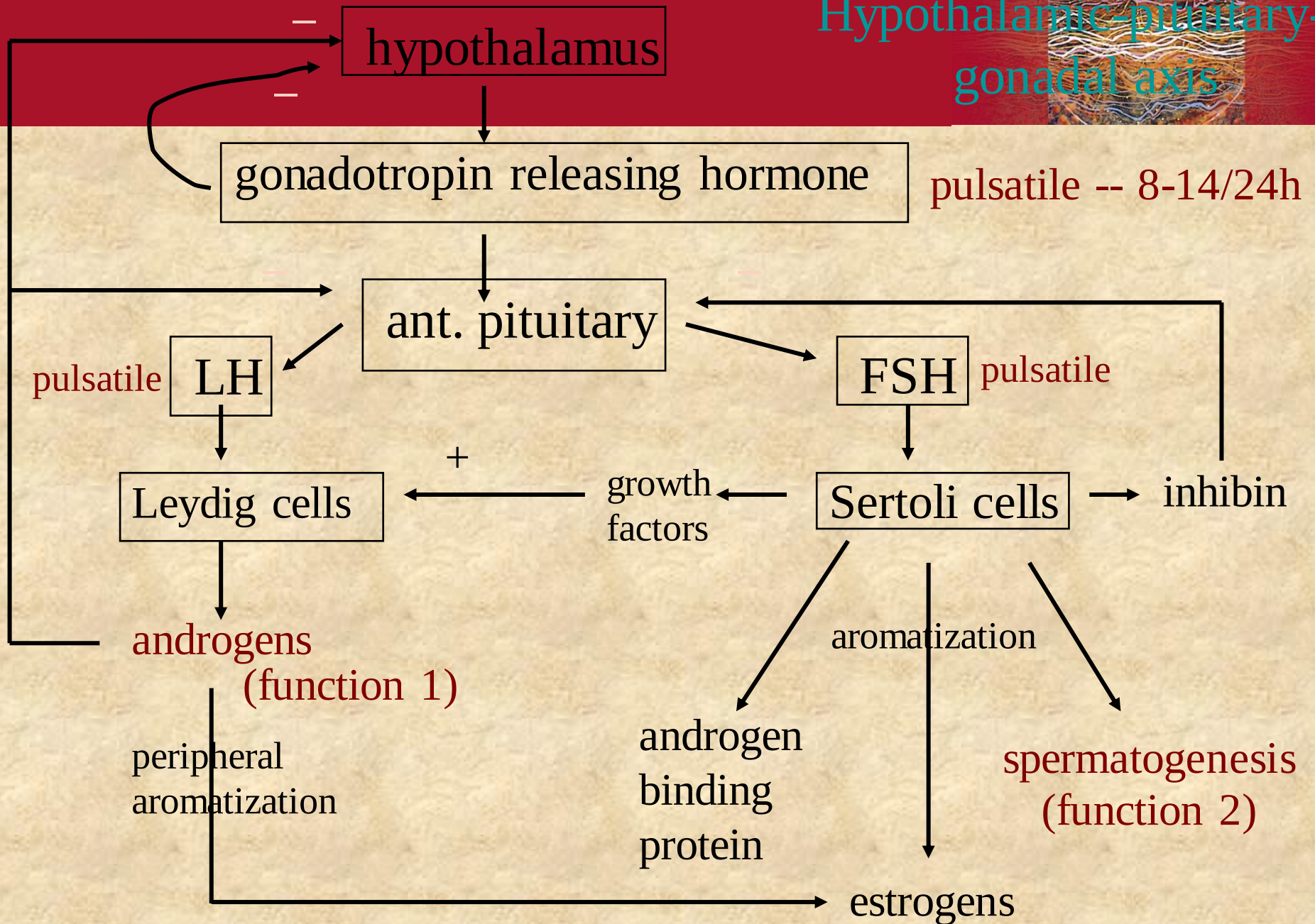
Functions



- Production and storage of sperms
- Synthesis and secretion of testosterone.

Both these functions are under ant. pituitary and hypothalamic control.

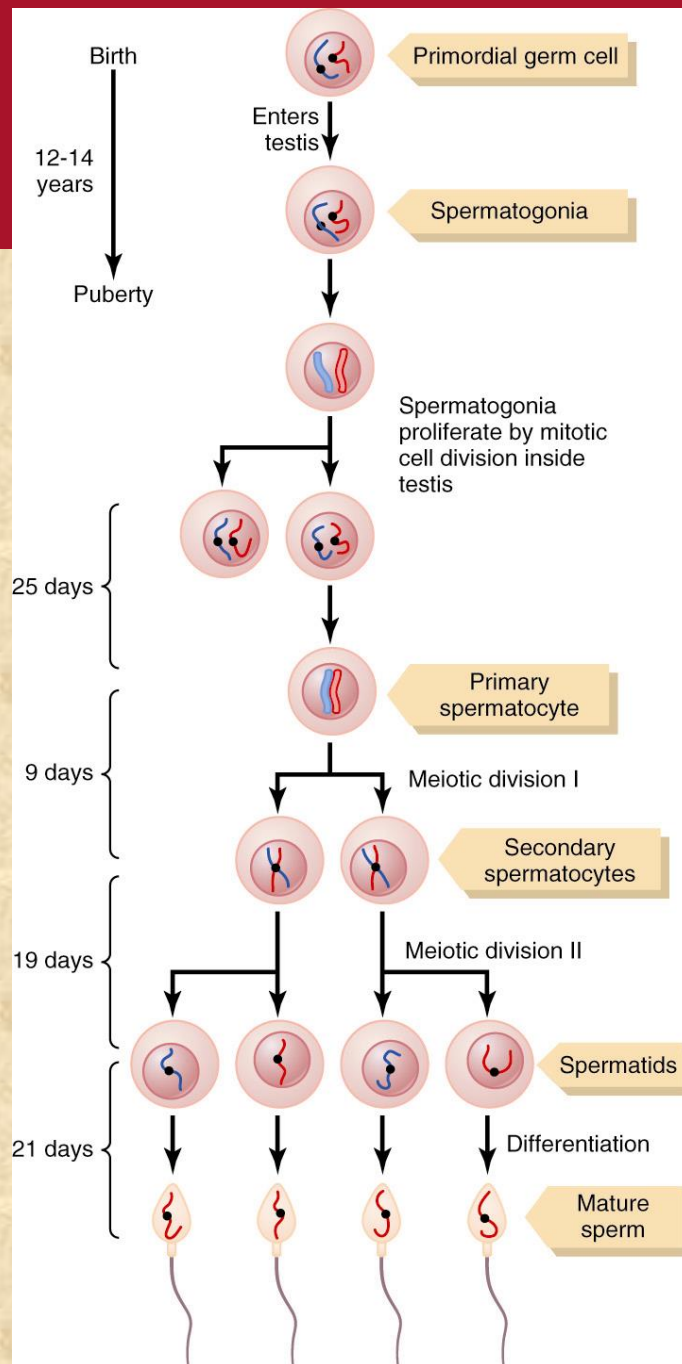
Hypothalamic-pituitary-gonadal axis



Spermatogenesis



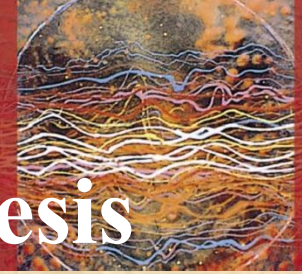
- It is the process by which spermatozoa are formed.
- It begins at puberty and continues throughout adult life.
- Duration -74 days
- Site seminiferous tubules of testis.



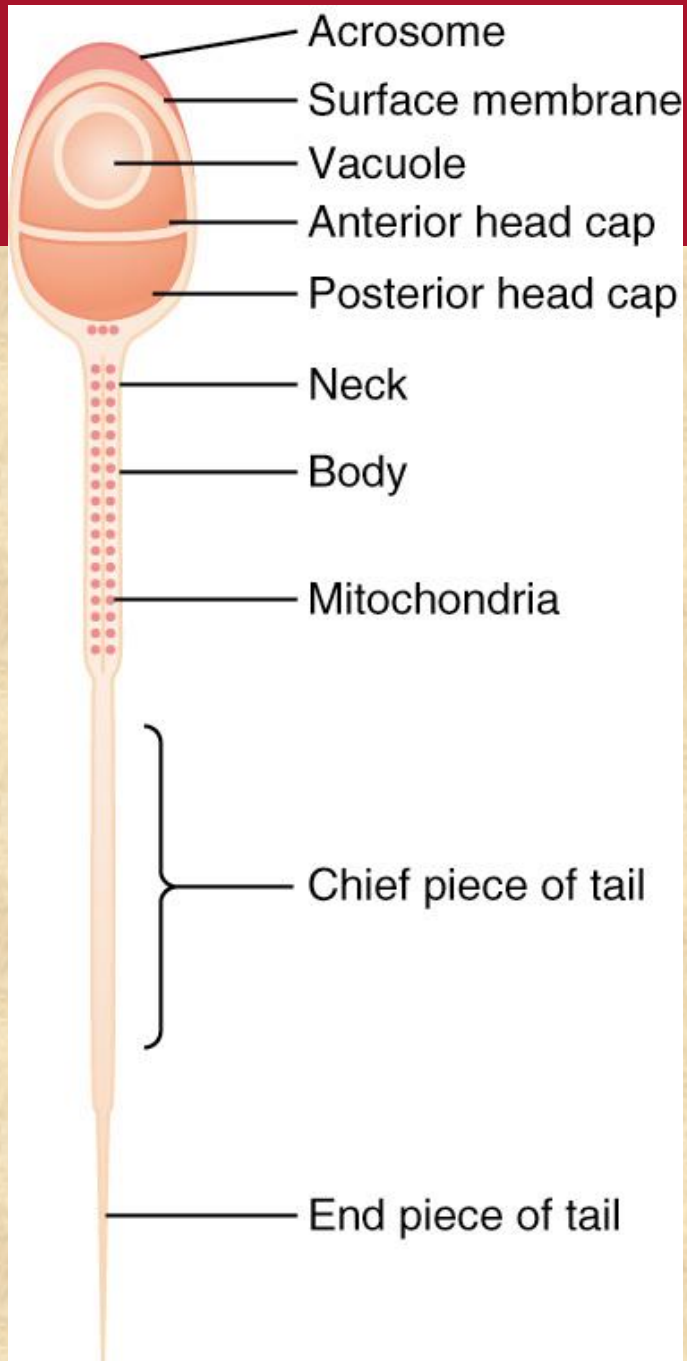
Cell Divisions During Spermatogenesis

Figure 80-3;
Guyton & Hall

Factors influencing spermatogenesis



- LH-stimulates Leydigs cells to secrete testosterone
- FSH-initiation of spermatogenesis at puberty, maturation of sperms
- Testosterone-growth, multiplication and maturation of sperms
- Growth hormone-promotes division of spermatogonia
- Temperature-optimum at 32 degree celcius



Structure of the Human Spermatozoon

Figure 80-4;
Guyton & Hall

Morphology of Sperm



head, neck, body, tail

acrosome: cap at top of sperm head, contains hyaluronidase and proteolytic enzymes, important in penetration into ovum

mitochondria – arranged around body

tail – **flagellum** – outgrowth of centriole – two microtubules in center, nine around the outside

Testosterone

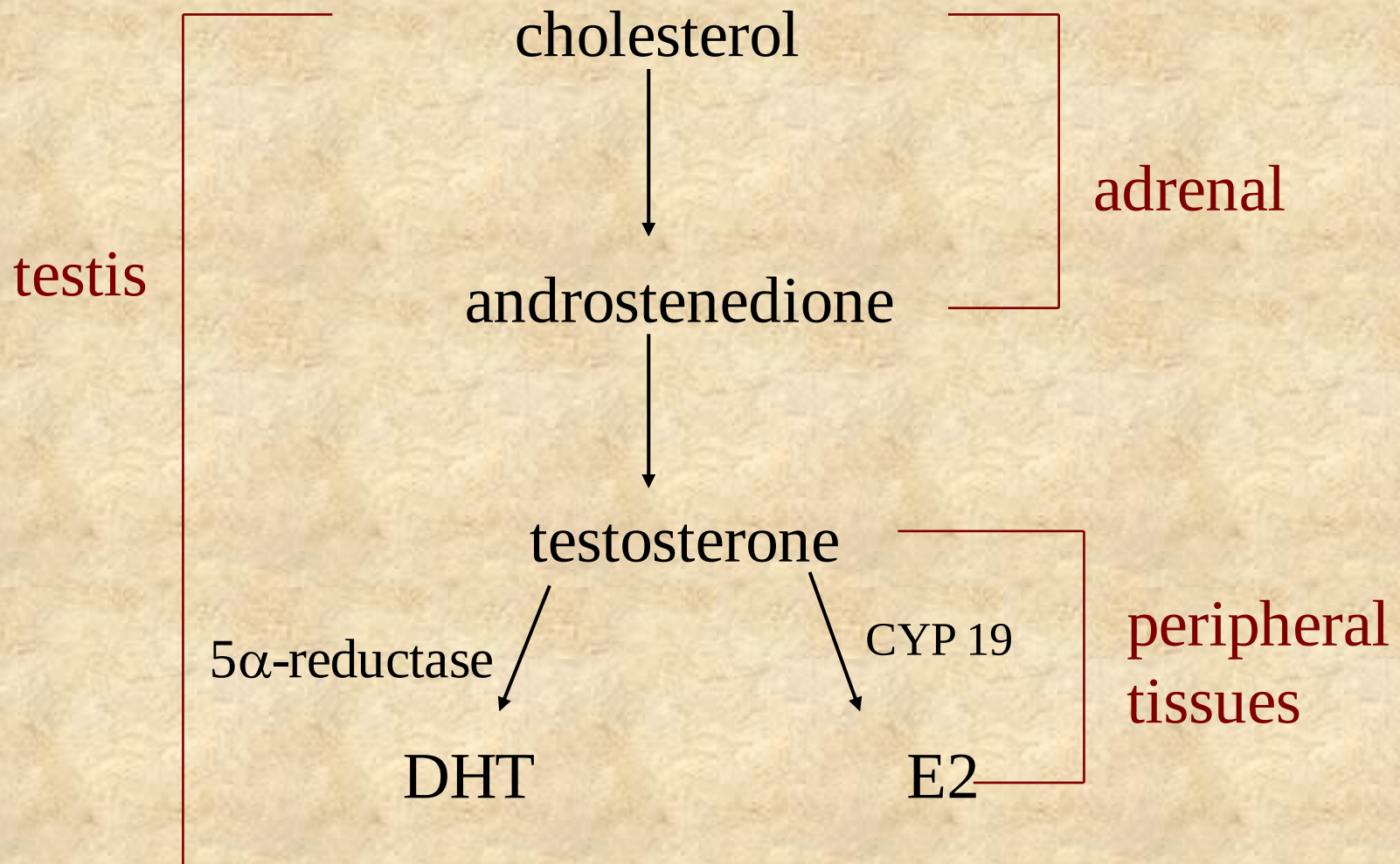


- Androgens are male sex hormones secreted by testis.
- They include testosterone, dihydrotestosterone, androstenedione
- Adrenal cortex produces androstenedione and dehydroepiandrosterone



- Testosterone is most powerful male sex hormone
- Produced by Leydigs cells of testis
- C₁₉ steroid hormone
- Rate of secretion- 4-9 mg/day in adult males
- In target tissues it is converted into dihydrotestosterone.

Tissues Producing Androgens



Fates of Testosterone:



45% of testosterone bound to sex hormone-binding globulin (SHBG)

55% bound to albumin and corticosteroid-binding globulin

2% free T – most important biologically

Metabolism of T: liver = 17-ketosteroids
kidney: urine (2%)

Functions of Testosterone



- Fetal development of male sex hormones (epididymis, vas deferens, seminal vesicles, etc)
- Pubertal growth of male sex organs.
- Secondary sexual characteristics at puberty
- Acts as anabolic hormone
- Helps in descent of testis into scrotum during last trimester of pregnancy.

Functions of Testosterone



adult primary and secondary characteristics:

1) body hair distribution

(pubis, face, chest, back, etc)

2) voice: hypertrophy of laryngeal mucosa and larynx

3) skin: thickens skin and

increases ruggedness of subcutaneous tissues,
sebaceous glands and oil production

4) muscle development

Functions of Testosterone



- 5) bone growth and calcium retention: thought to inhibit production of osteoclasts
- 6) red blood cells – causes increases in erythropoietin – stimulates RBC production
- 7) stimulates sodium and water reabsorption in PT of kidney

Cryptorchidism



- The failure of testis to descend into the scrotum
- -10% of newborn babies can have undescended testis, but they later descend by the age of one year.
- Treatment-
 - 1.administration of gonadotropic hormones
 - 2.surgery as early as possible

Assignment



- SAQ

1.Spermatogenesis

2.Testosterone