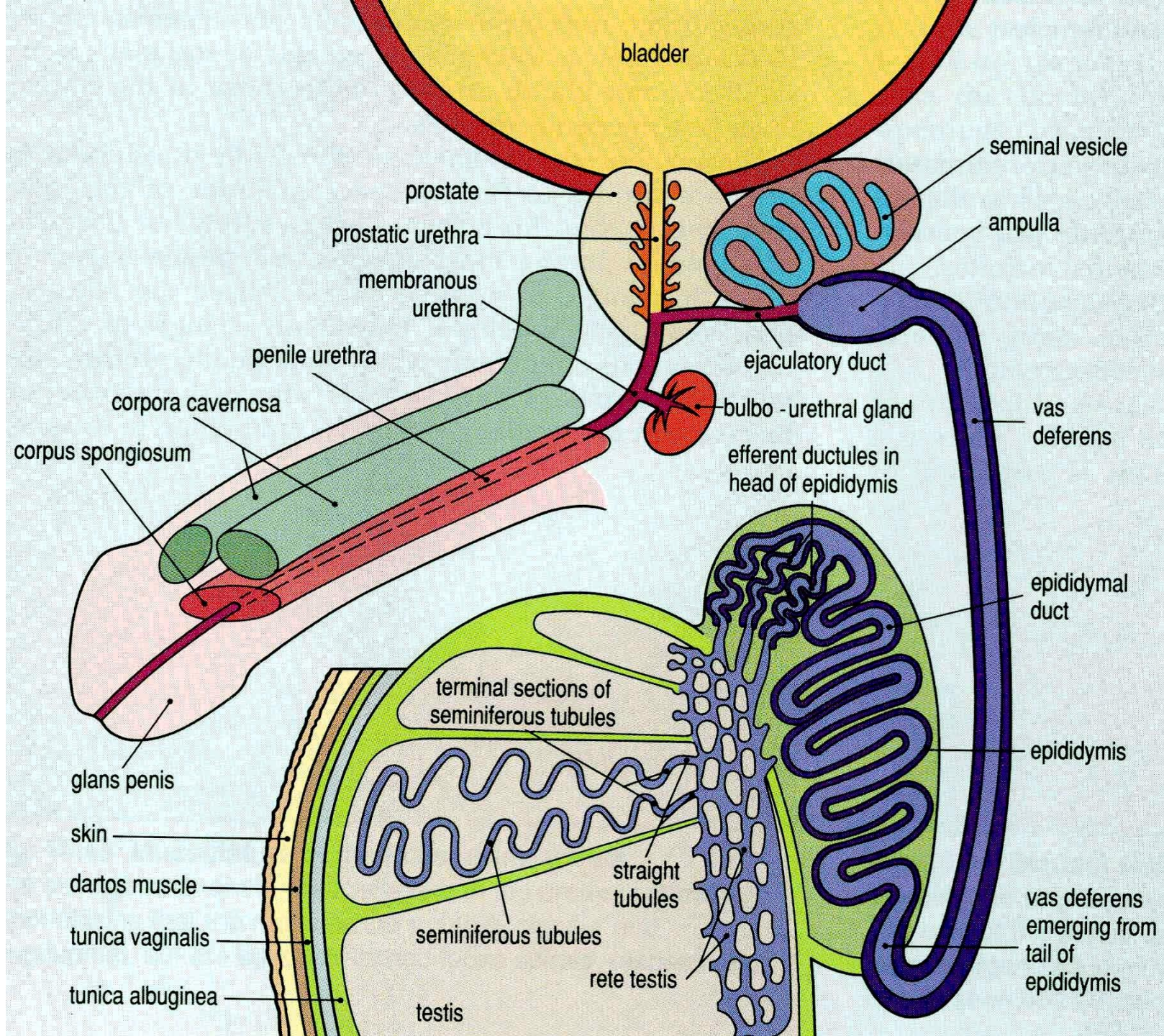


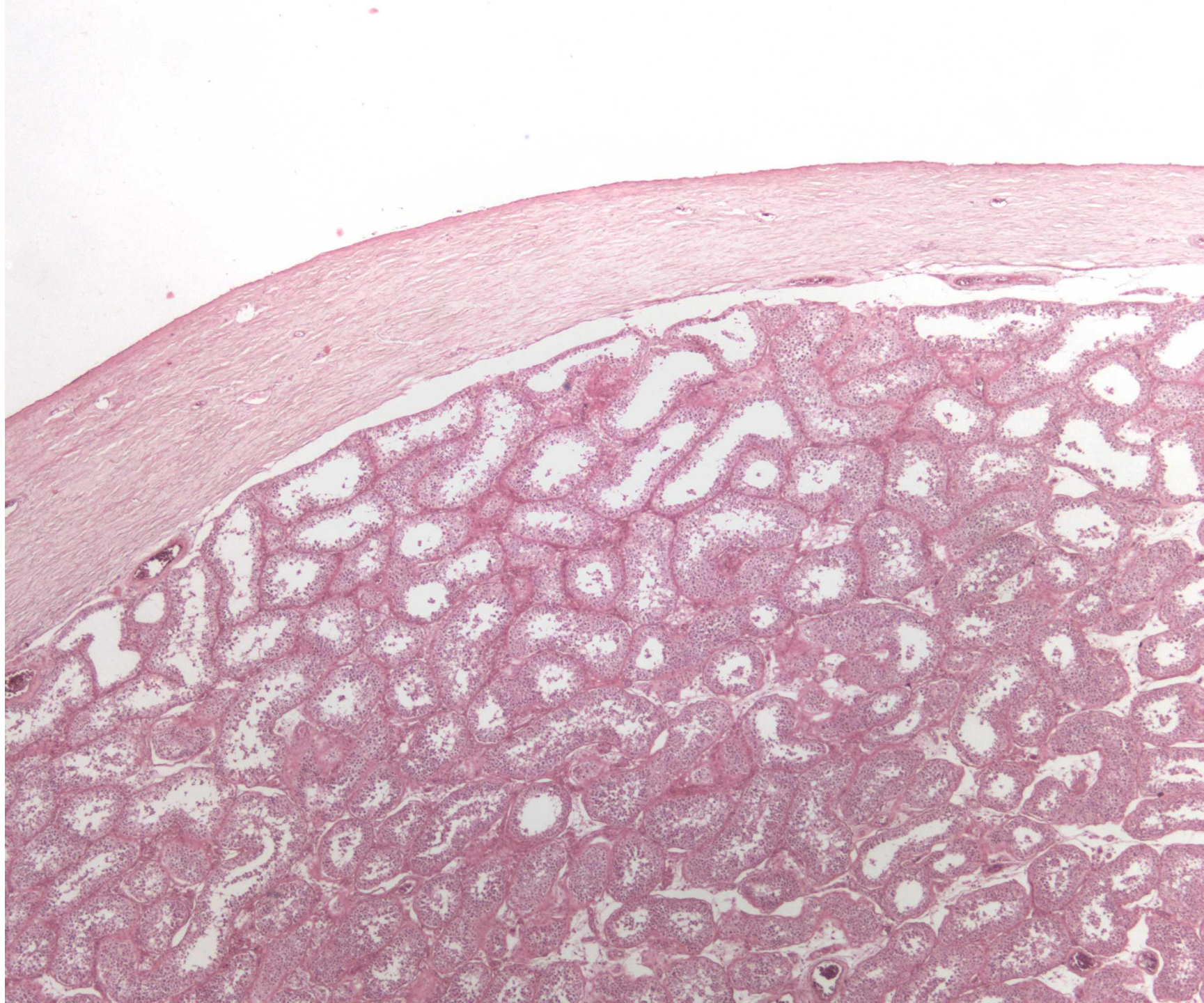
Male reproductive system

MUDr. Pavel Rořtok

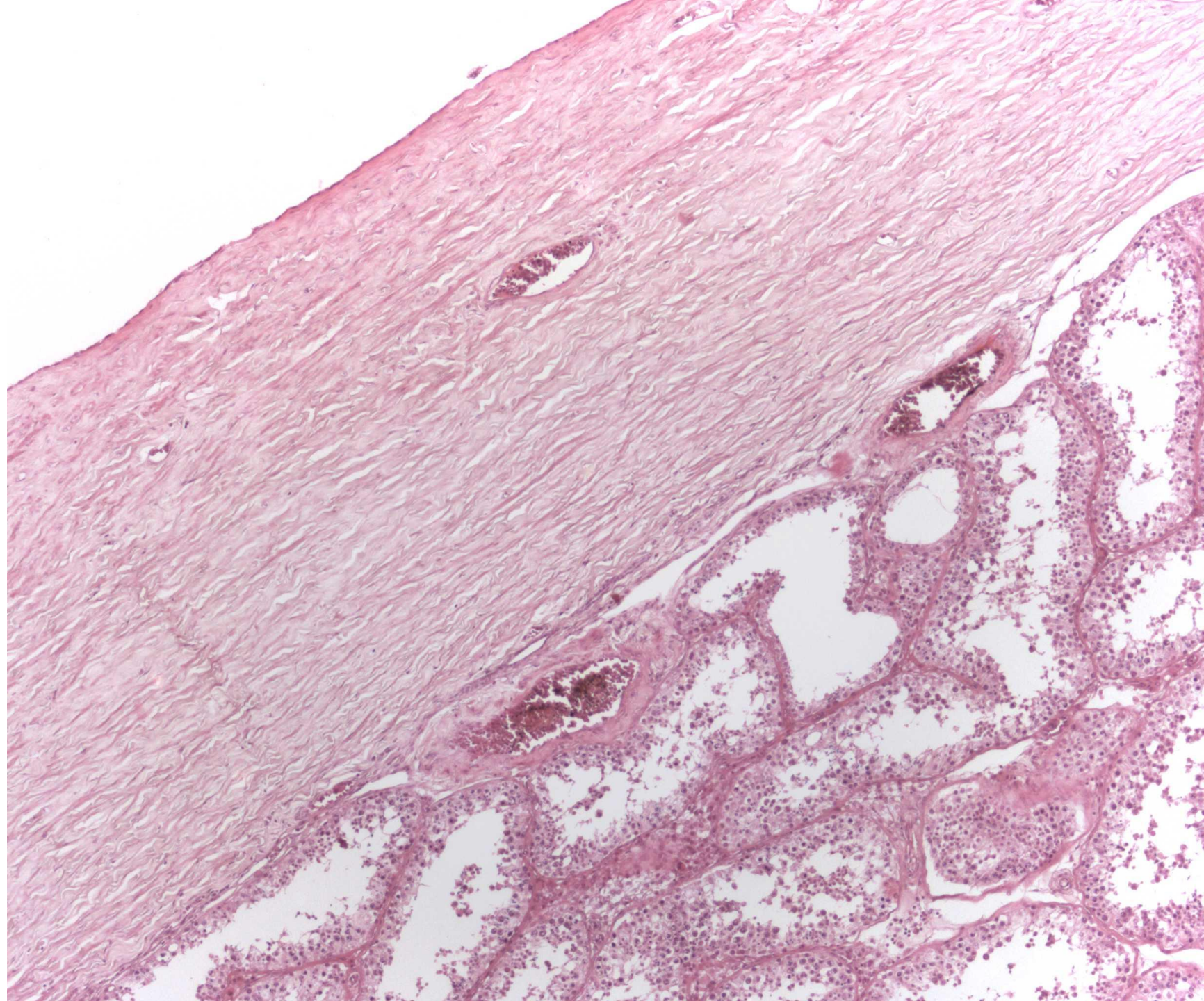
Male reproductive system:
 testis, epididymis, vas
 deferens, ductus
 ejaculatorius, prostate,
 seminal vesicle, penis.
 Function: development of
 male gametes, production
 of seminal fluid, sexual
 intercourse



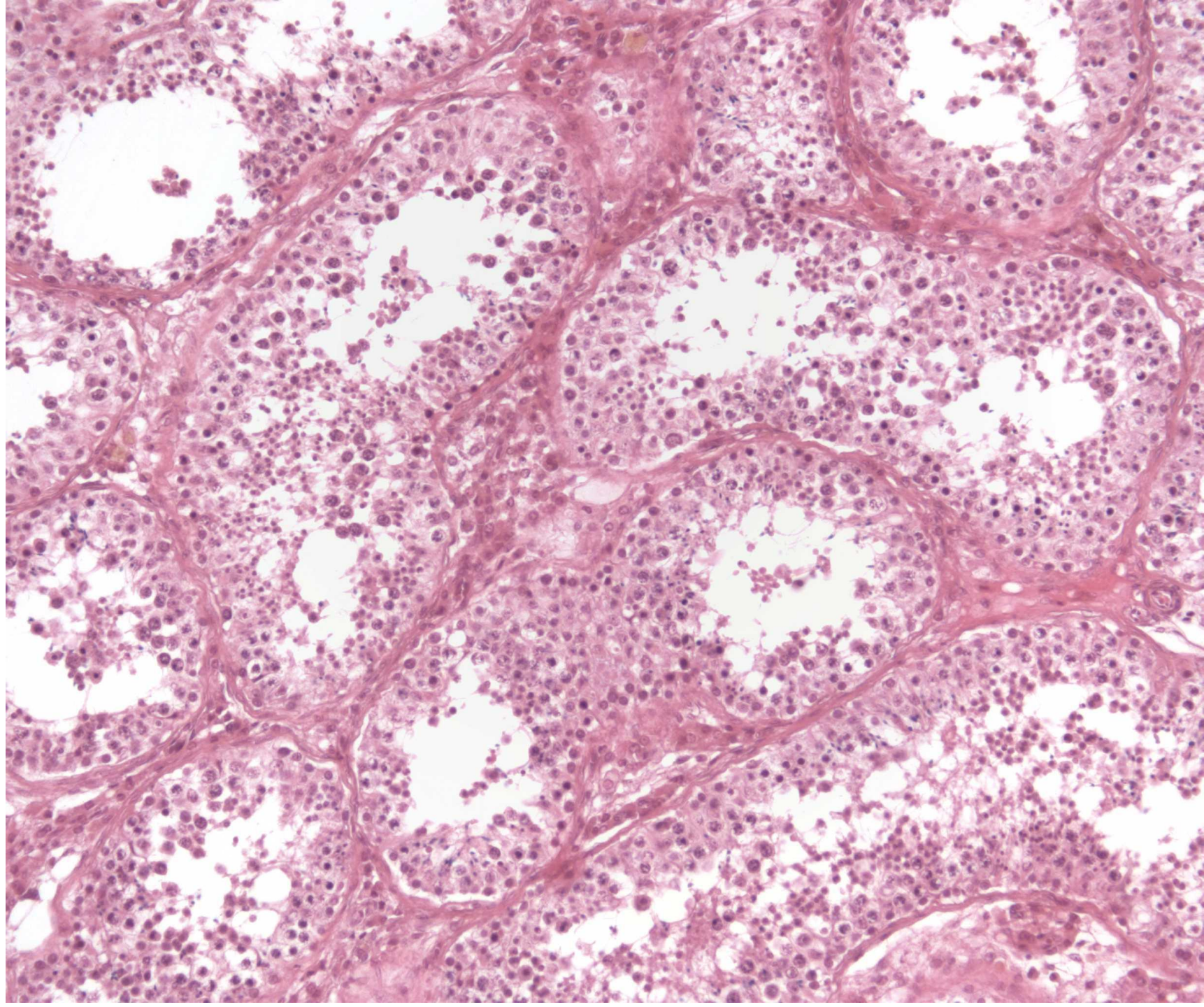
Testis: tunica albuginea,
tubuli seminiferi contorti



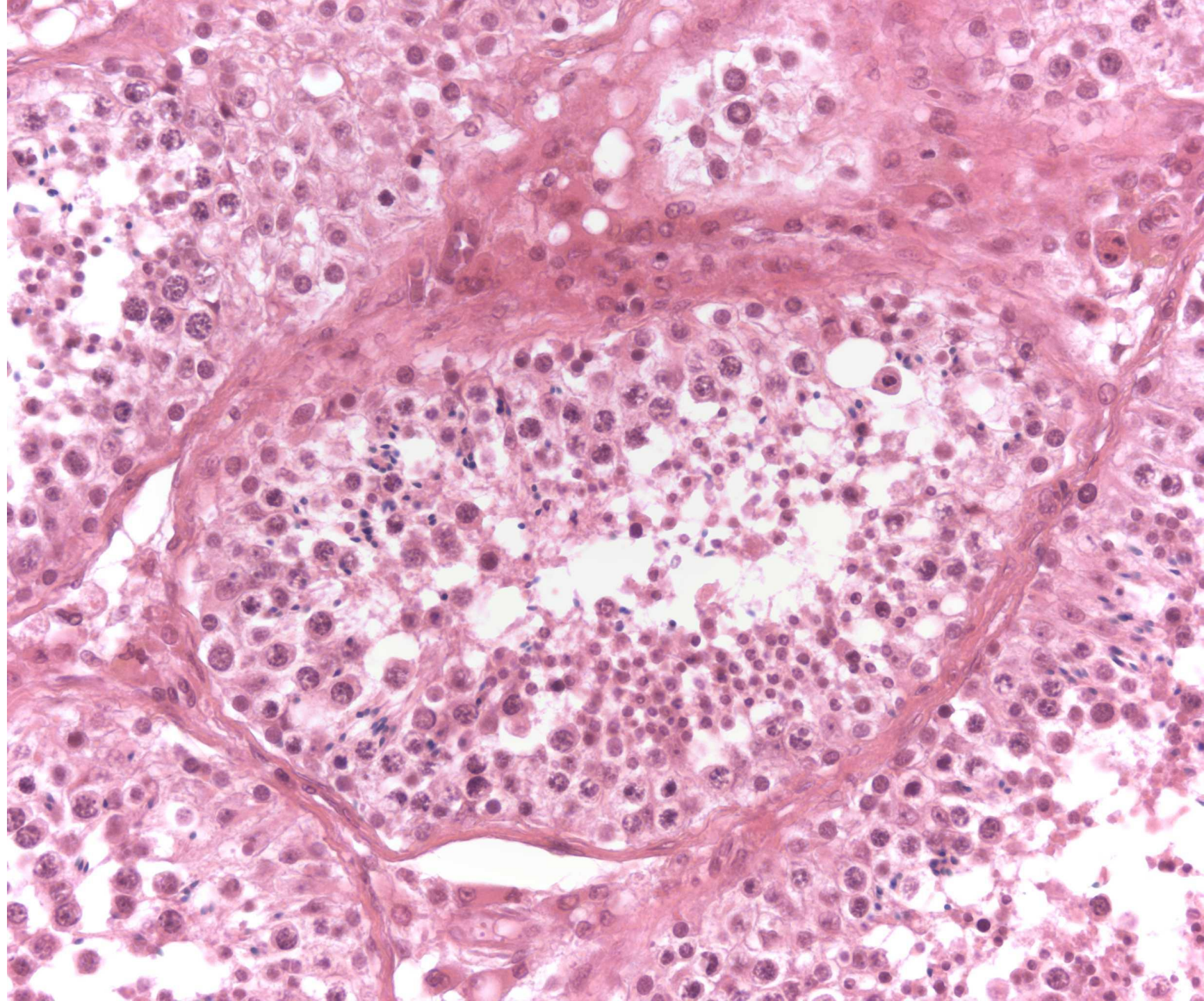
What can be on
the surface?
Compare with
other capsules.

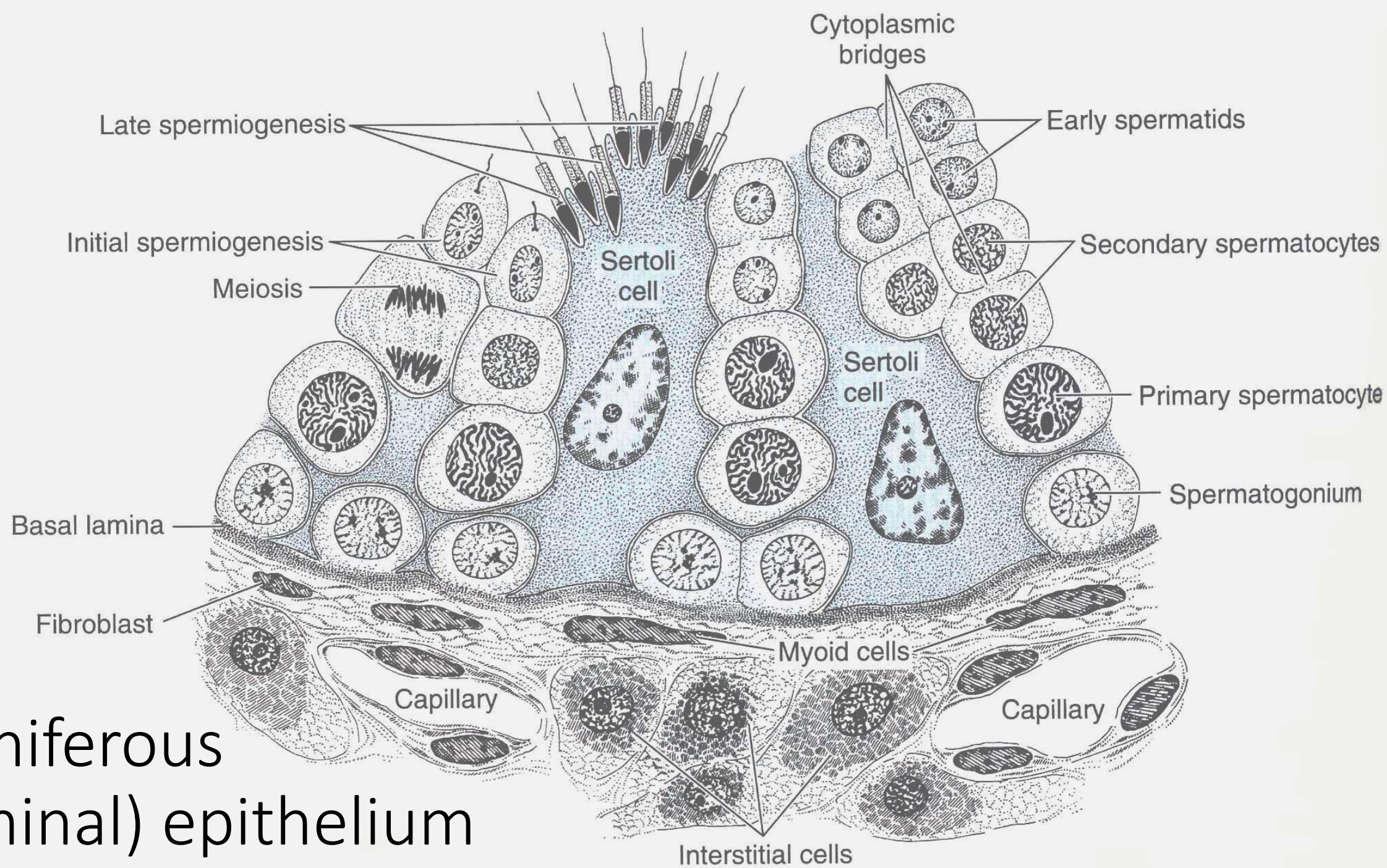


Tubuli seminiferi contorti



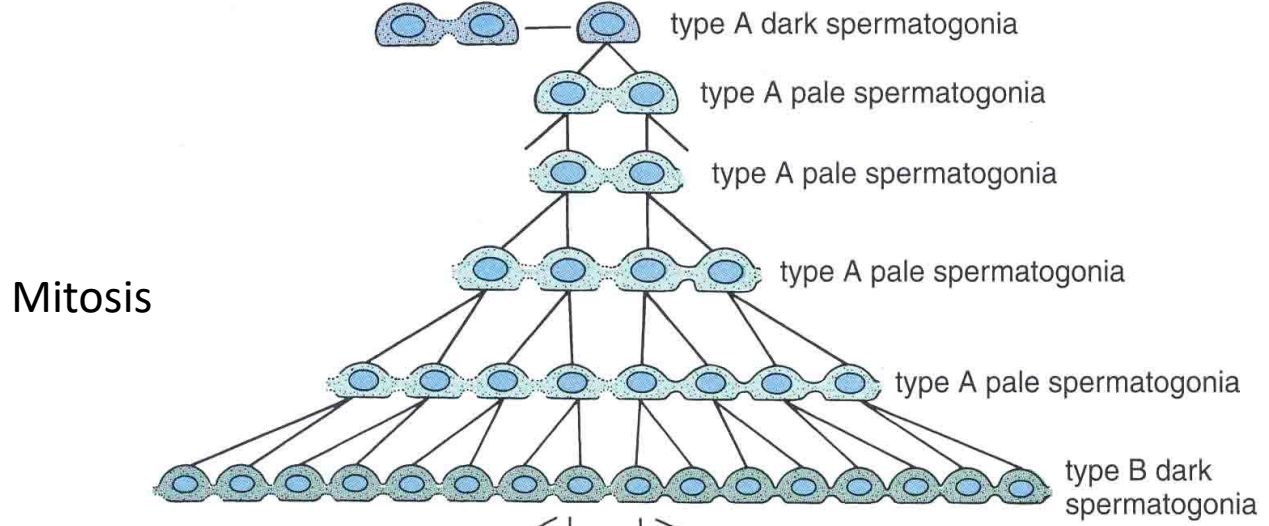
Multiple cells of spermatogenesis visible



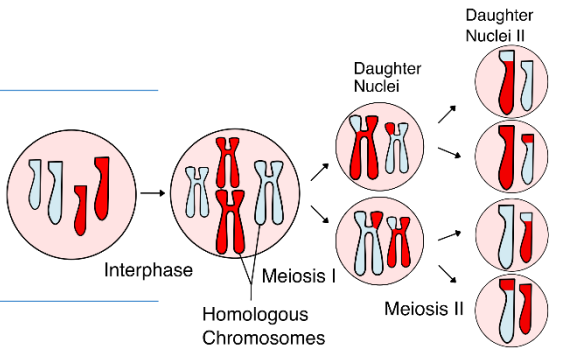
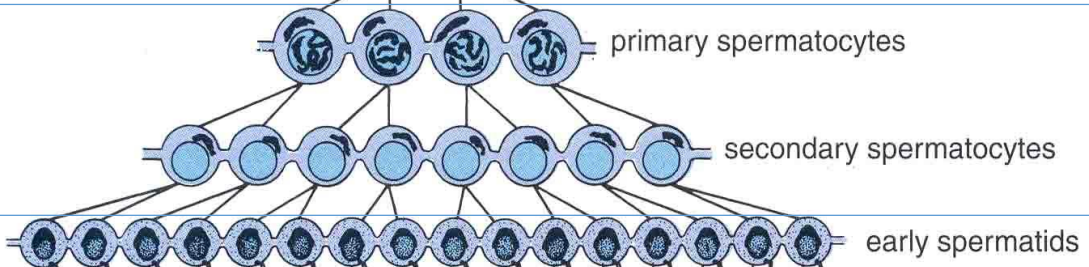


Seminiferous (germinal) epithelium

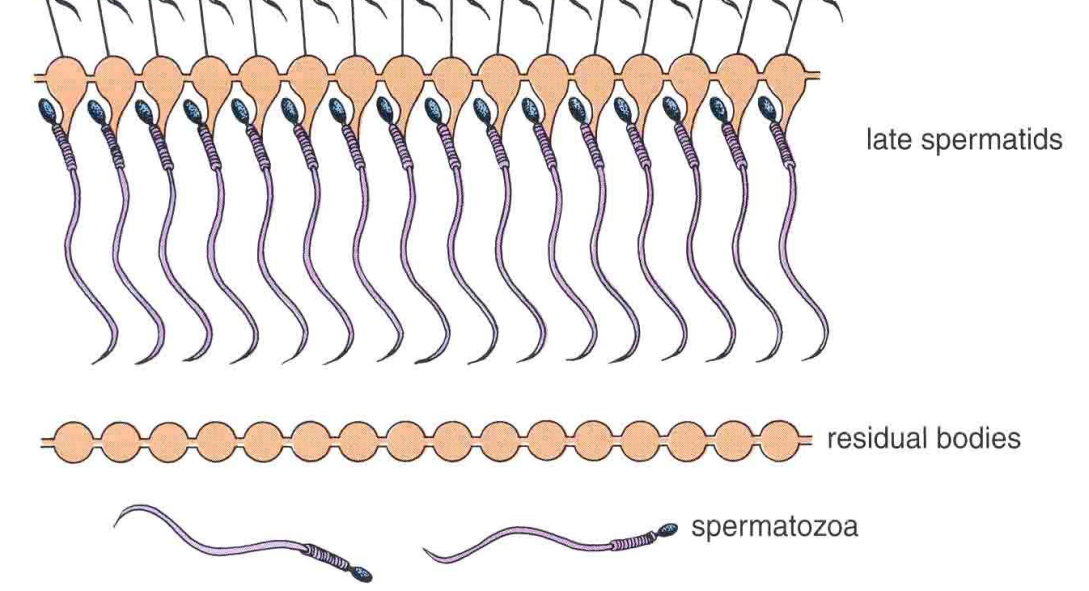
Spermatocytogenesis



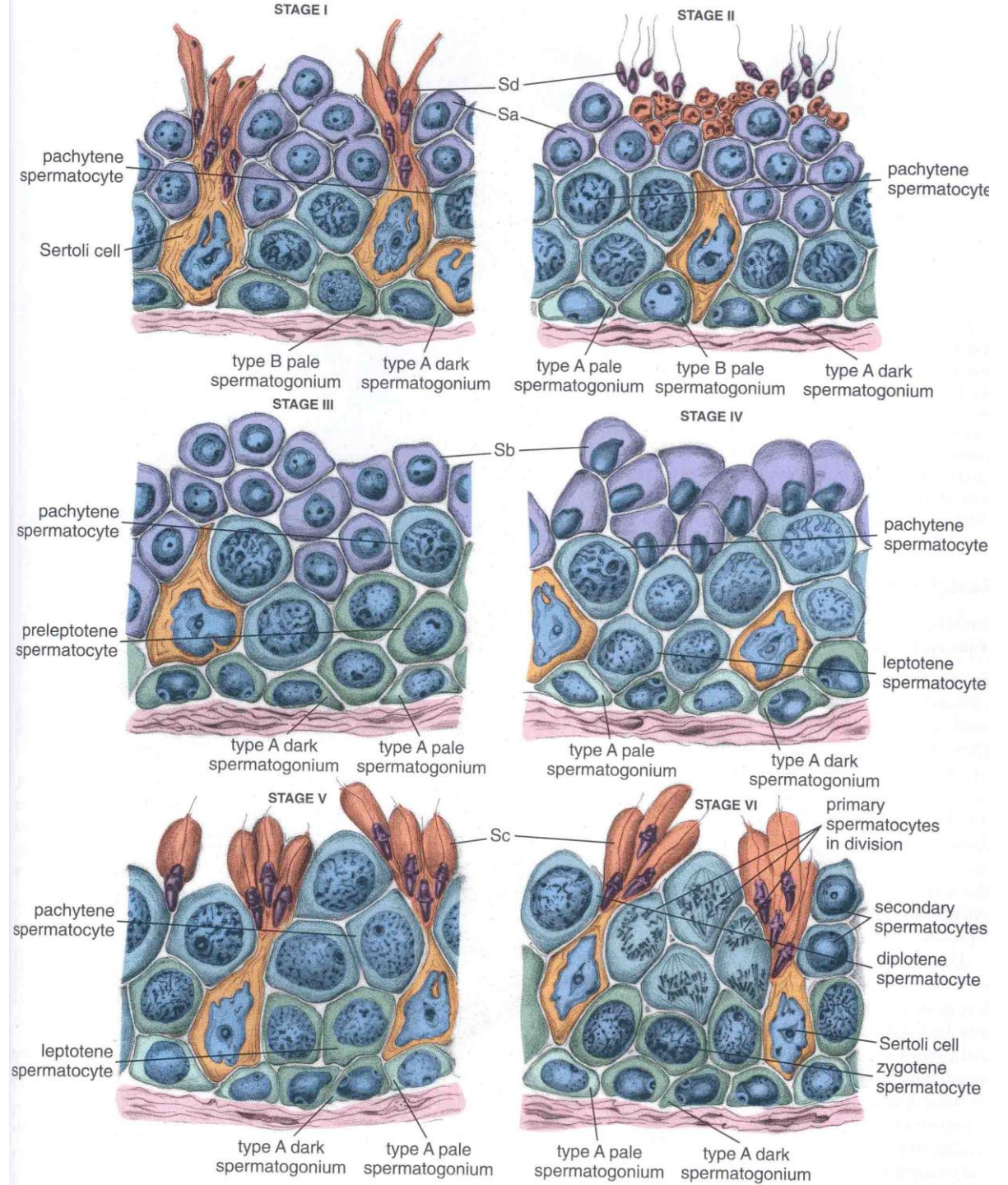
Meiosis

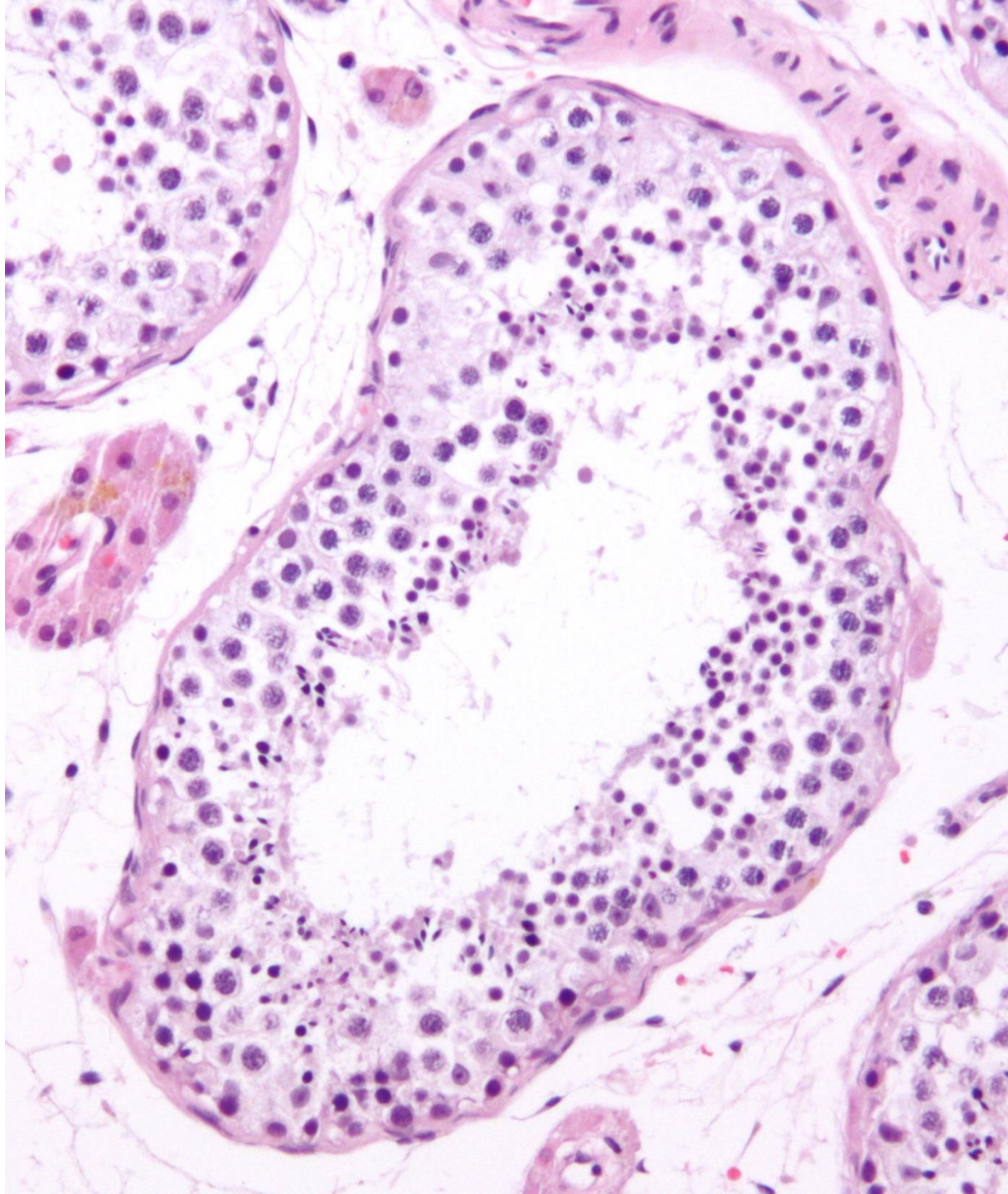


Spermatohistogenesis

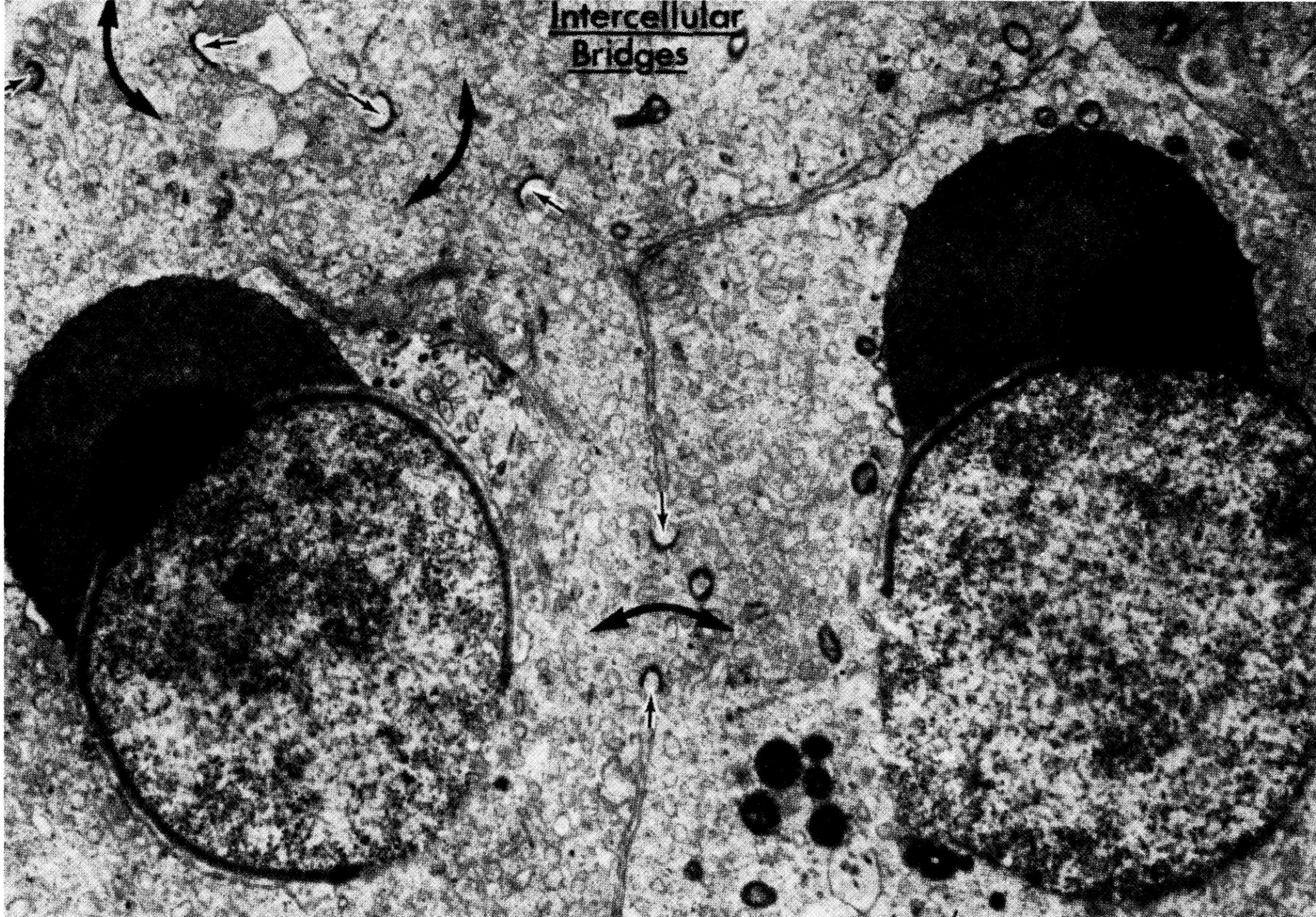


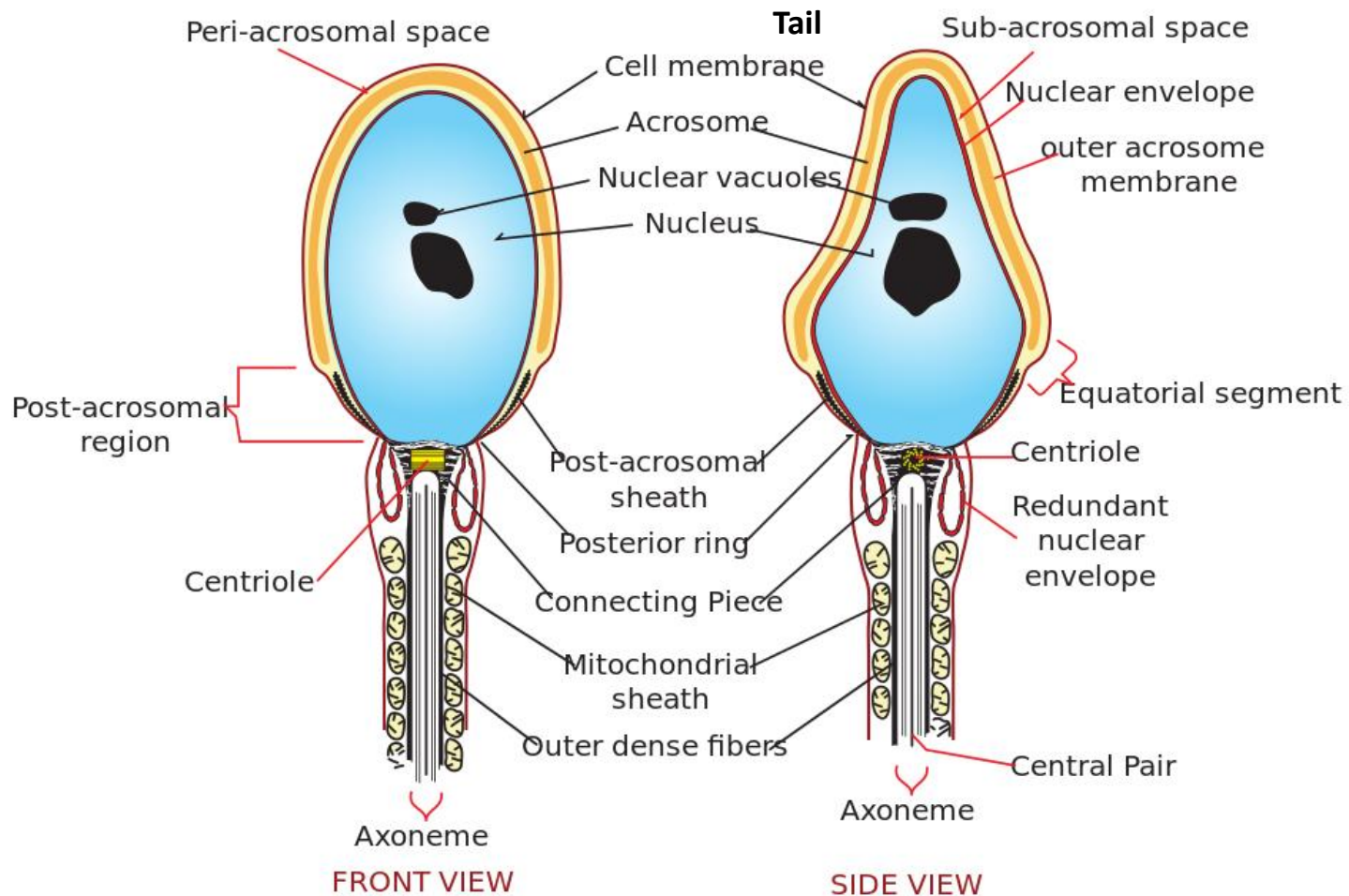
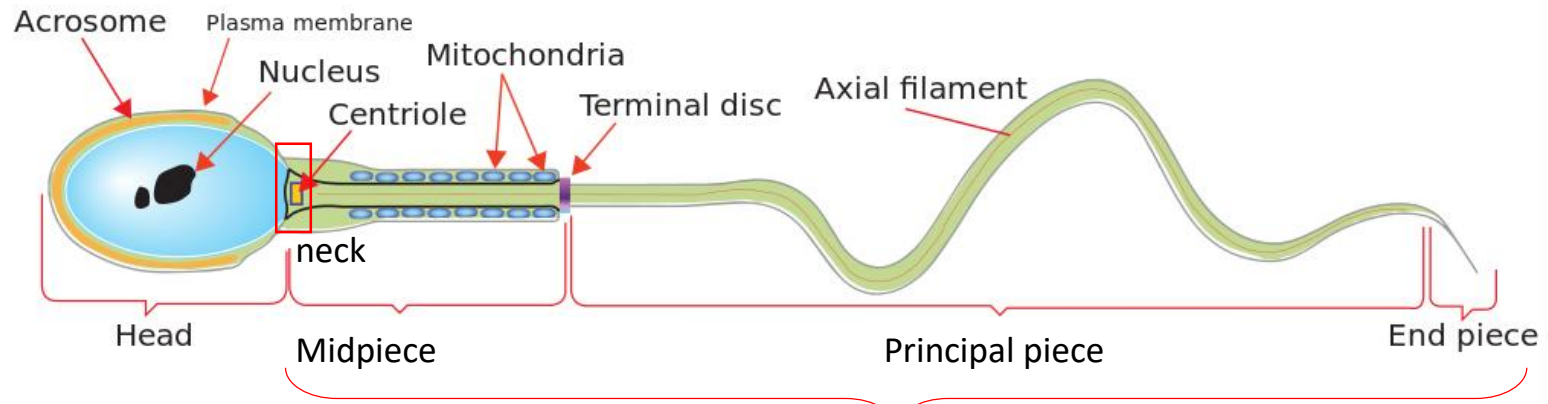
Stages are not so pronounced in humans, but in many animals (e.g. rodents) they are clearly distinguished. In humans, the duration of spermatogenesis is about 74 days with daily production of about 300,000,000 spermatozoa.



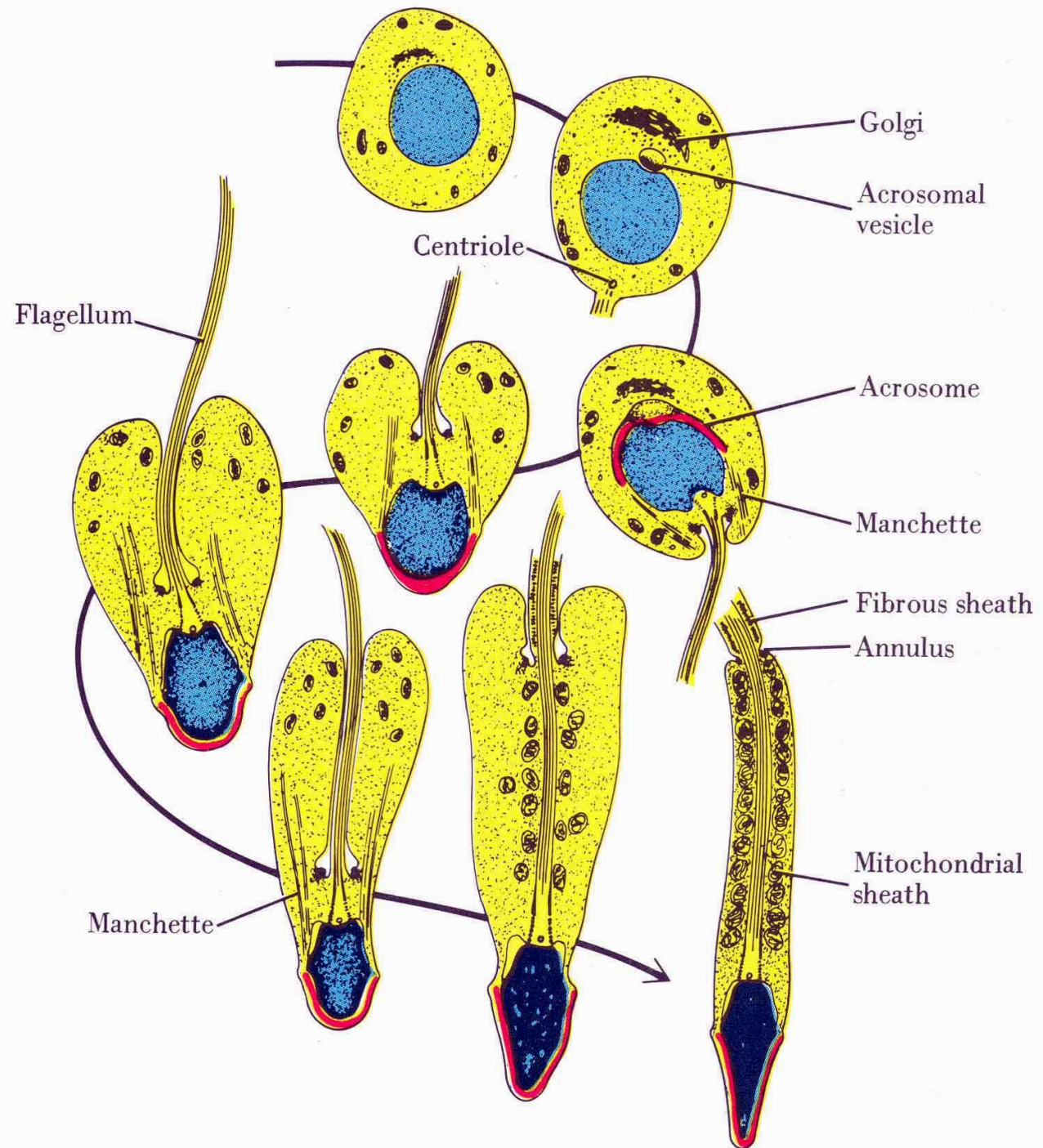
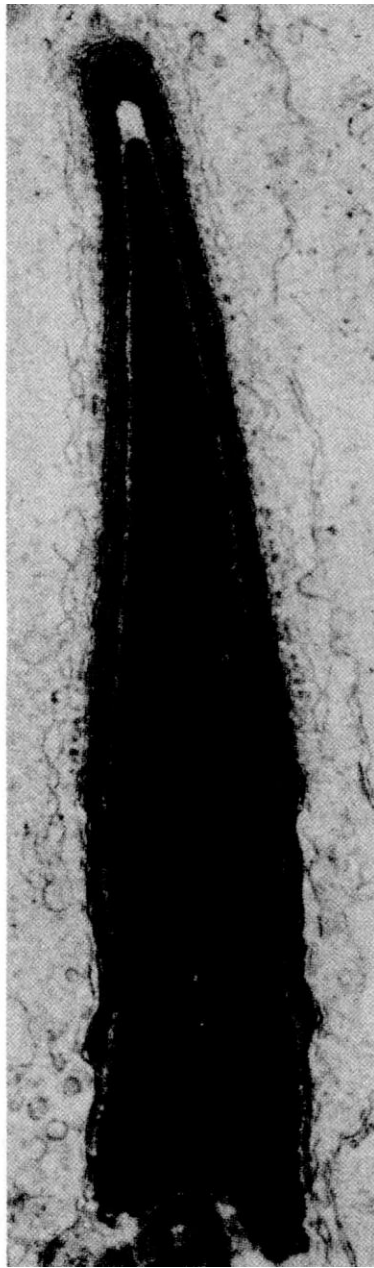
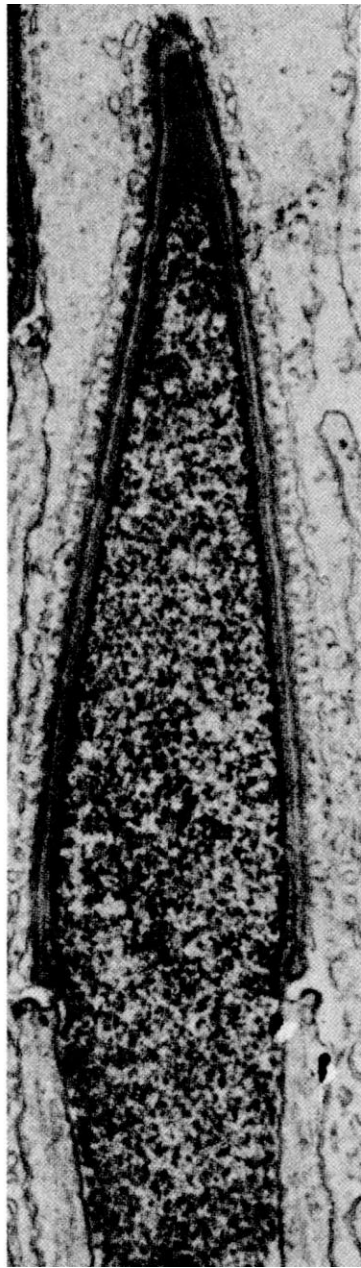
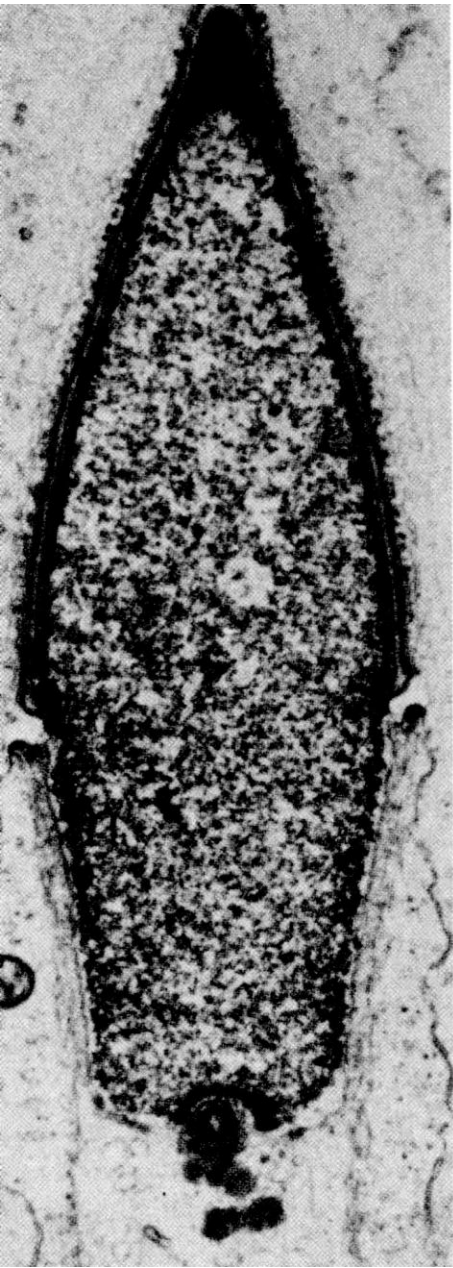


Intercellular
Bridges





https://en.wikipedia.org/wiki/Sperm#/media/File:Complete_diagram_of_a_human_spermatozoa_en.svg



Round spermatids



Condensing spermatids



Hyperacetylation

Histones degradation



New components

Spermatozoon



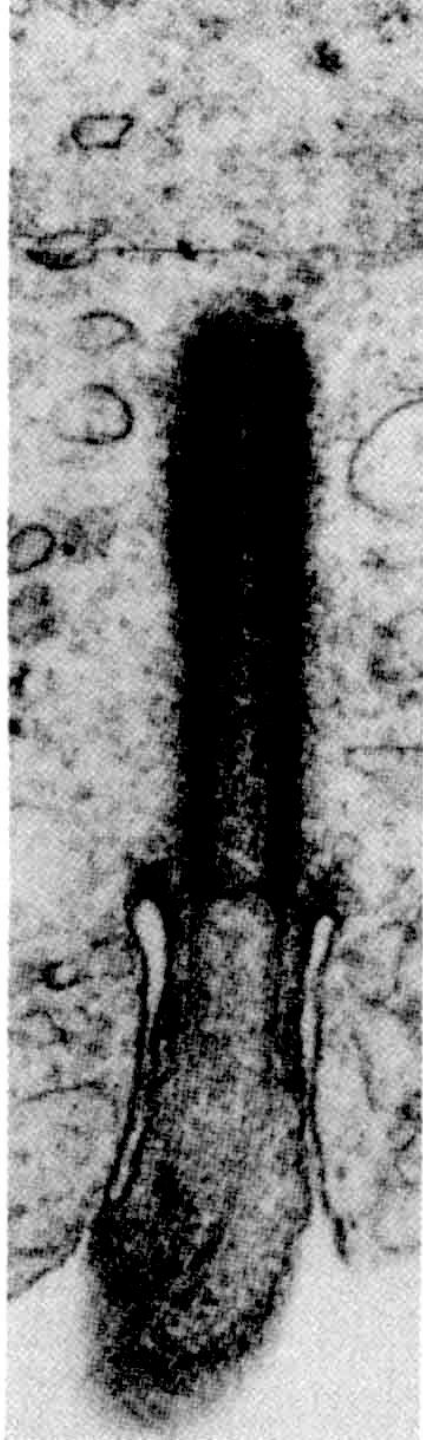
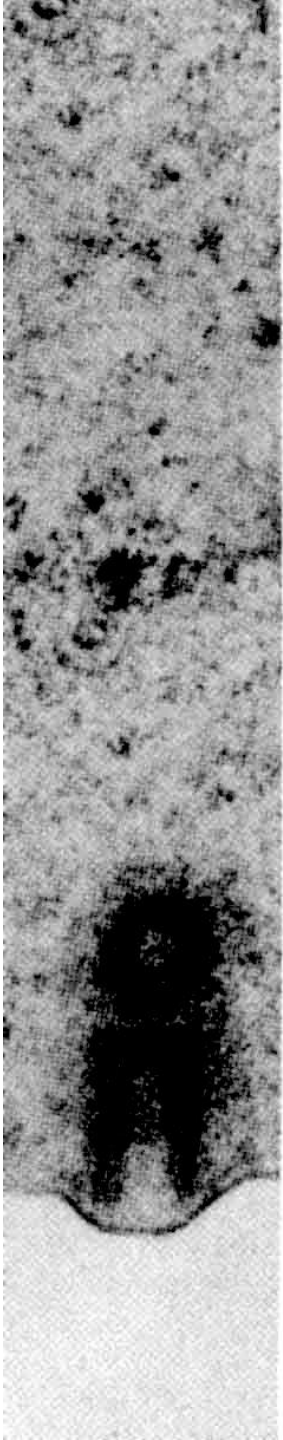
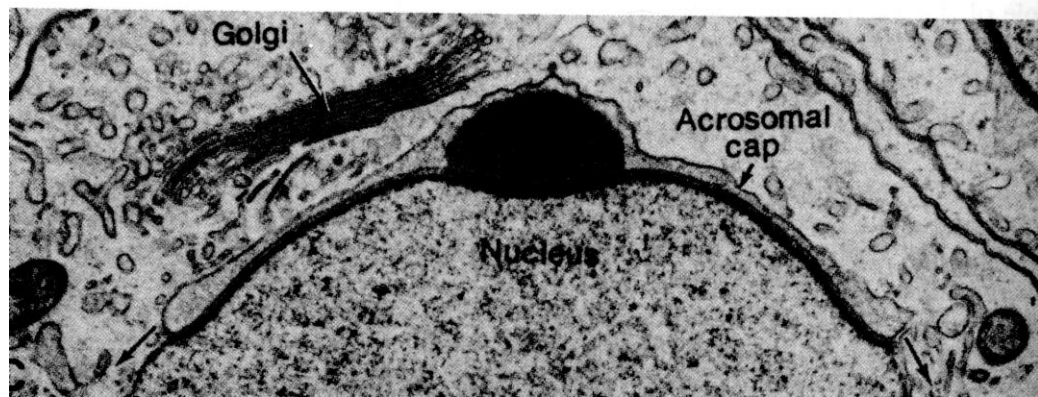
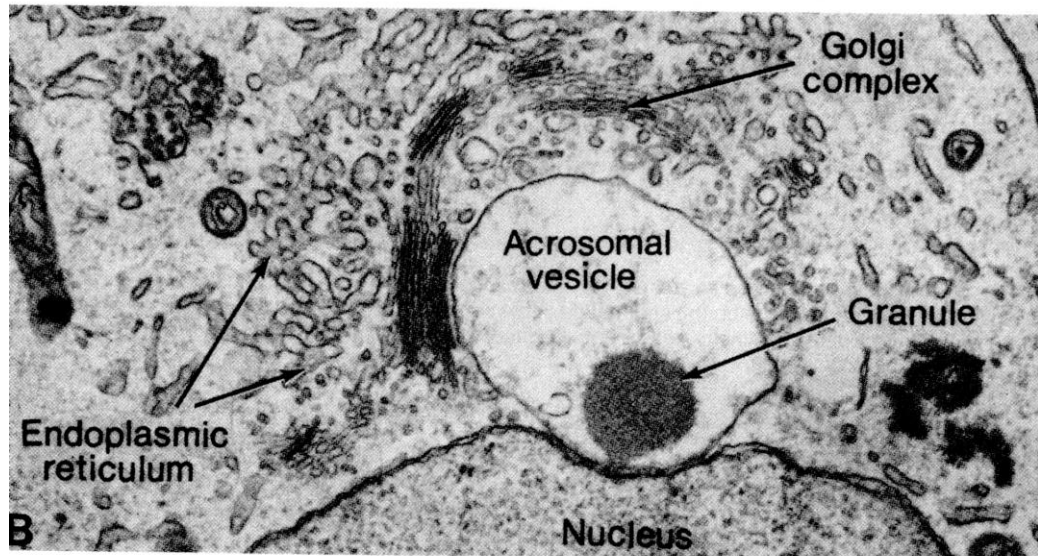
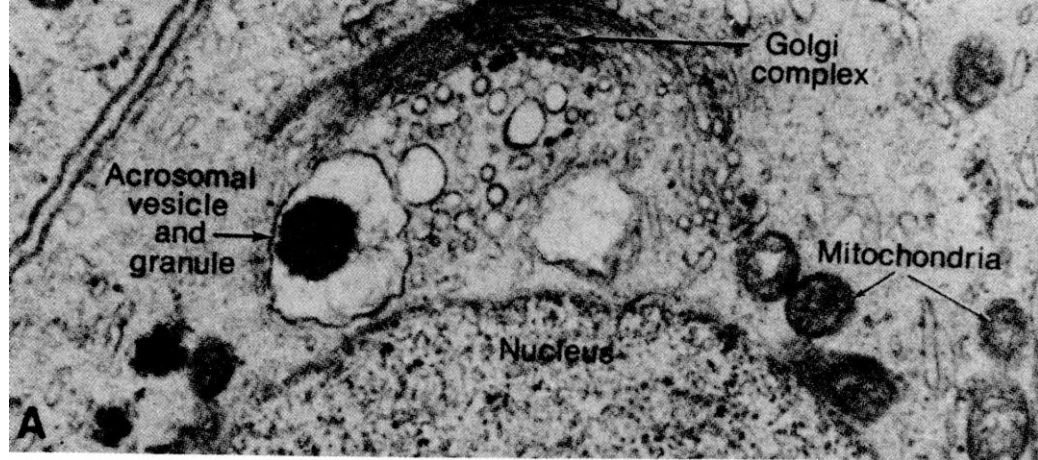
Protamines

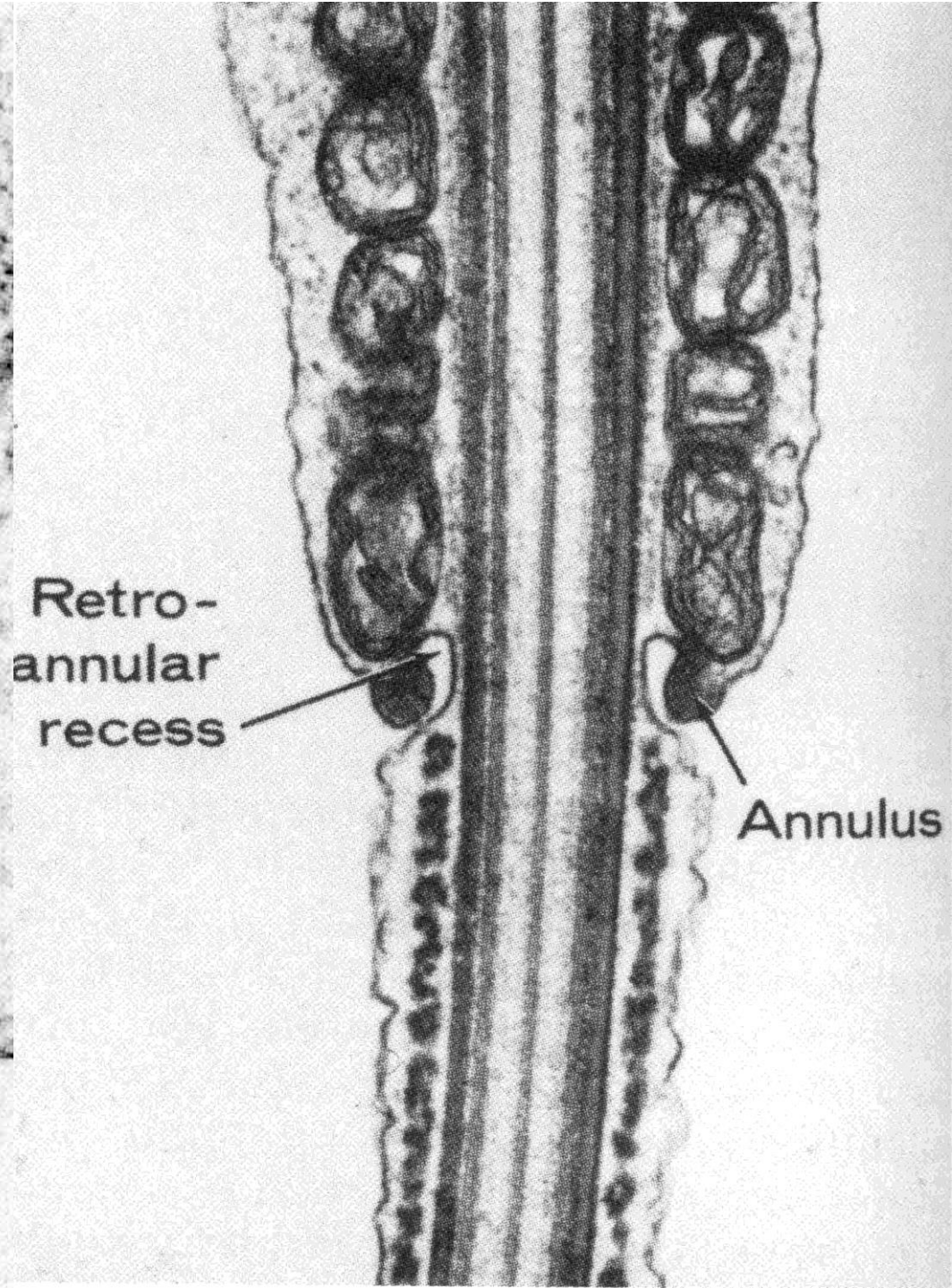
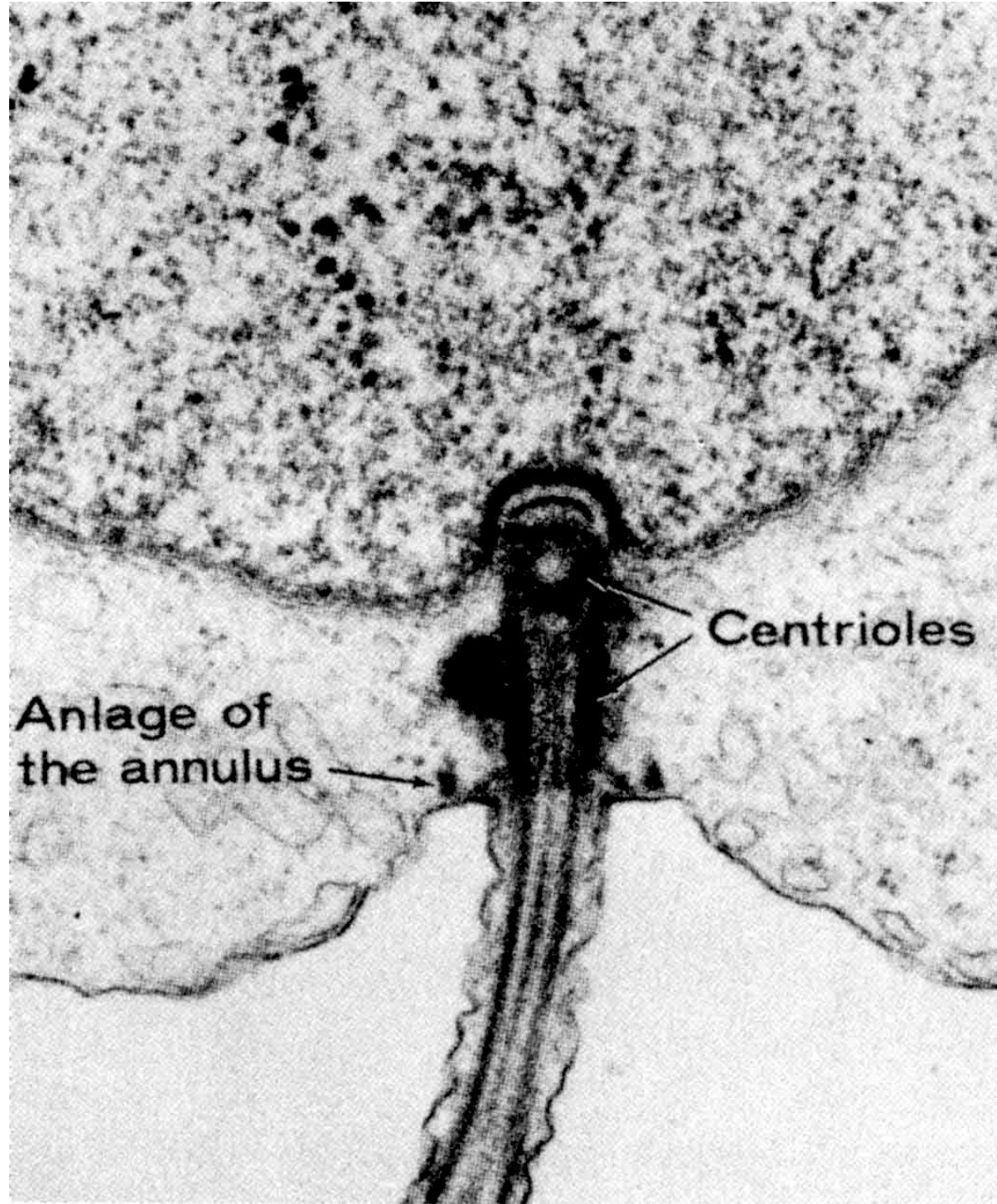


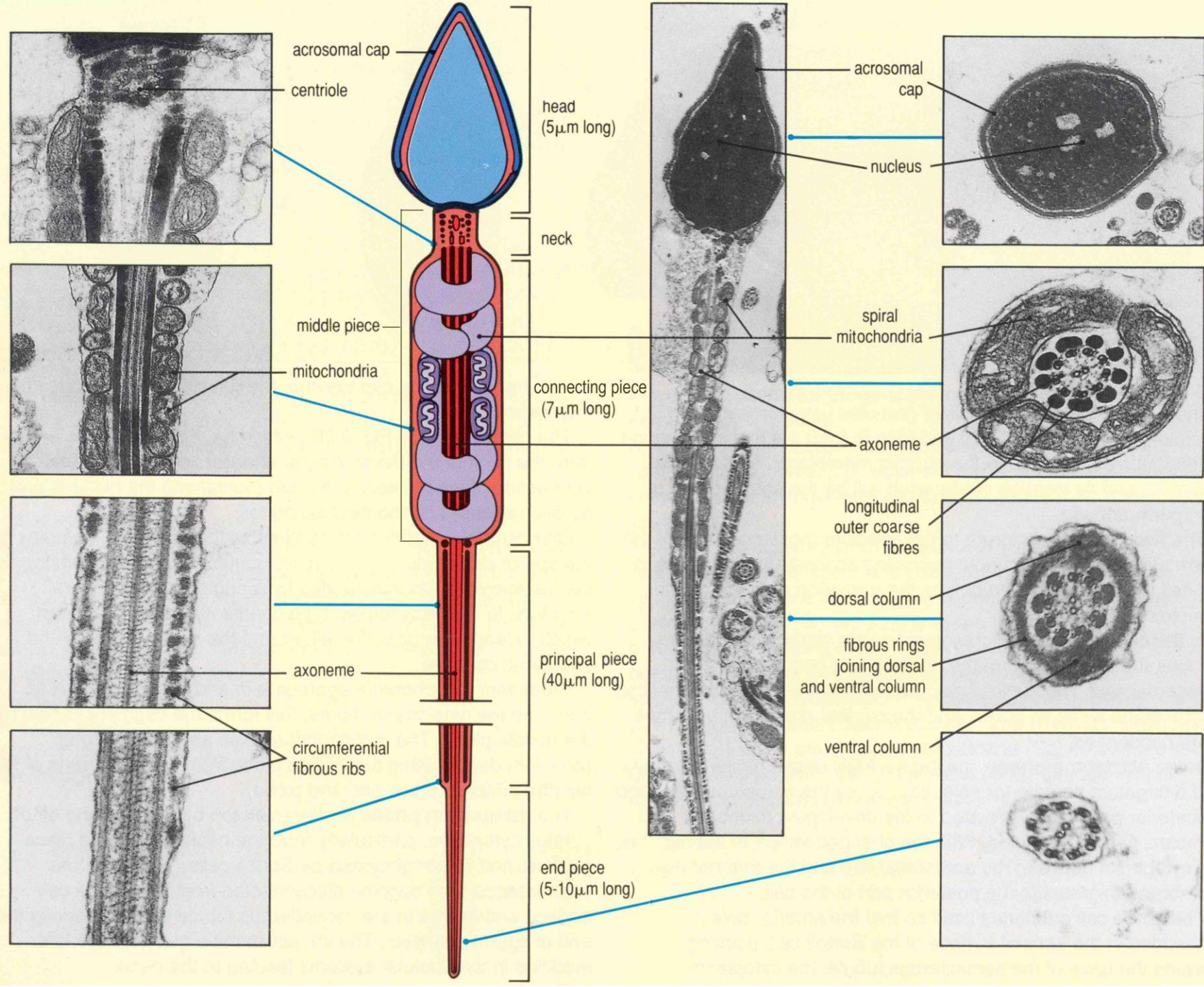
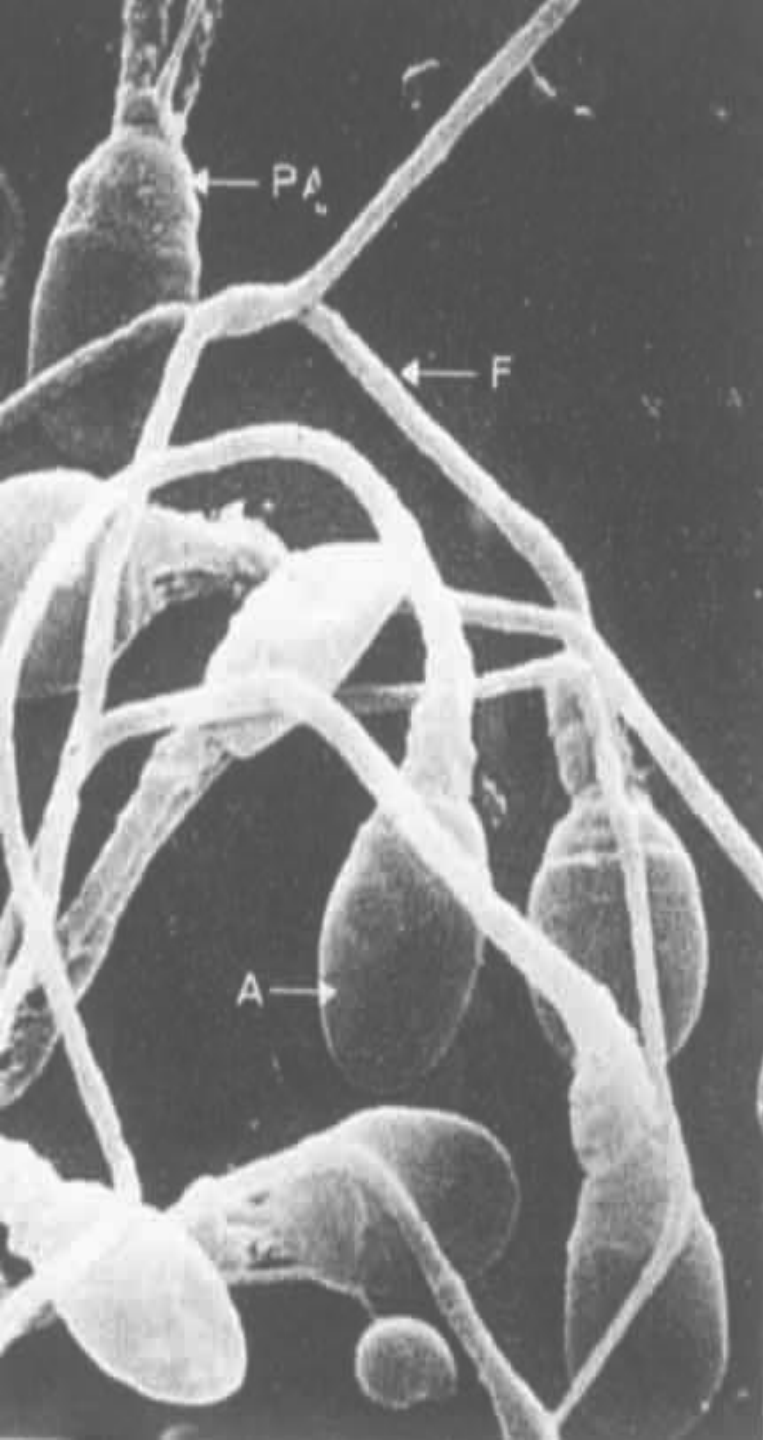
5%

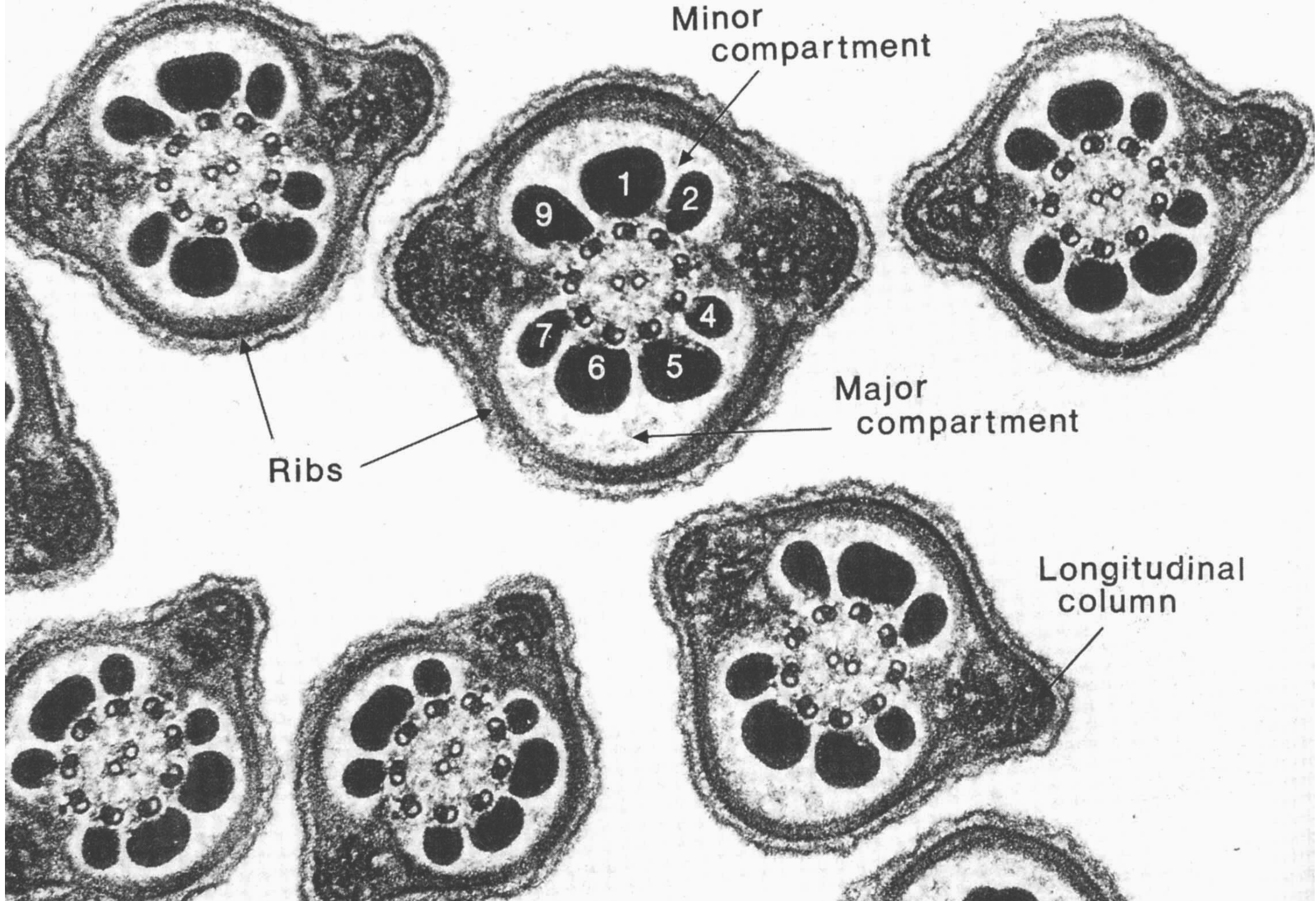
95%

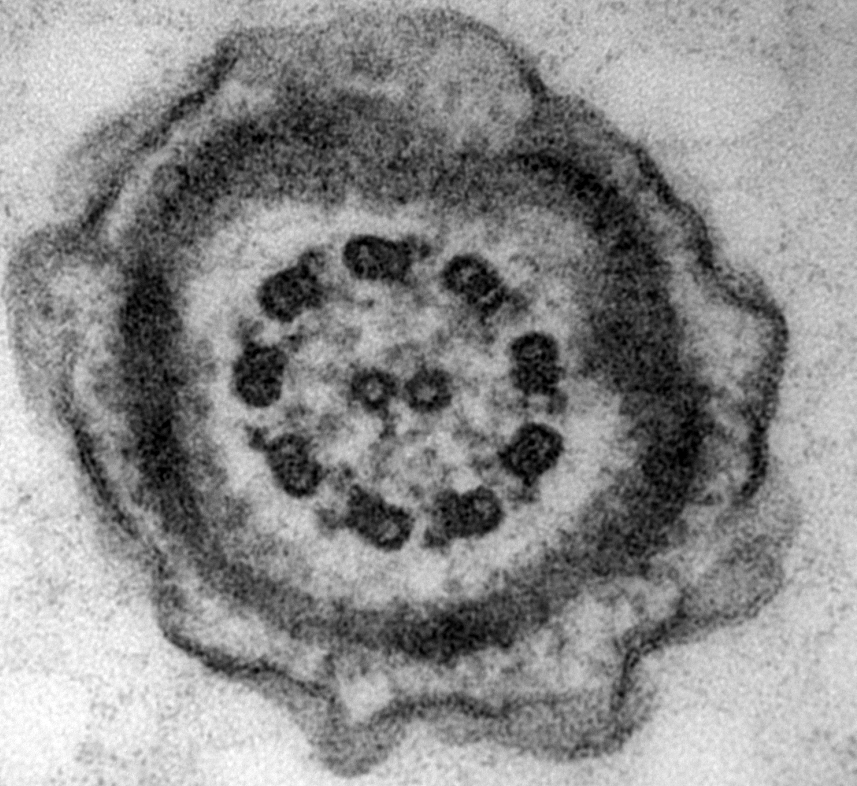
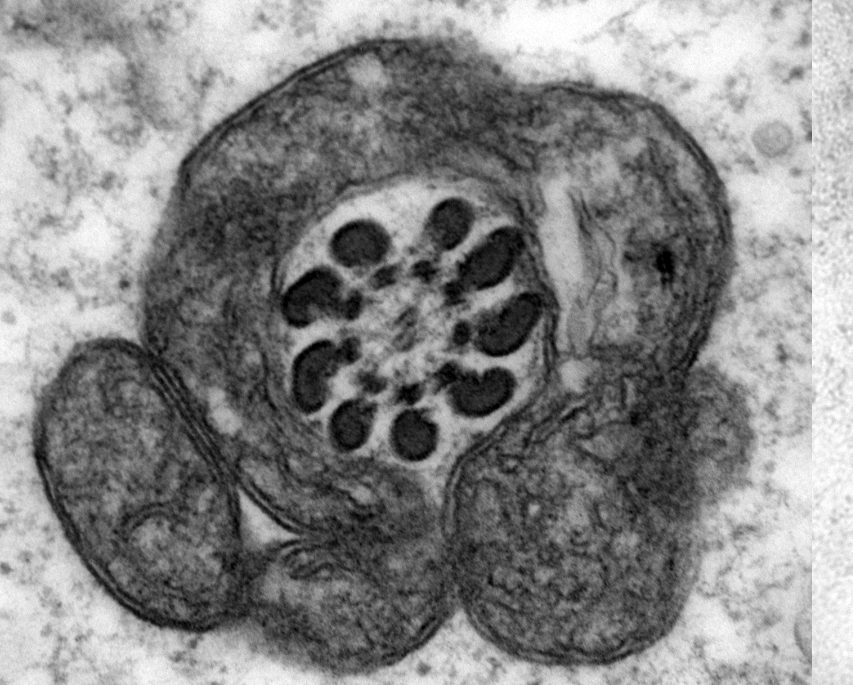
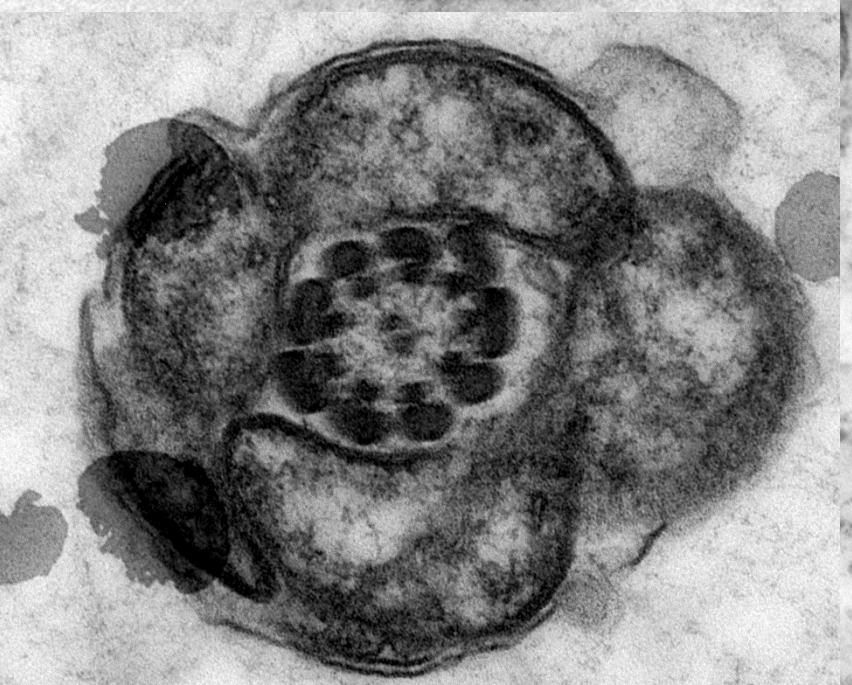
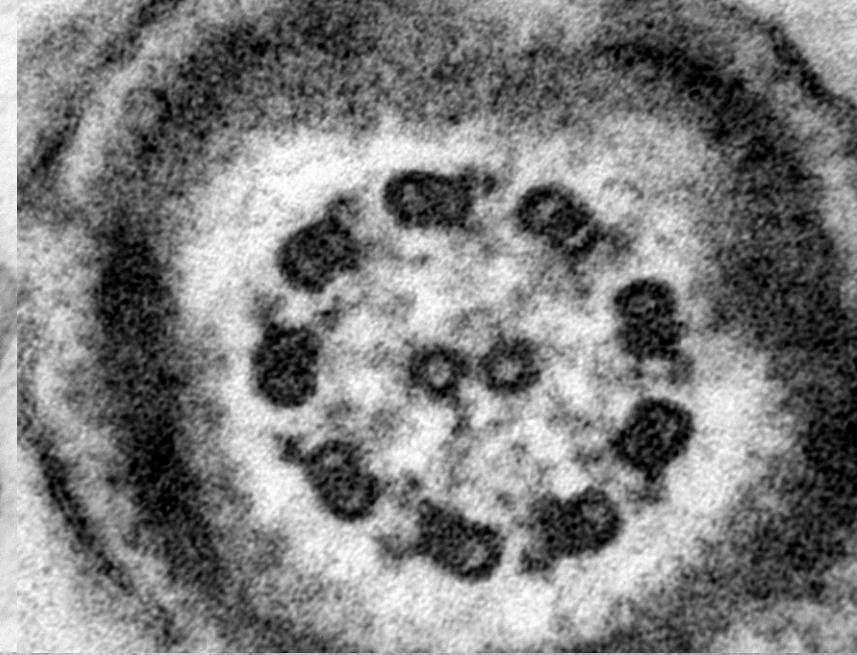
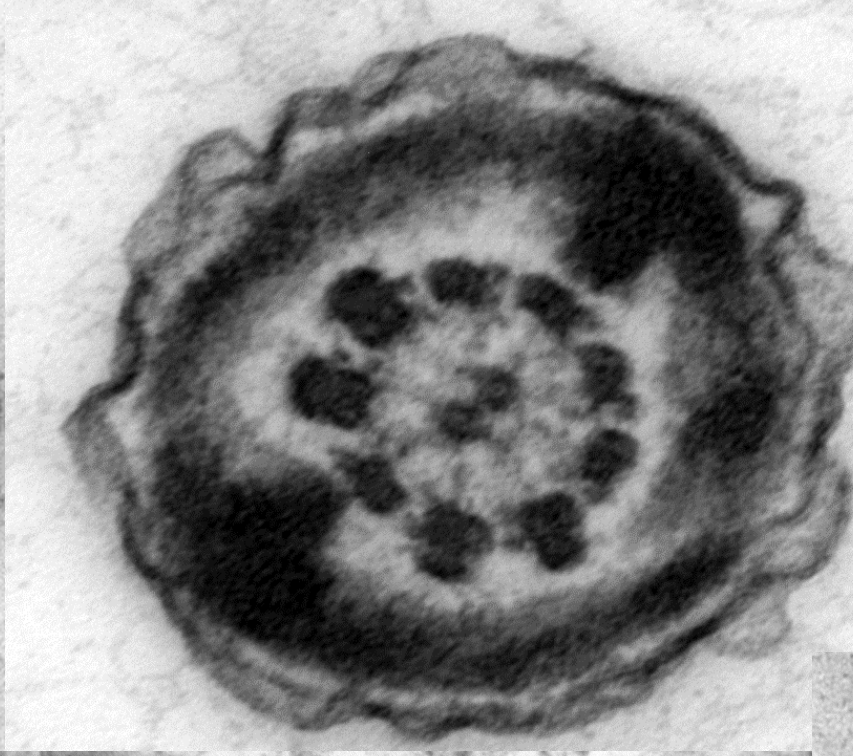
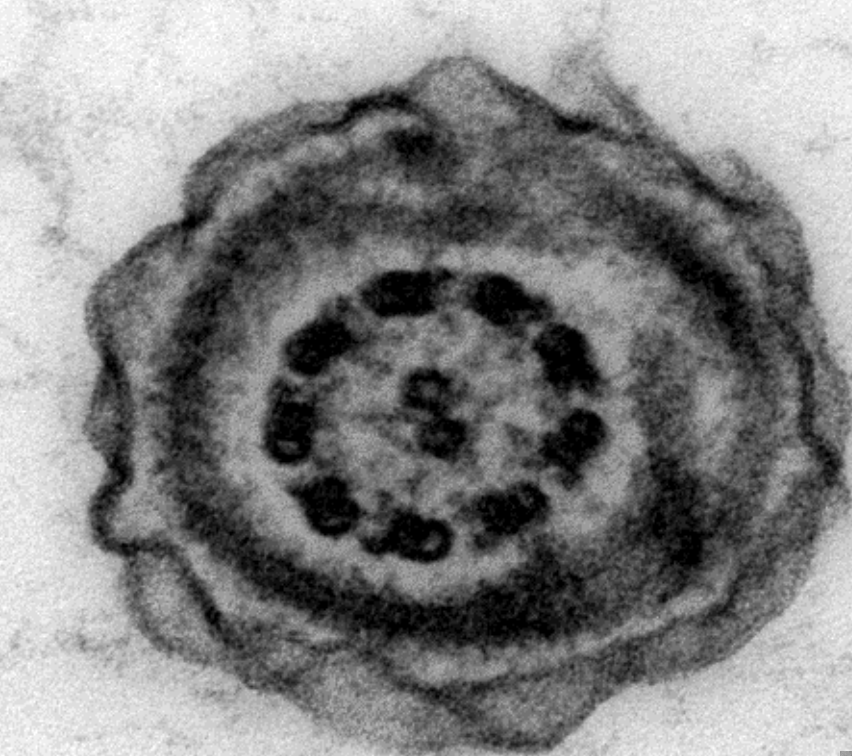
Most histones in the spermatozoa are replaced by protamines, allowing for a more condensed nucleus.

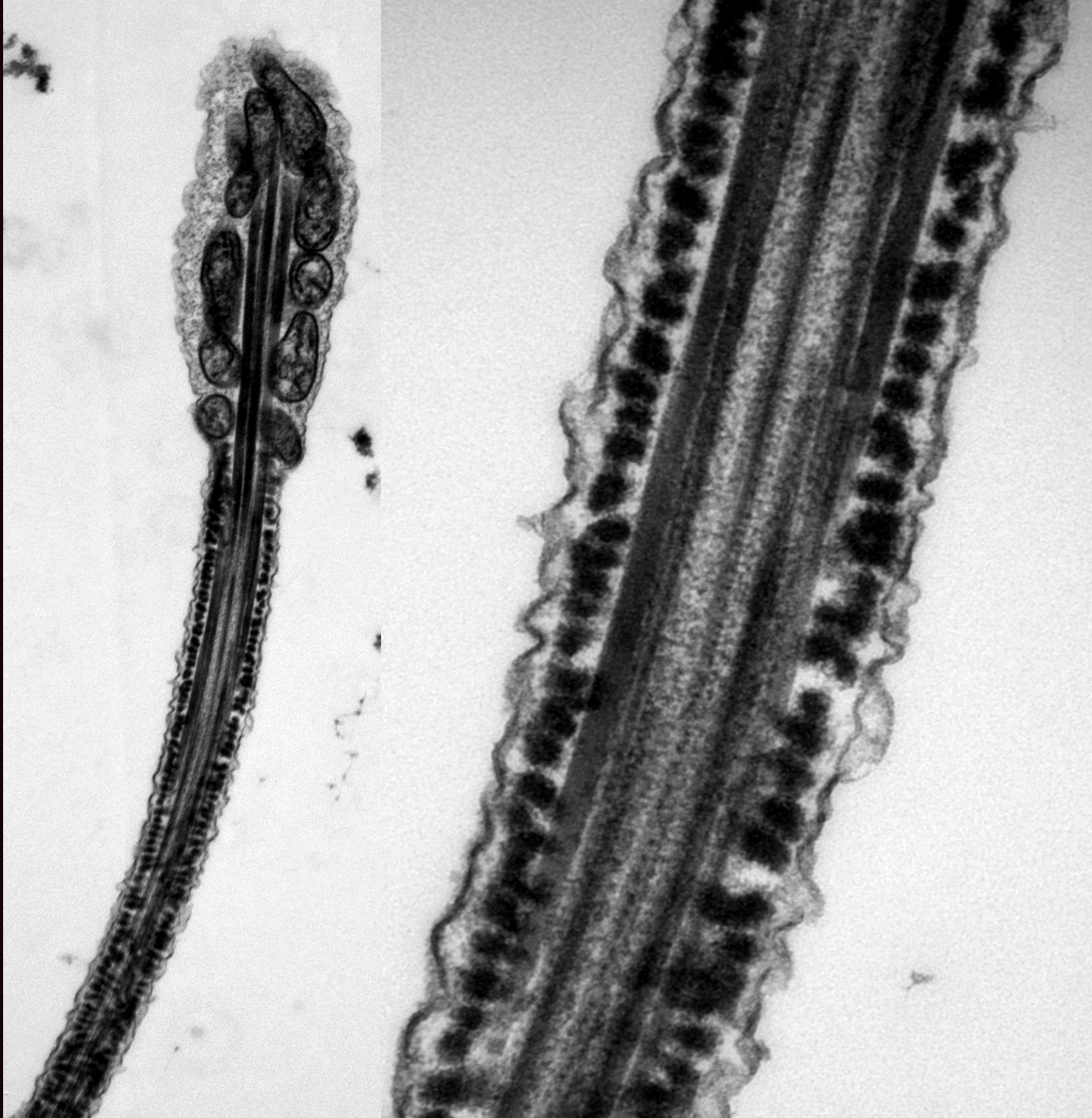
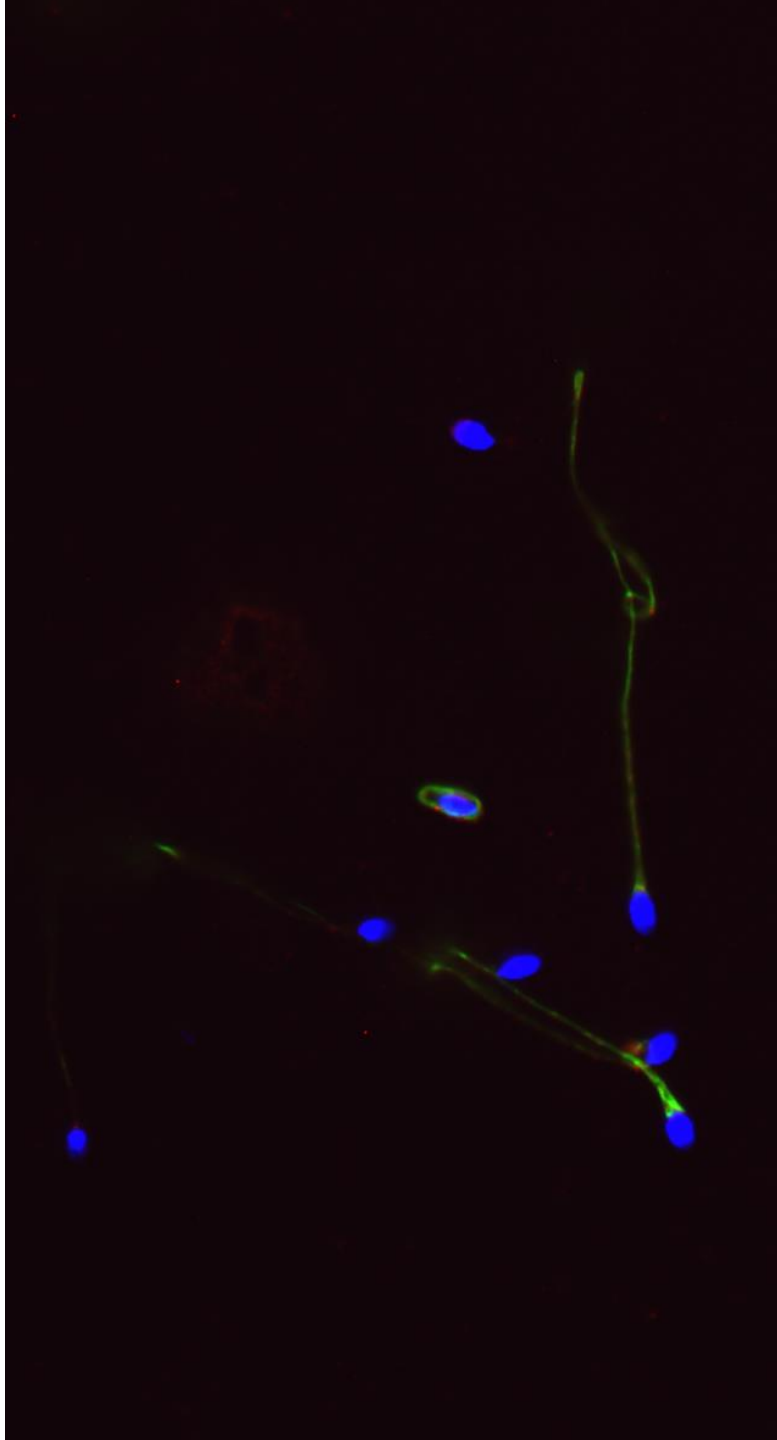


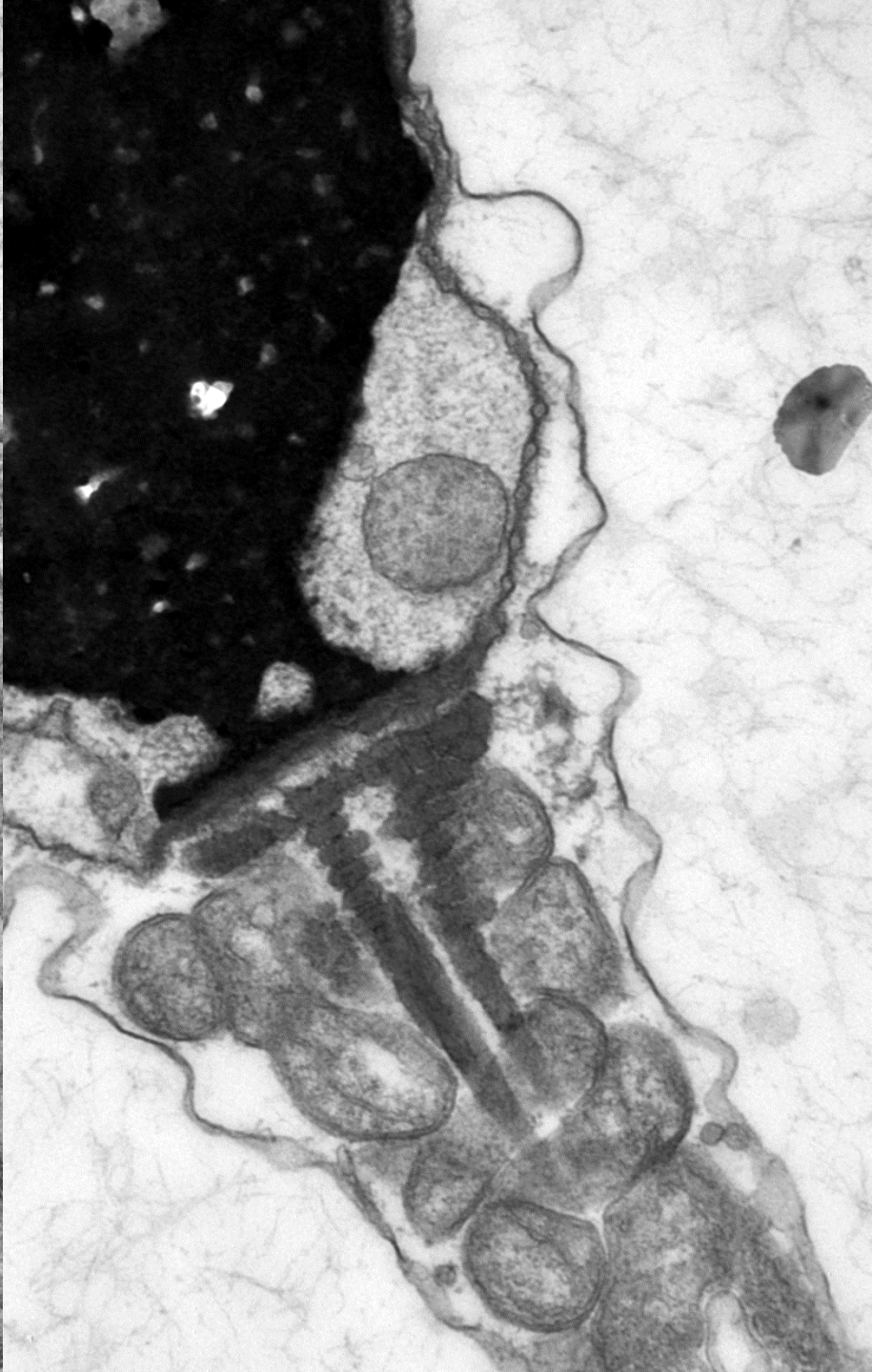
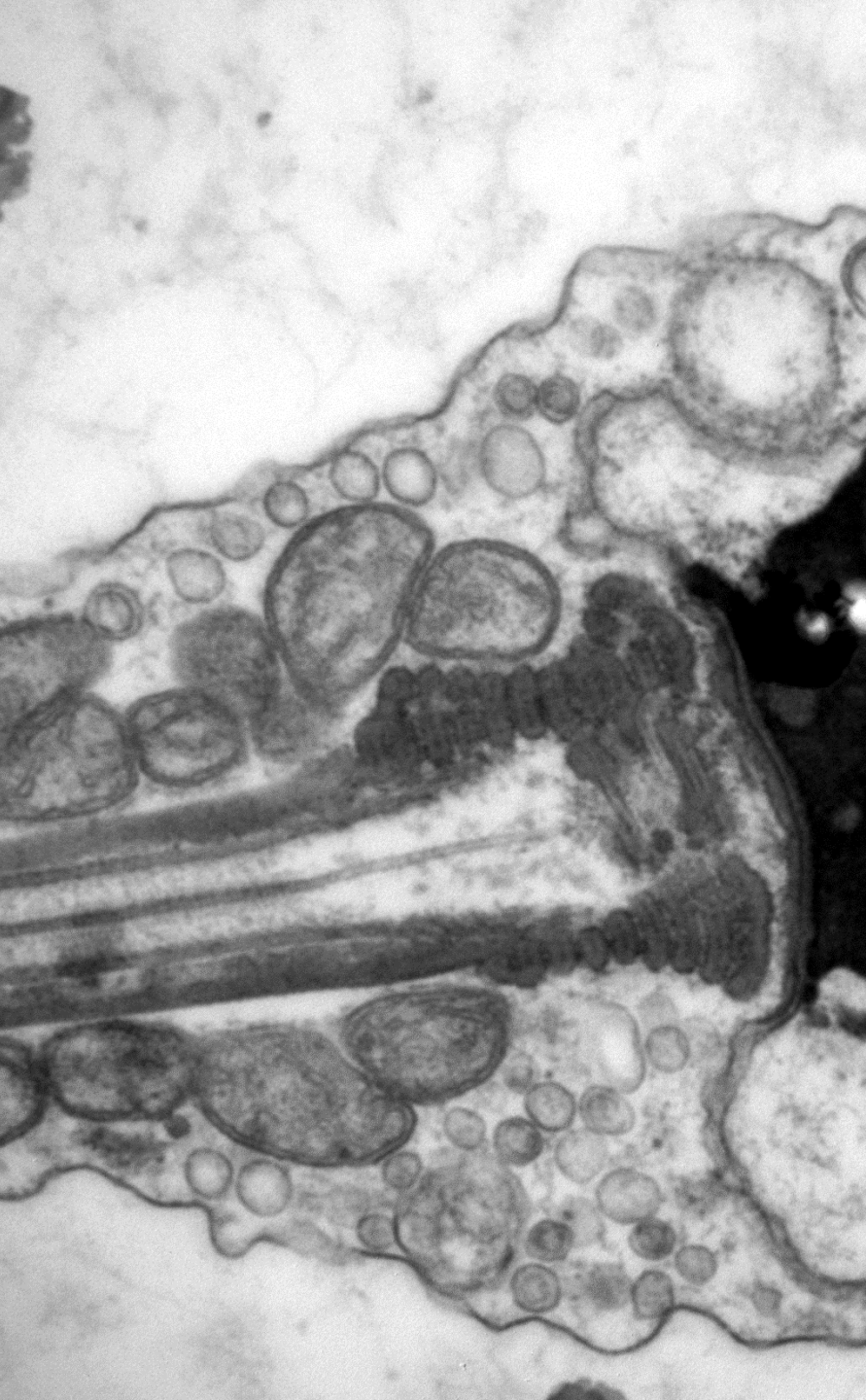


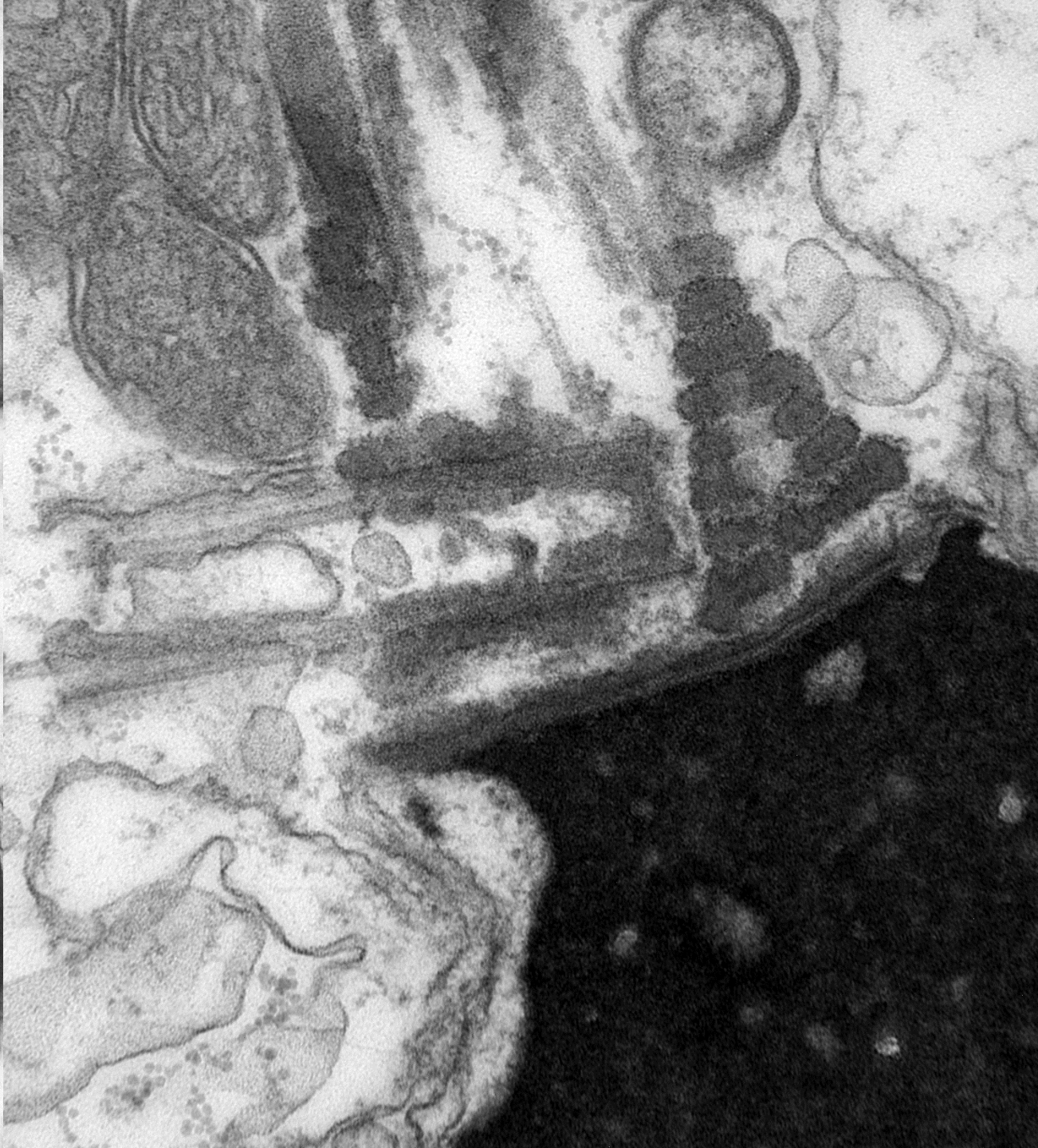
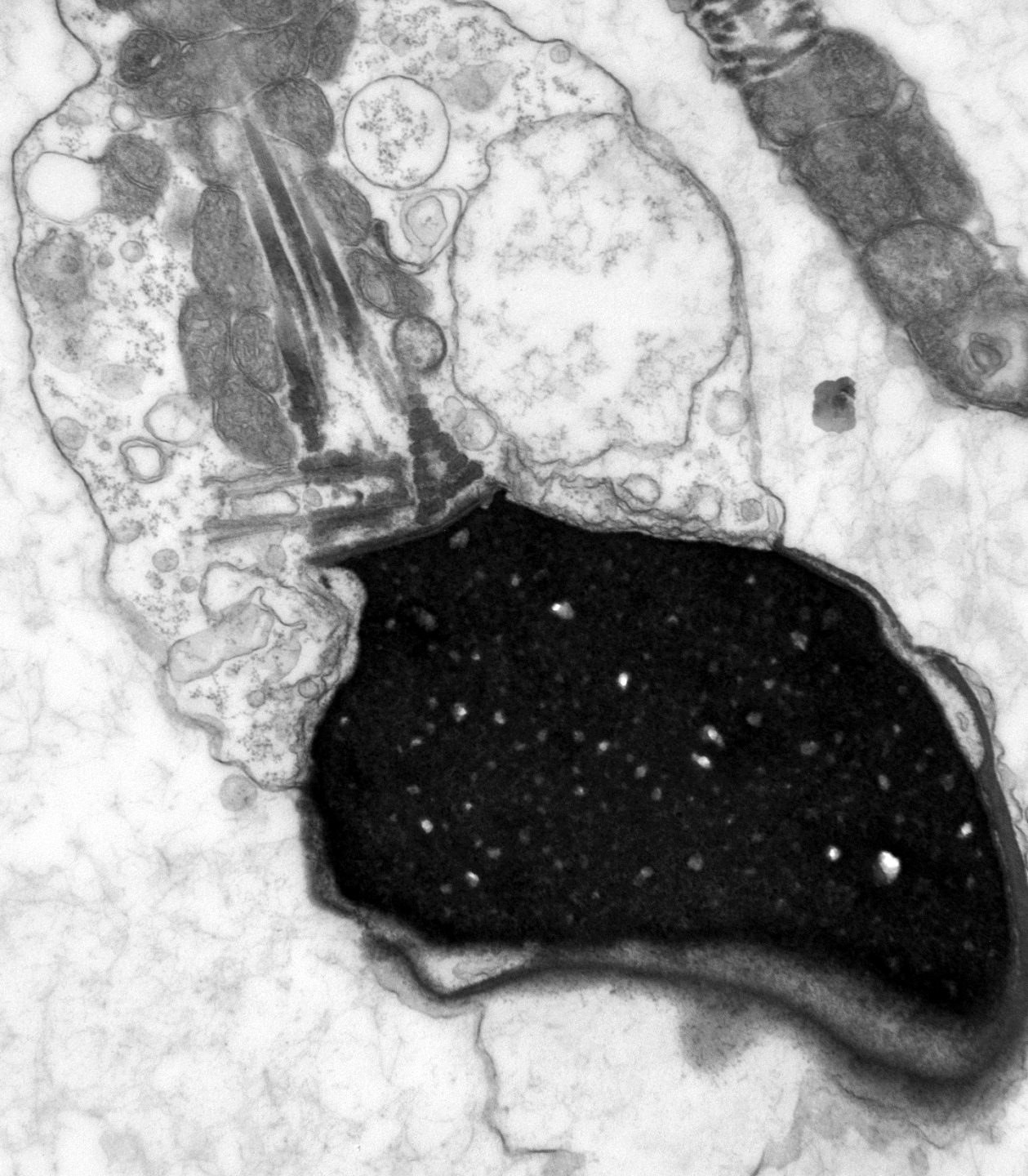


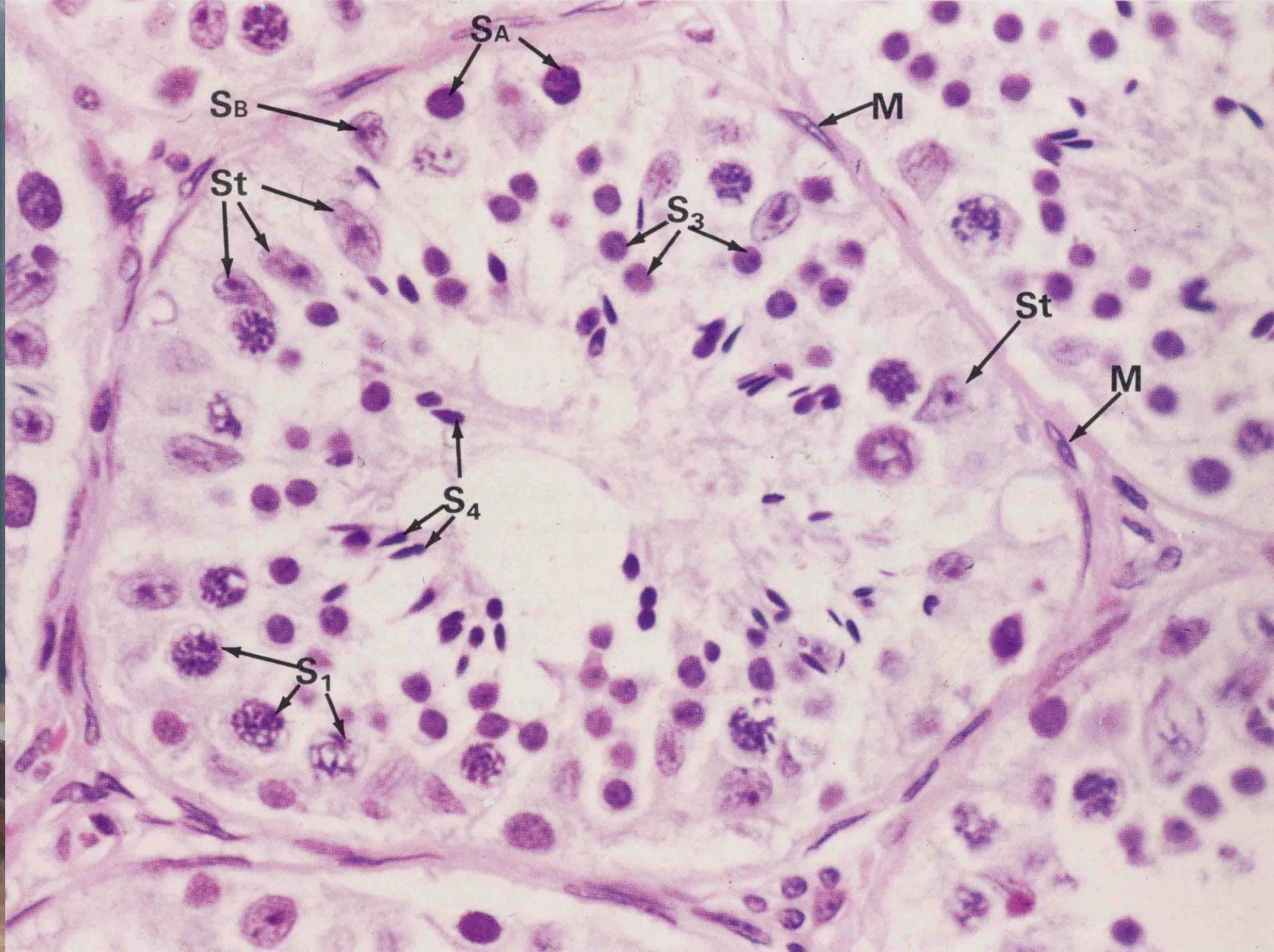








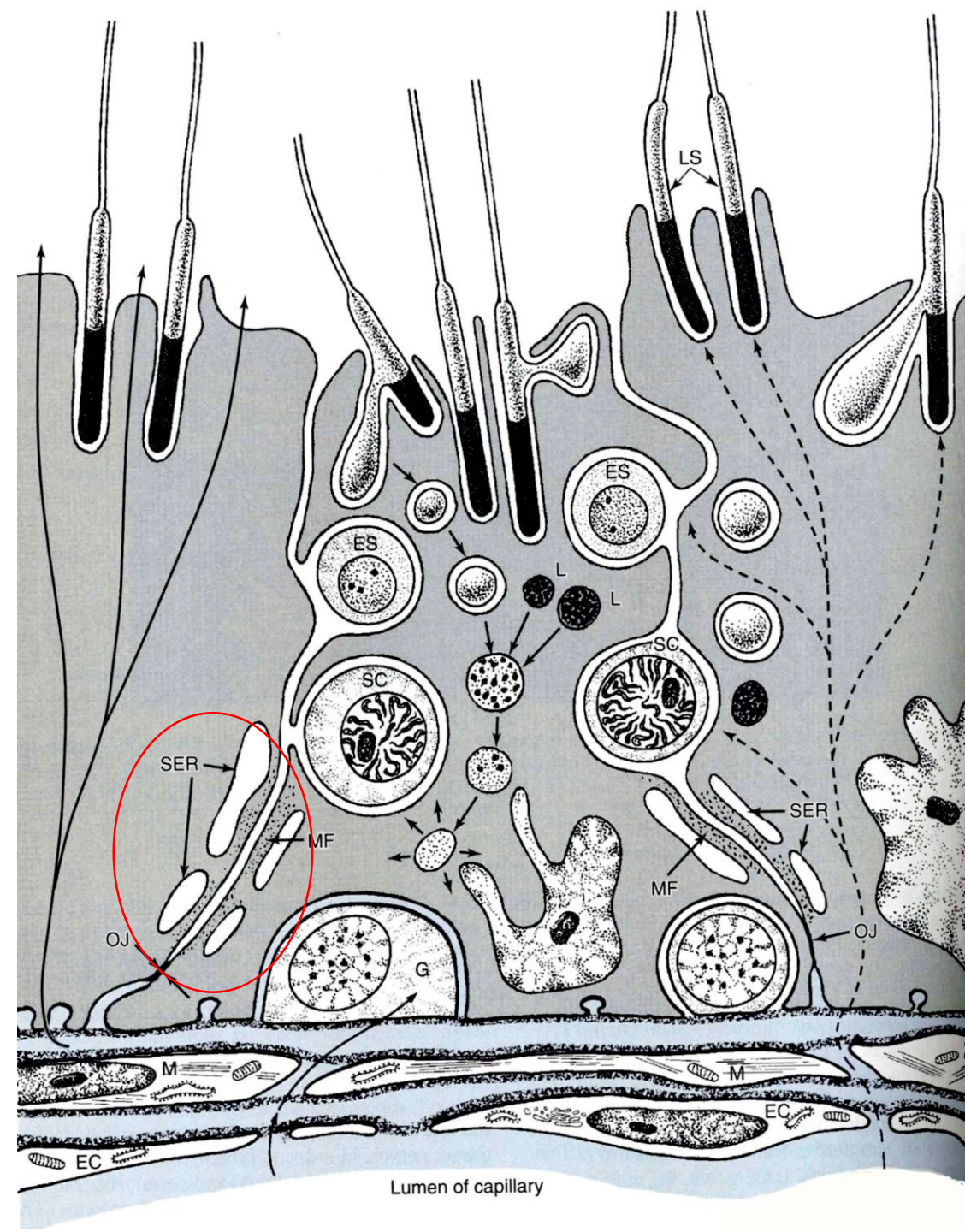




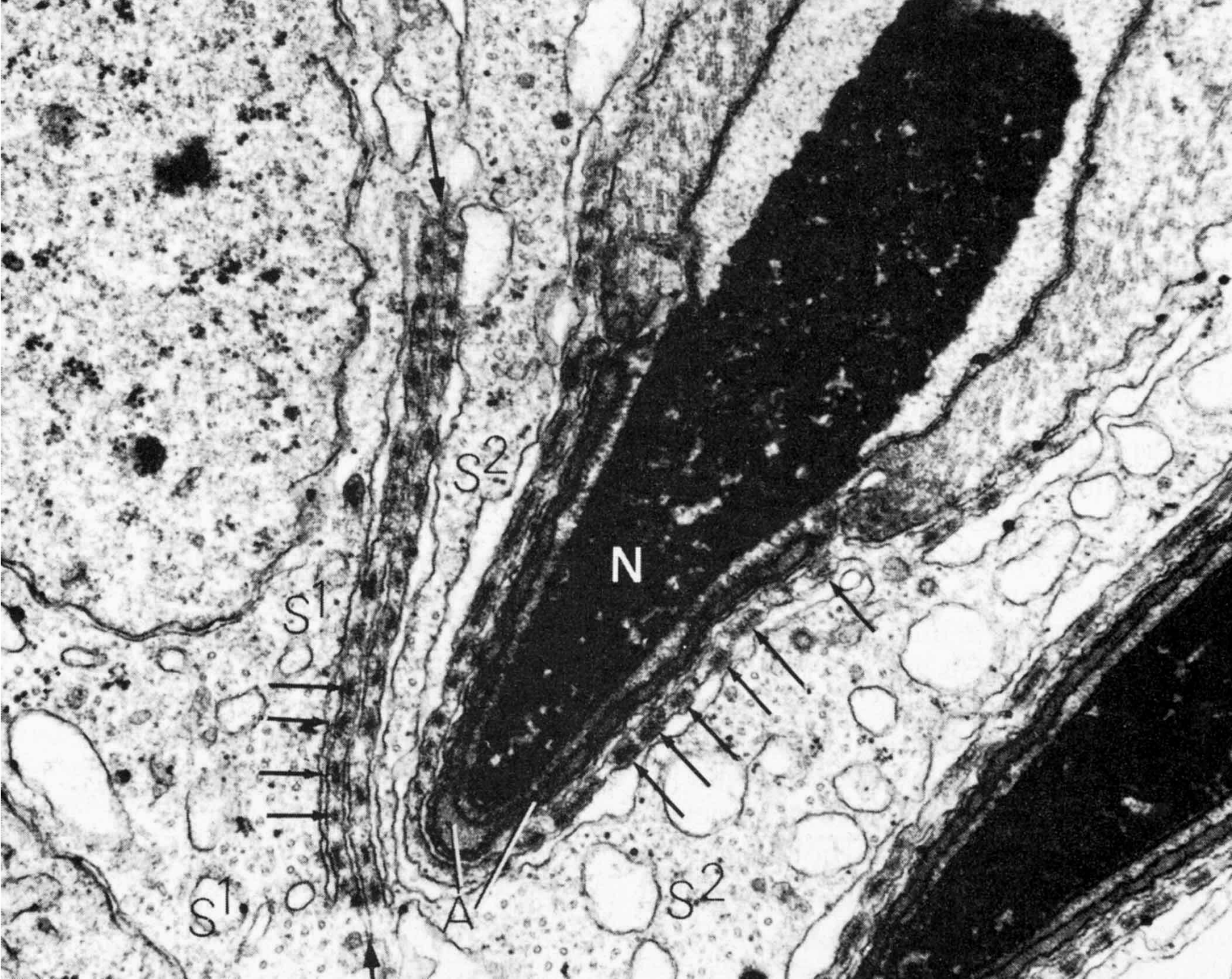
Cells of spermatogenesis are supported by Sertoli cells and are attached to them during development.



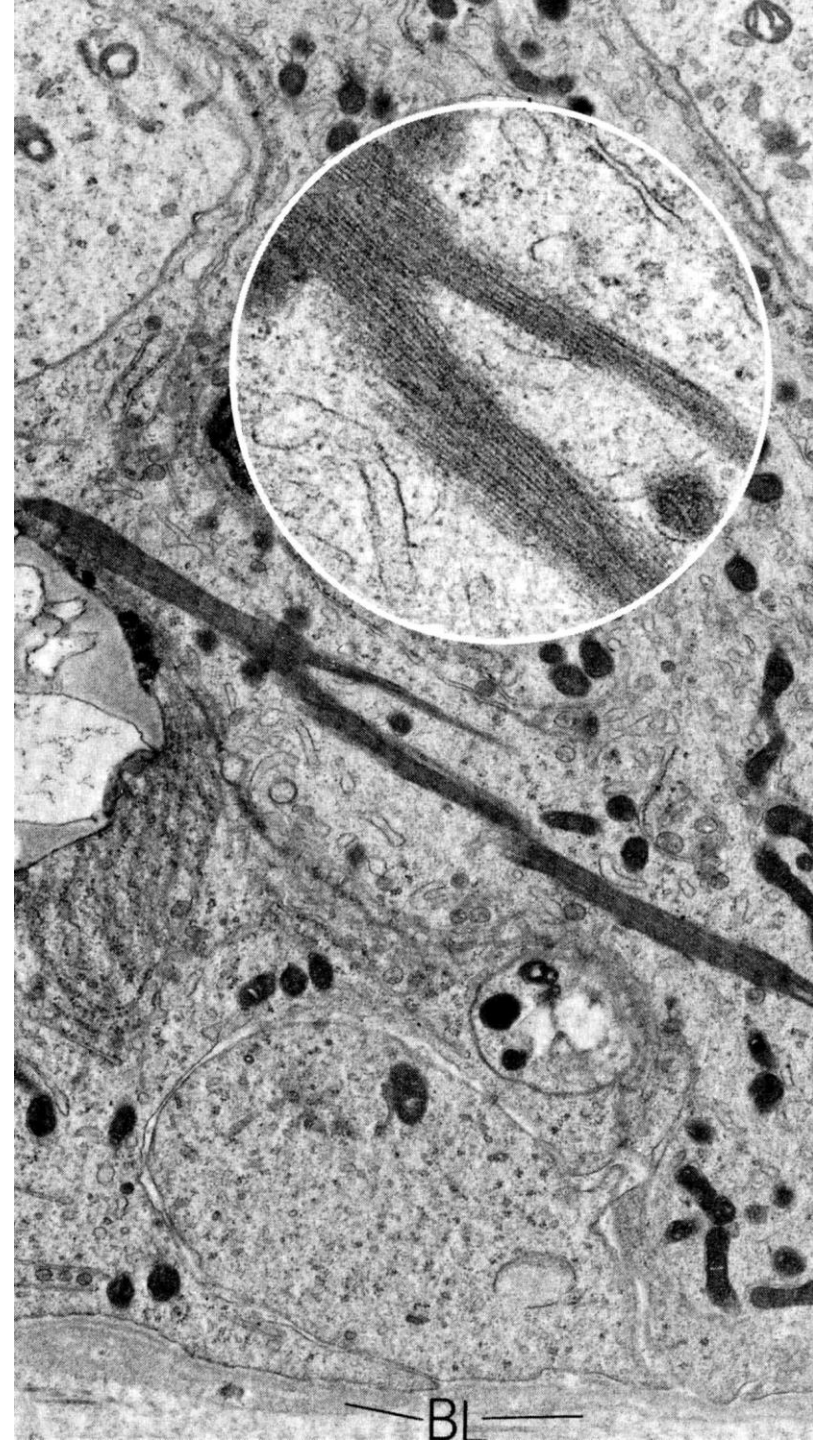
Sertoli cells have specialized junctions that divide the luminal and basal compartment, the blood-testis barrier. For example, androgen-binding protein has a high concentration in the luminal compartment. Developing cells are also isolated from the immune system.



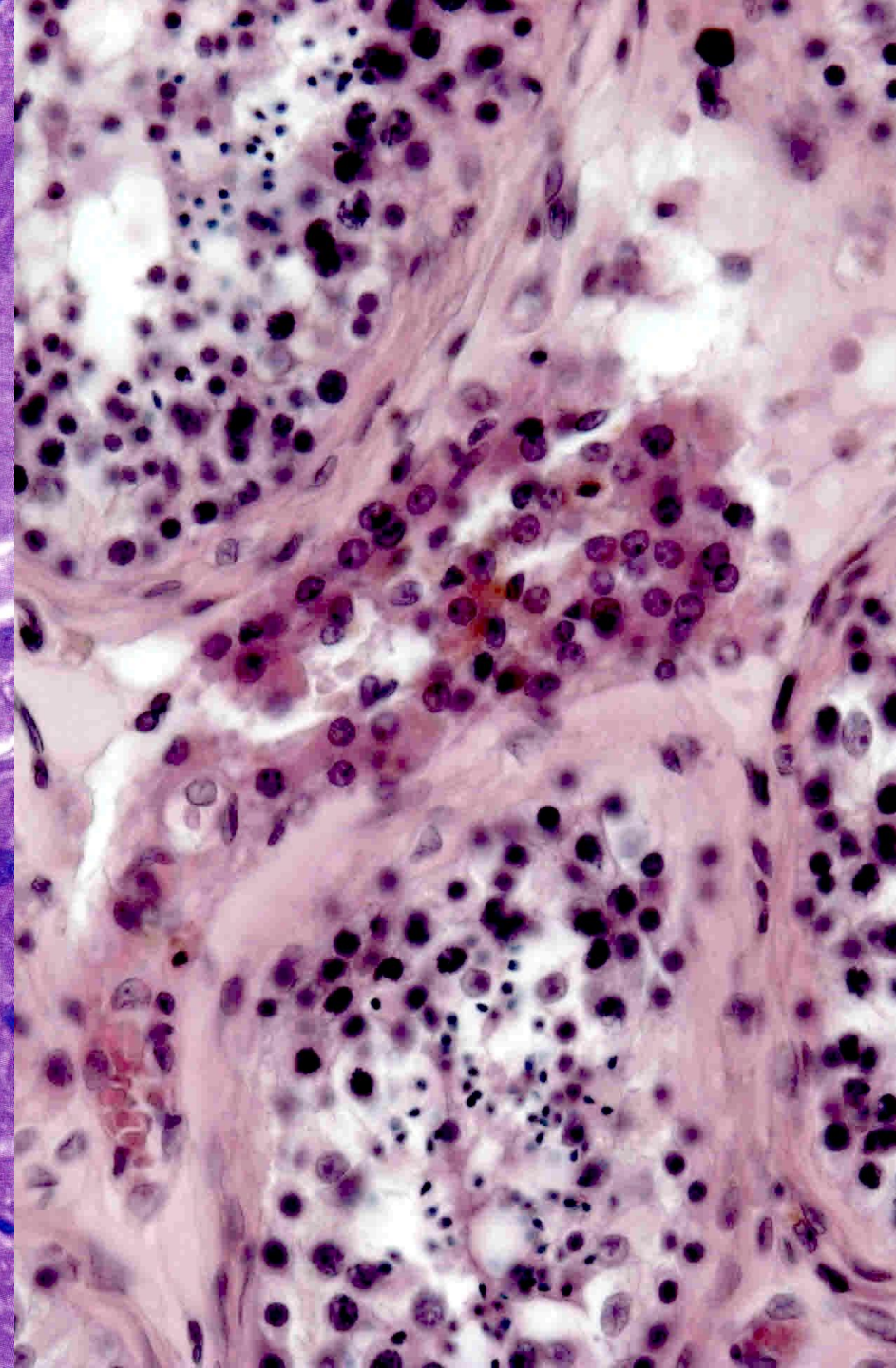
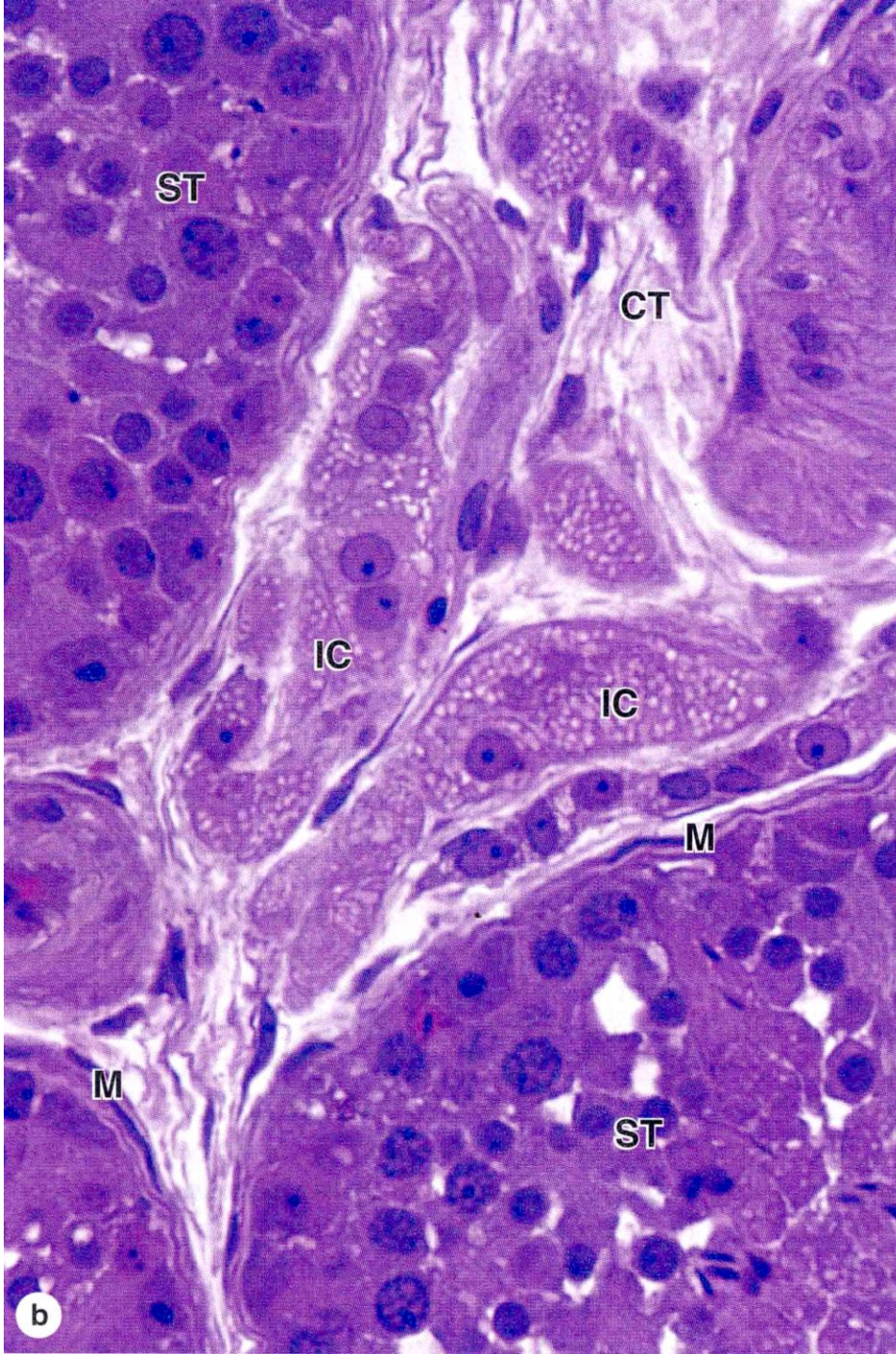
Sertoli-to-Sertoli
junctional complex:
tight junction
(zonula occludens) +
cisterna of smooth
ER + actin filament
bundles. A similar
complex connects to
the spermatid.



Charcot-Böttcher crystalloids are inclusion bodies typical for Sertoli cells. Their precise function is unknown, although they are hypothesised to play a role in lipid metabolism.



Leydig interstitial cells contain lipid droplets and produce steroid hormones.

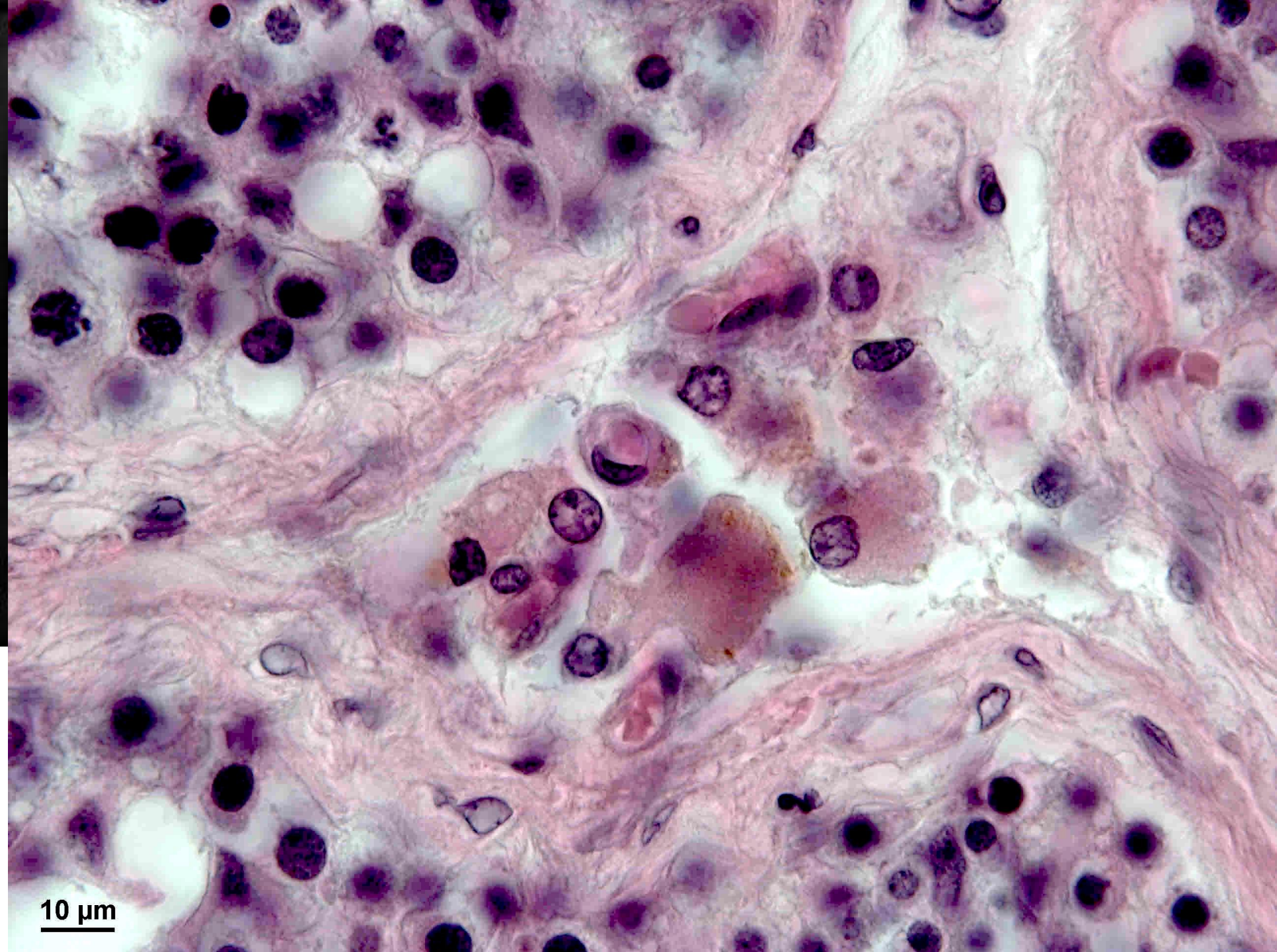


b

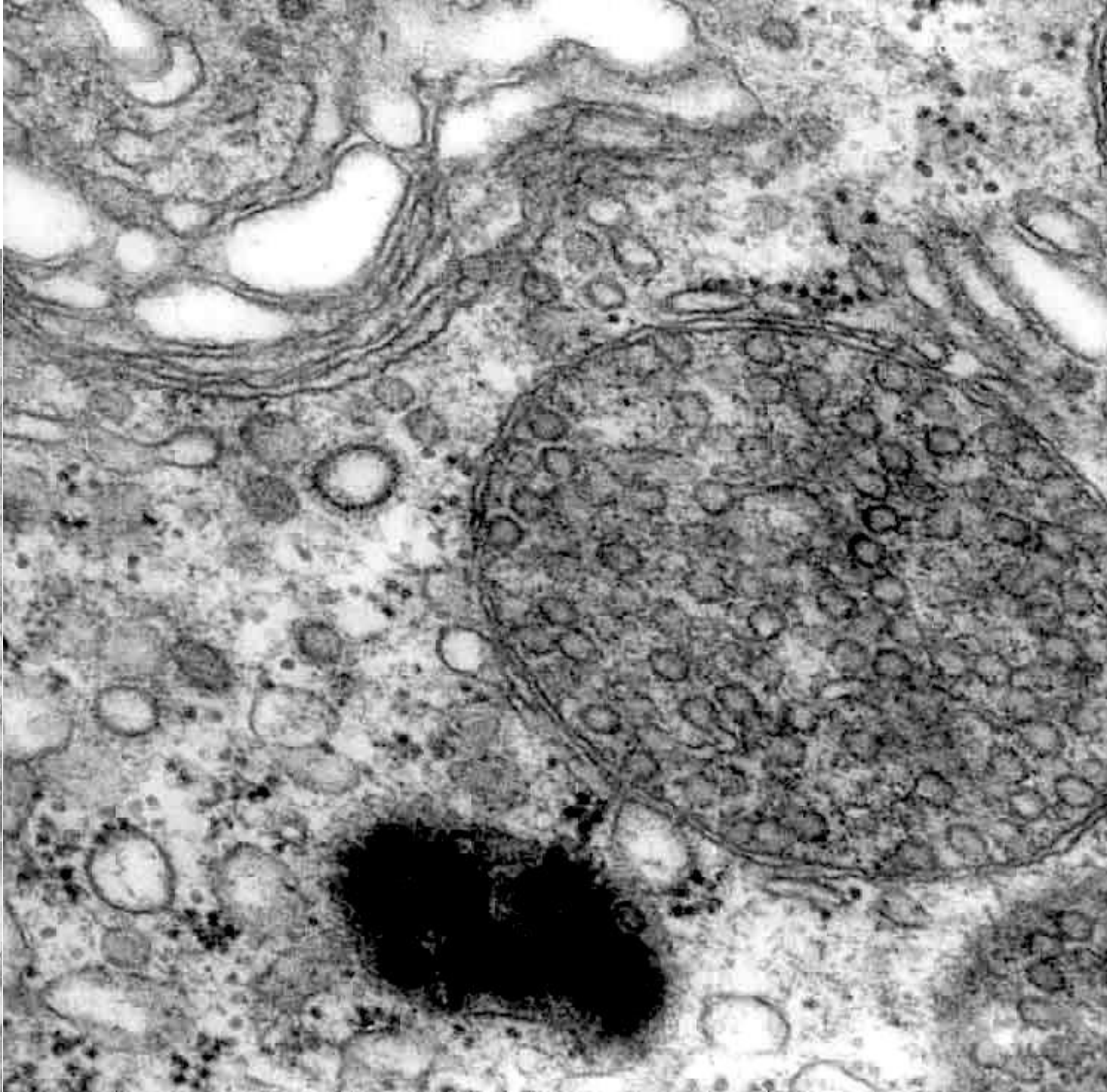
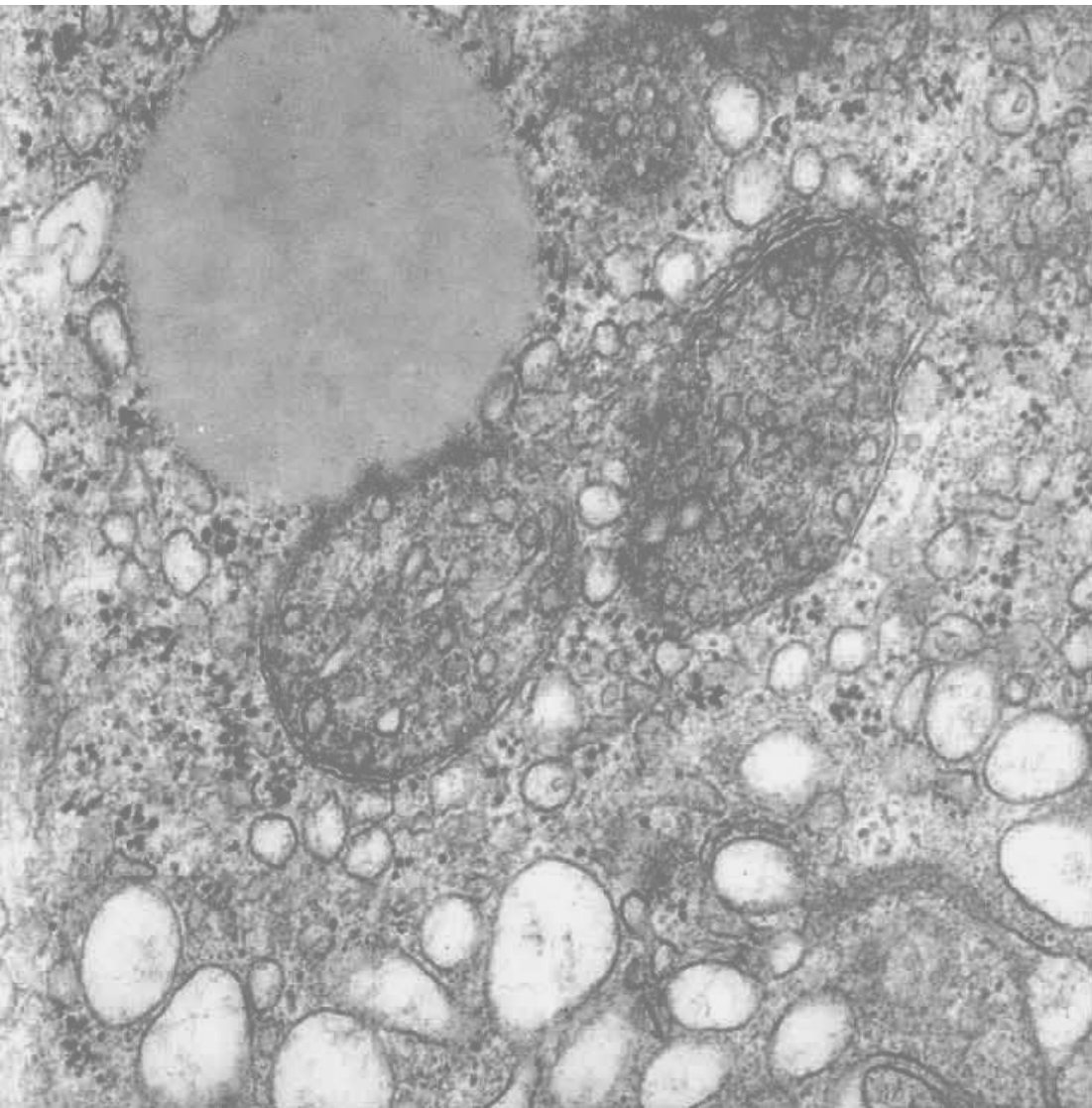


This man's Leydig cells are:

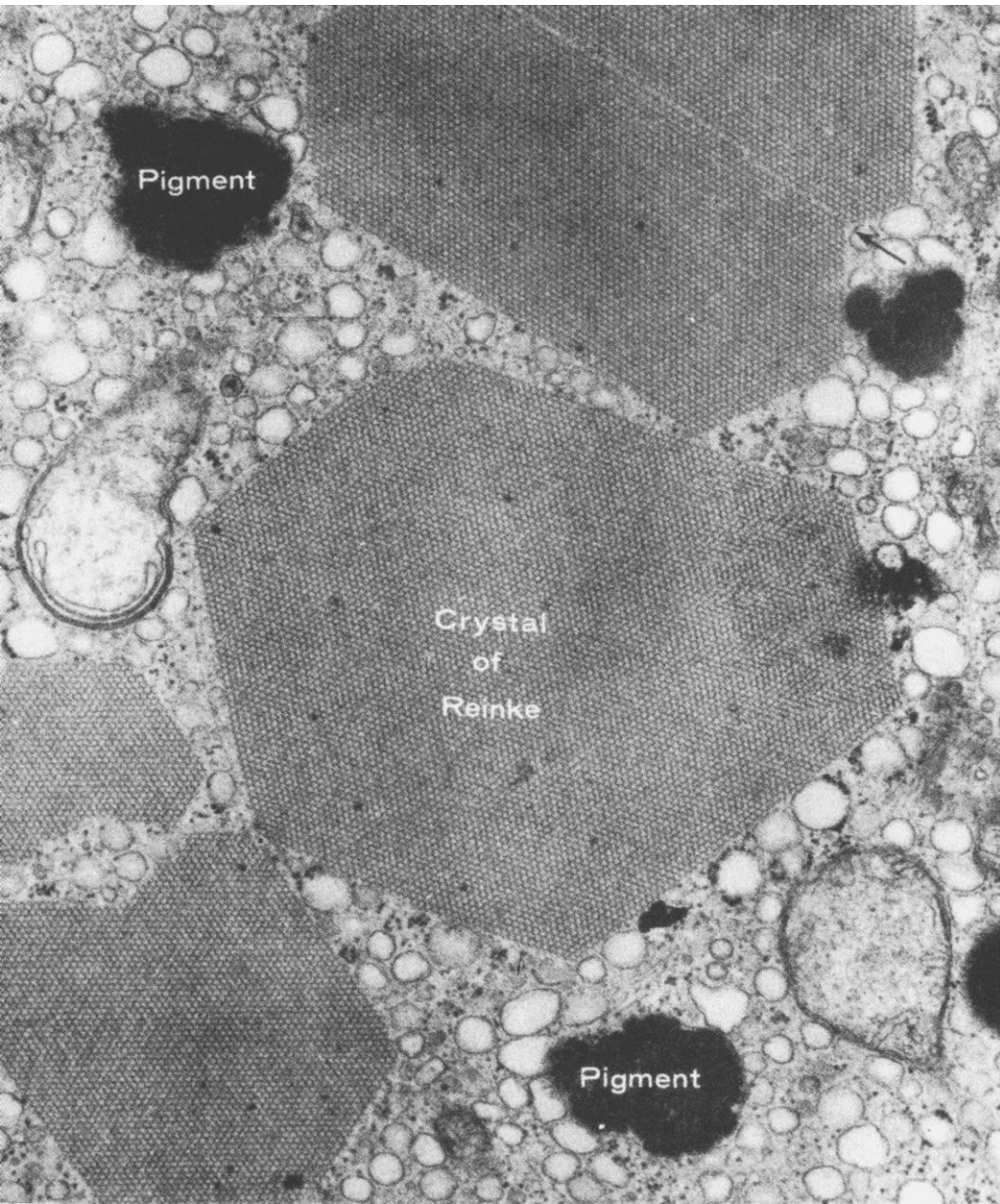
- a) Exceptionally well developed
- b) Underdeveloped
- c) Normally developed

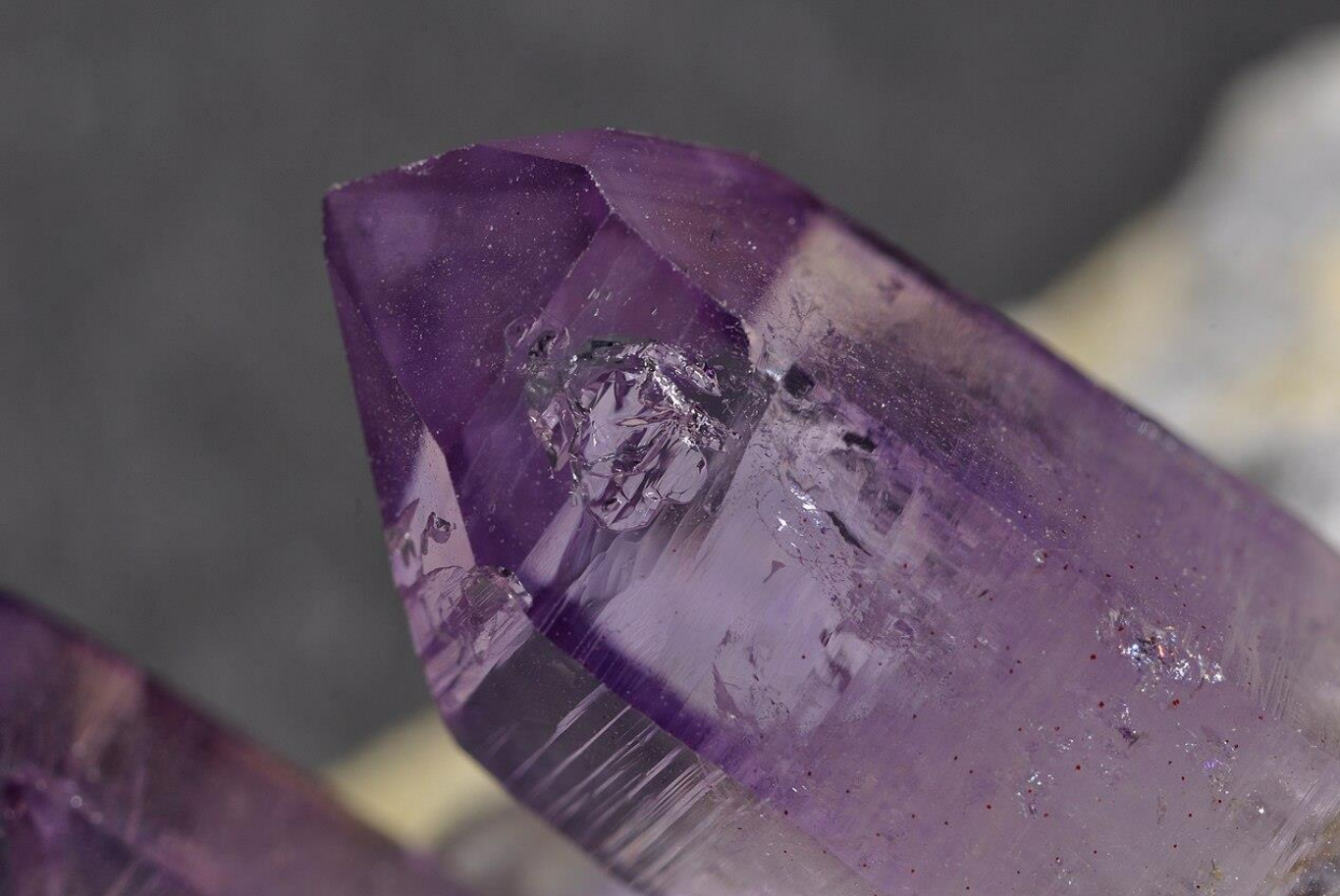


Smooth ER and tubular mitochondria handle steroid production.



Reinke crystalloid is an inclusion typical for Leydig cells. Their precise composition and function is virtually unknown.

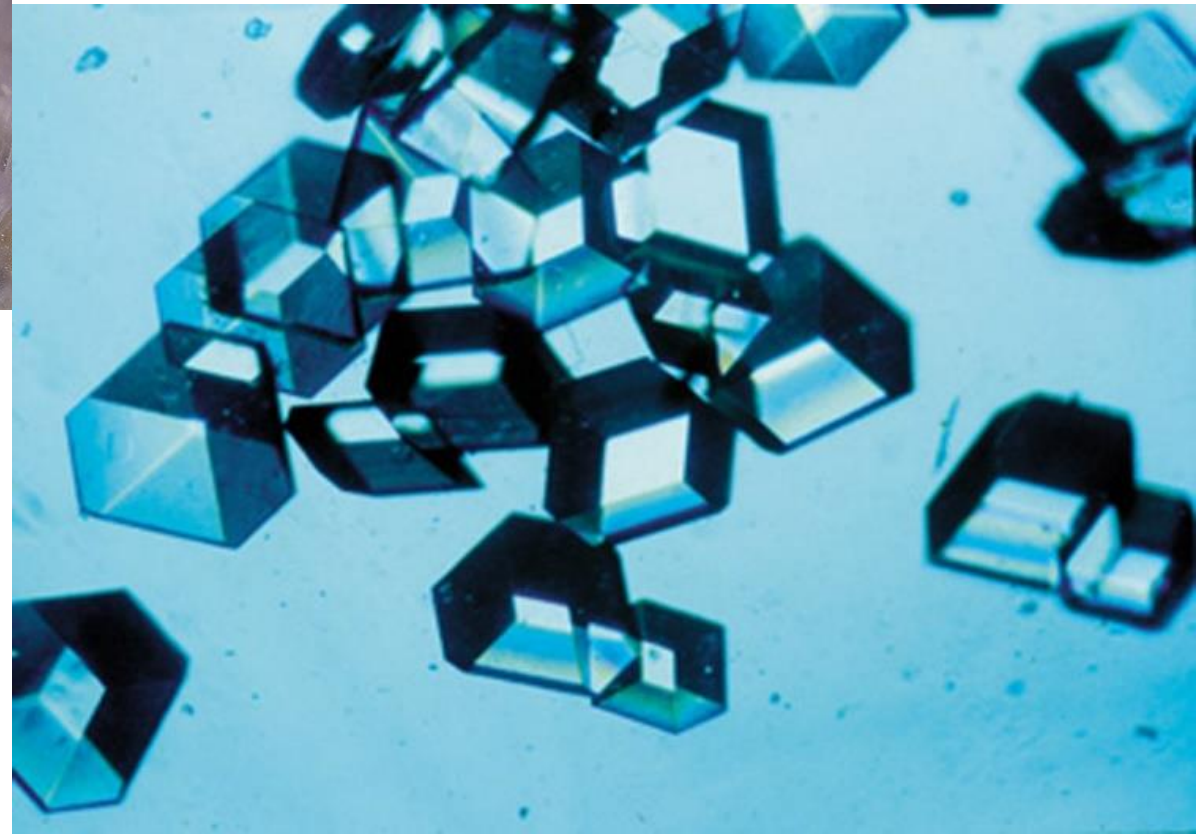




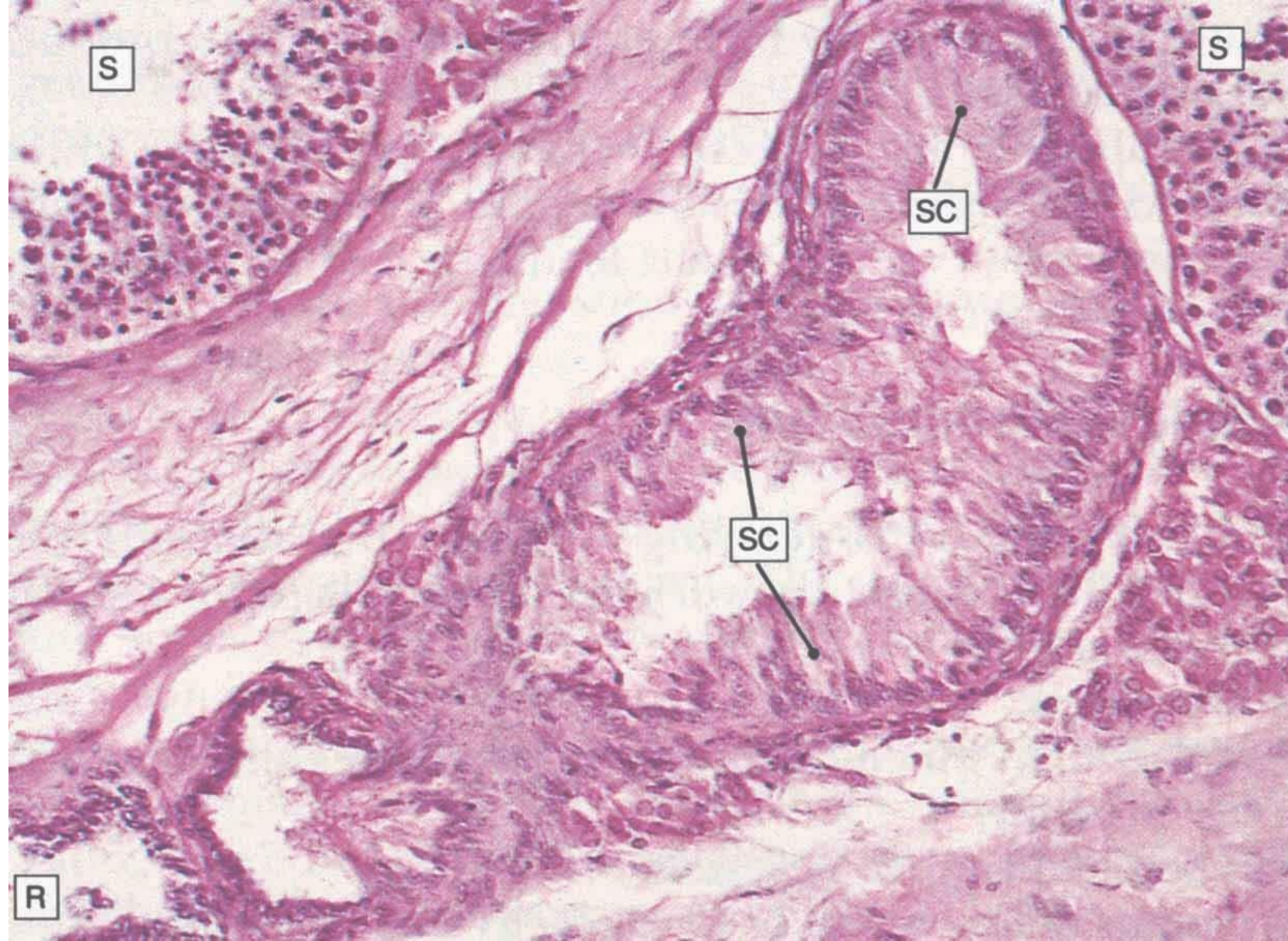
Amethyst quartz crystal - inorganic

<https://en.wikipedia.org/wiki/Crystal>

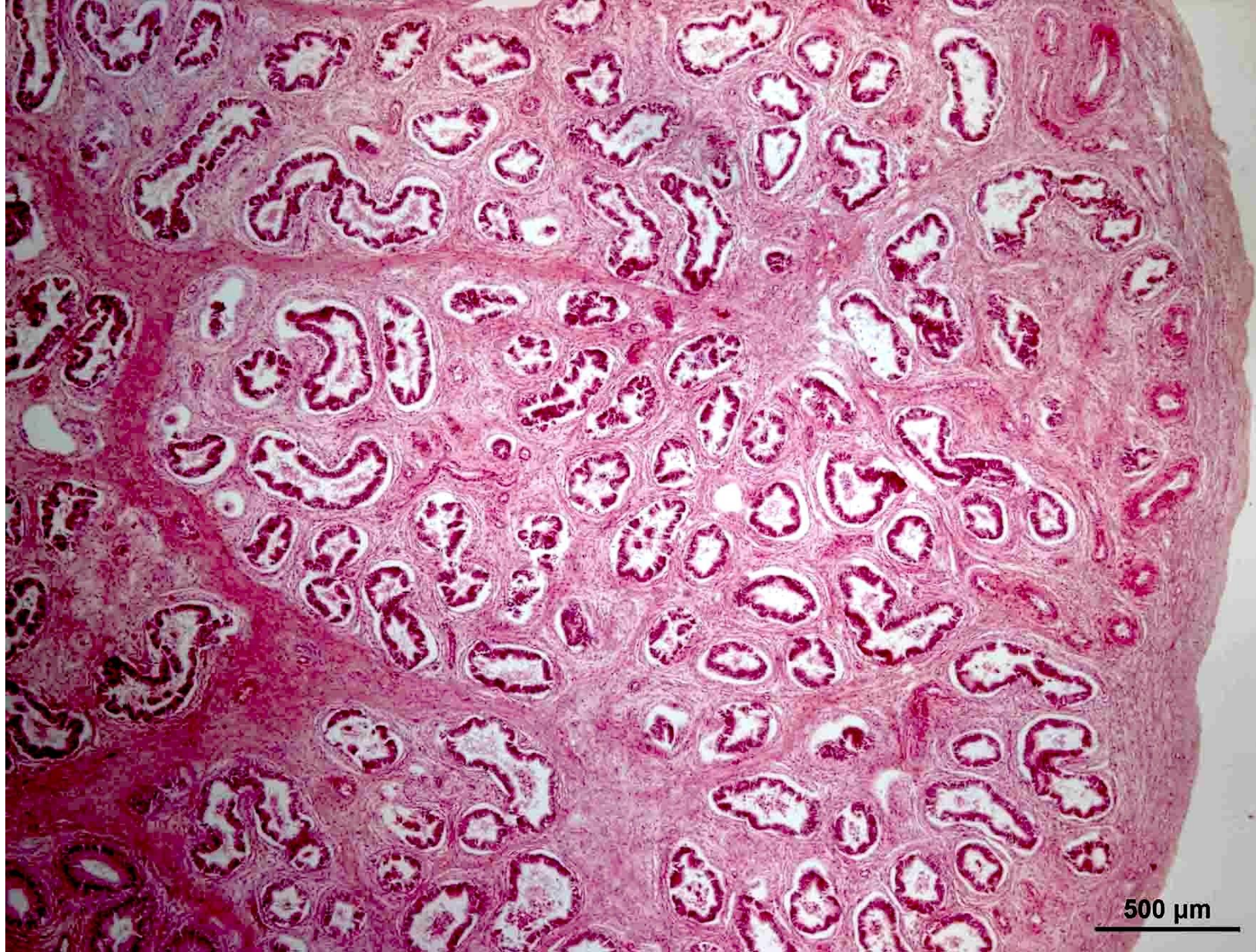
Insulin crystal - organic



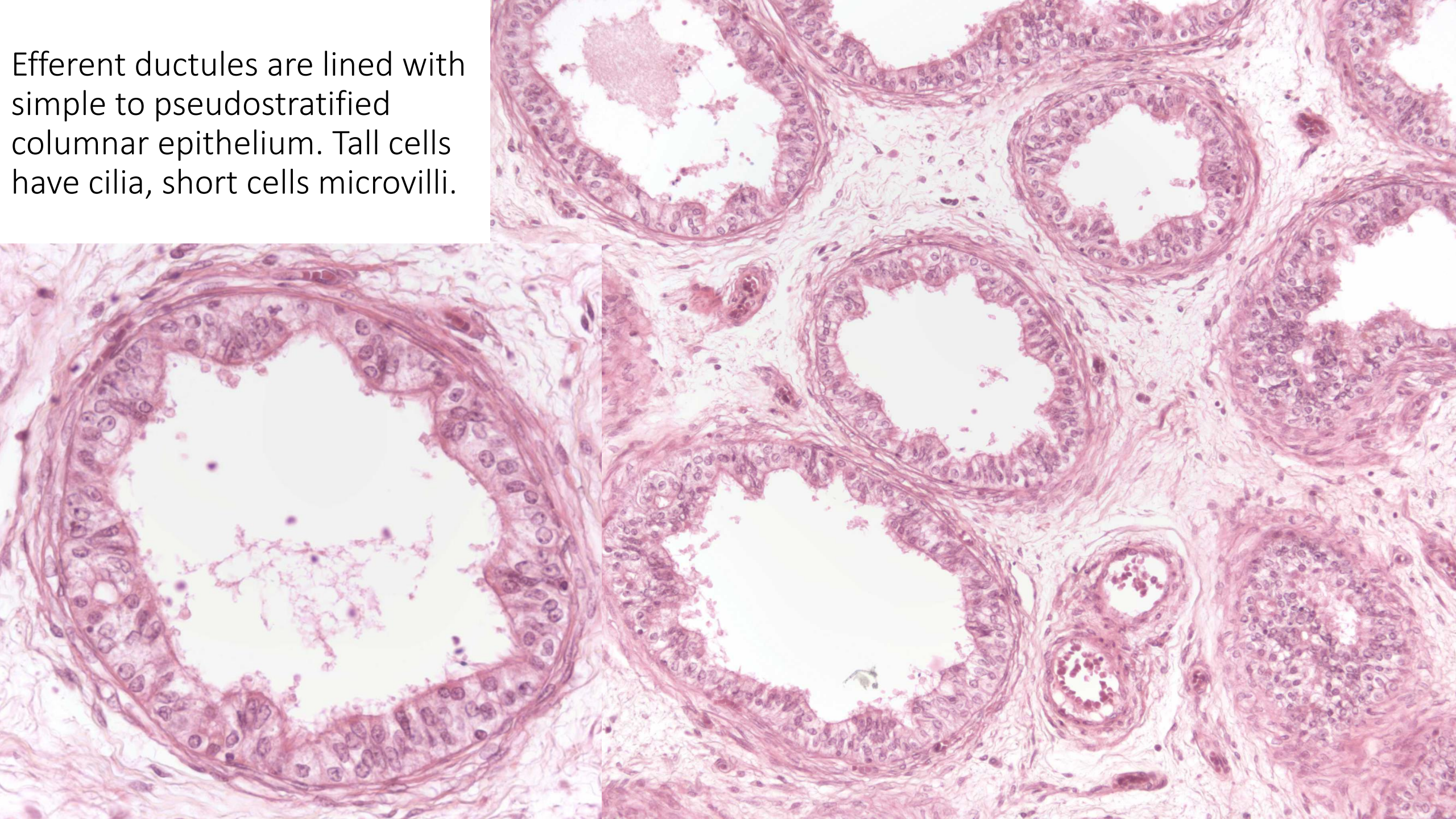
Tubuli recti
contain only
Sertoli cells.



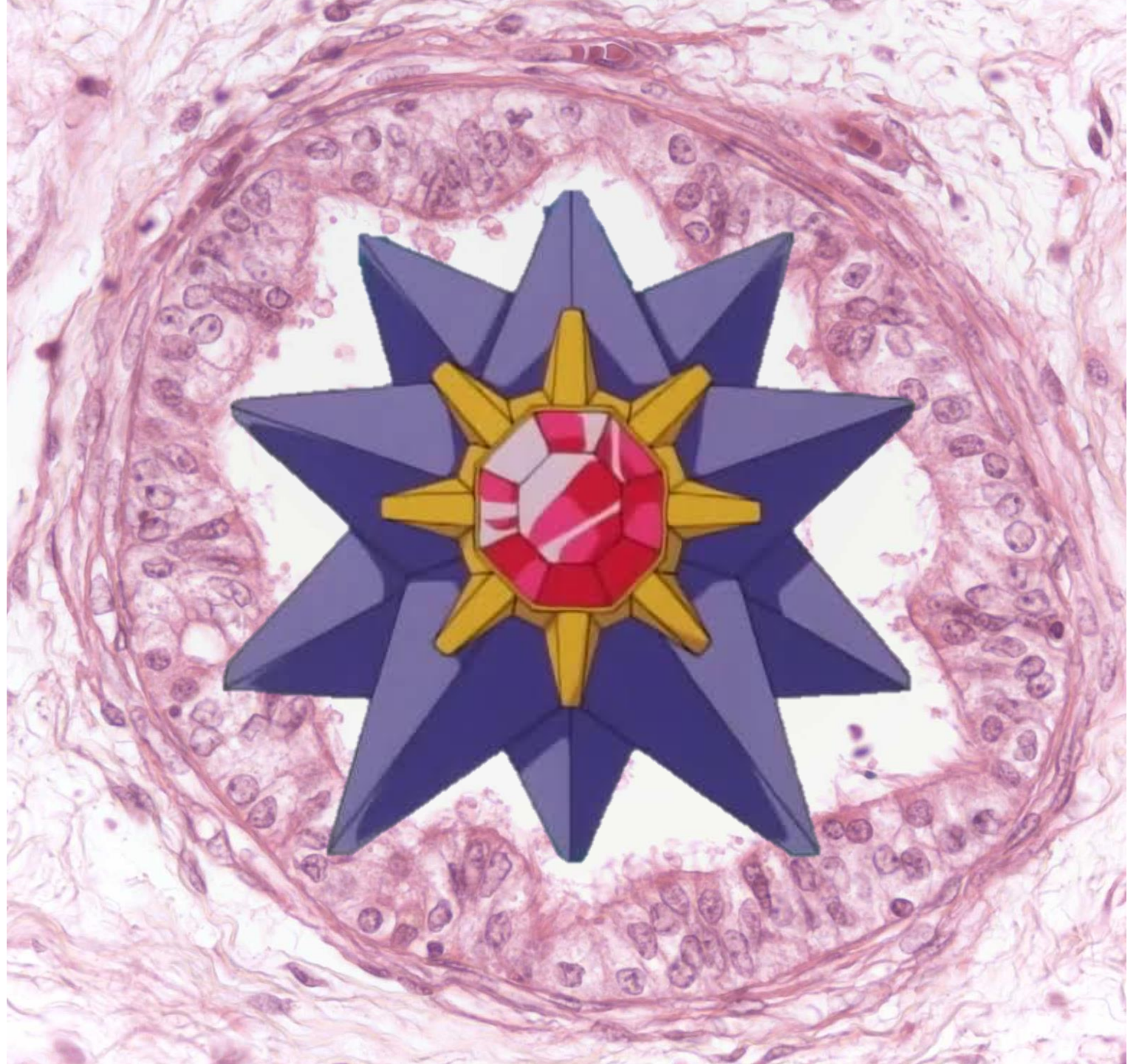
Efferent ductules in the head of epididymis. They absorb the testicular fluid.



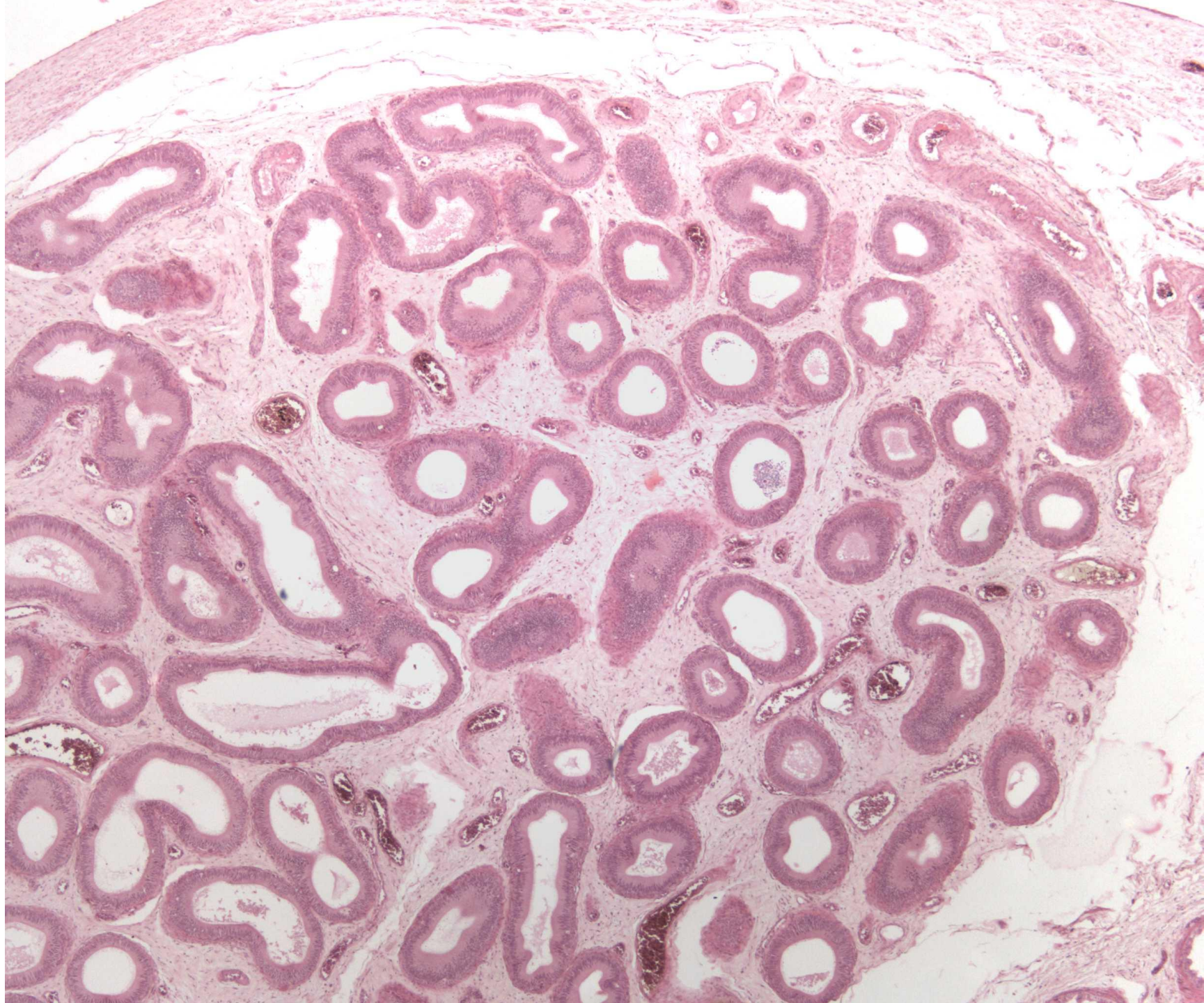
Efferent ductules are lined with simple to pseudostratified columnar epithelium. Tall cells have cilia, short cells microvilli.



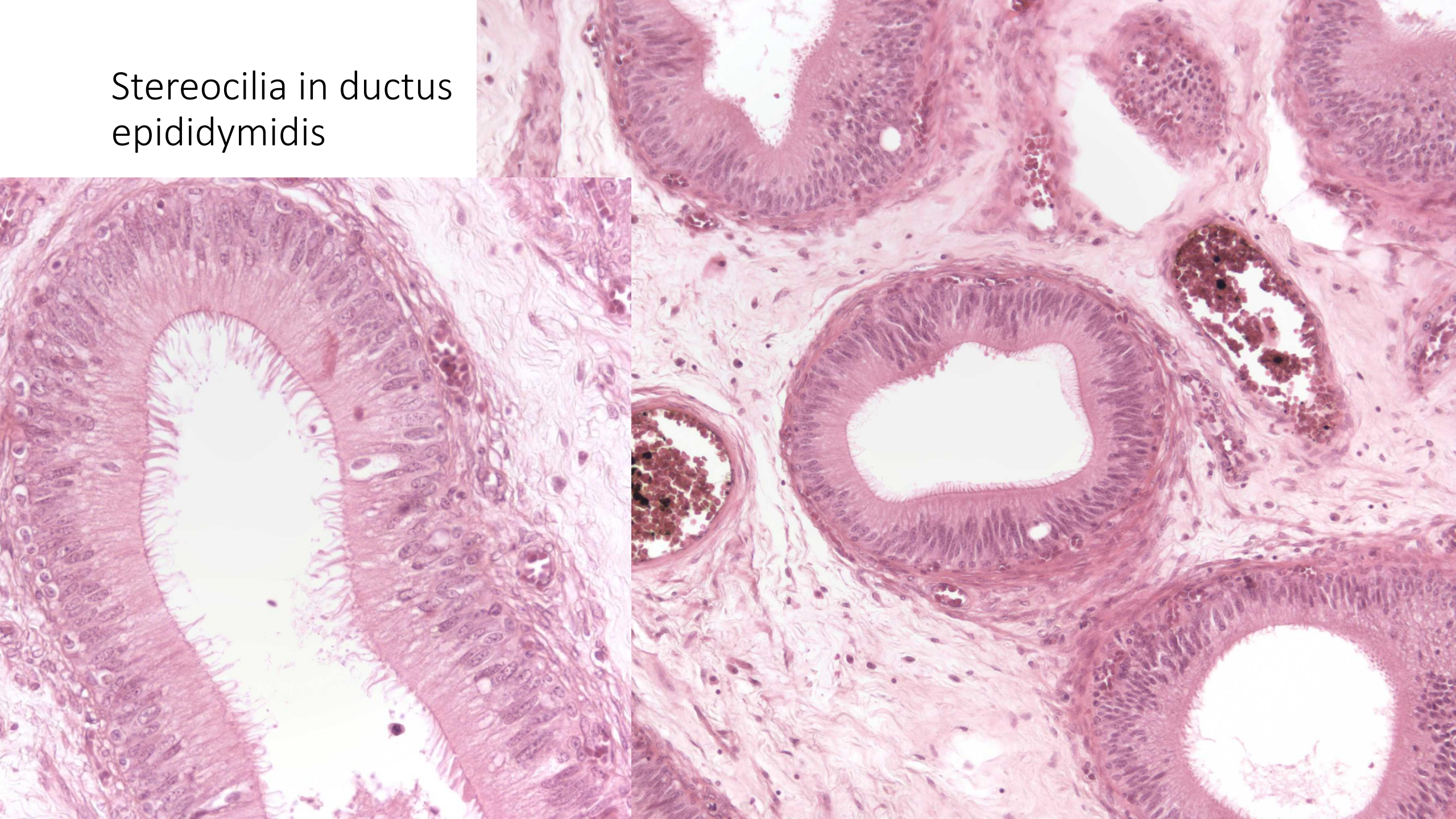
<https://bulbapedia.bulbagarden.net/wiki/File:0121Starmie.png>
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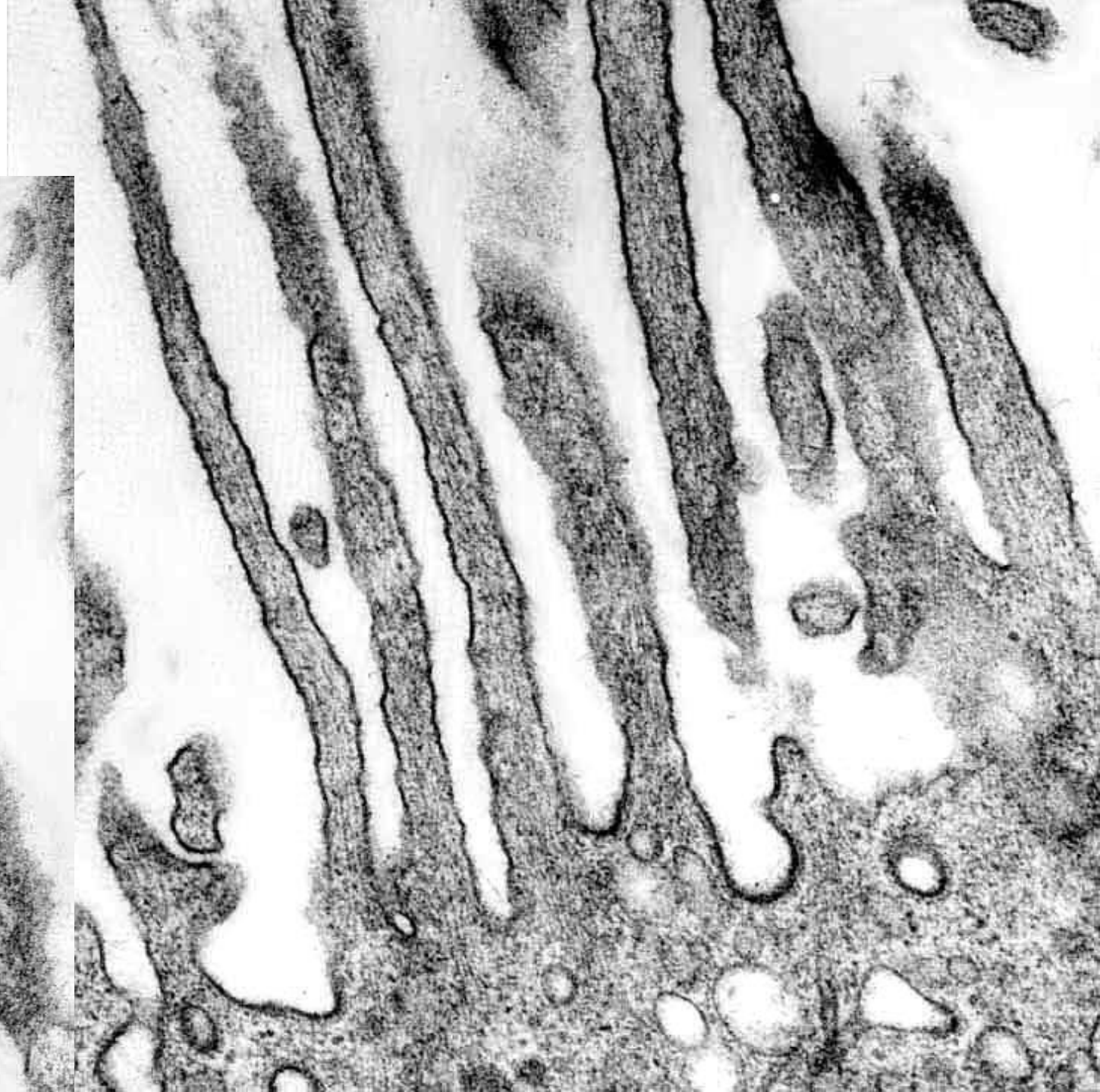
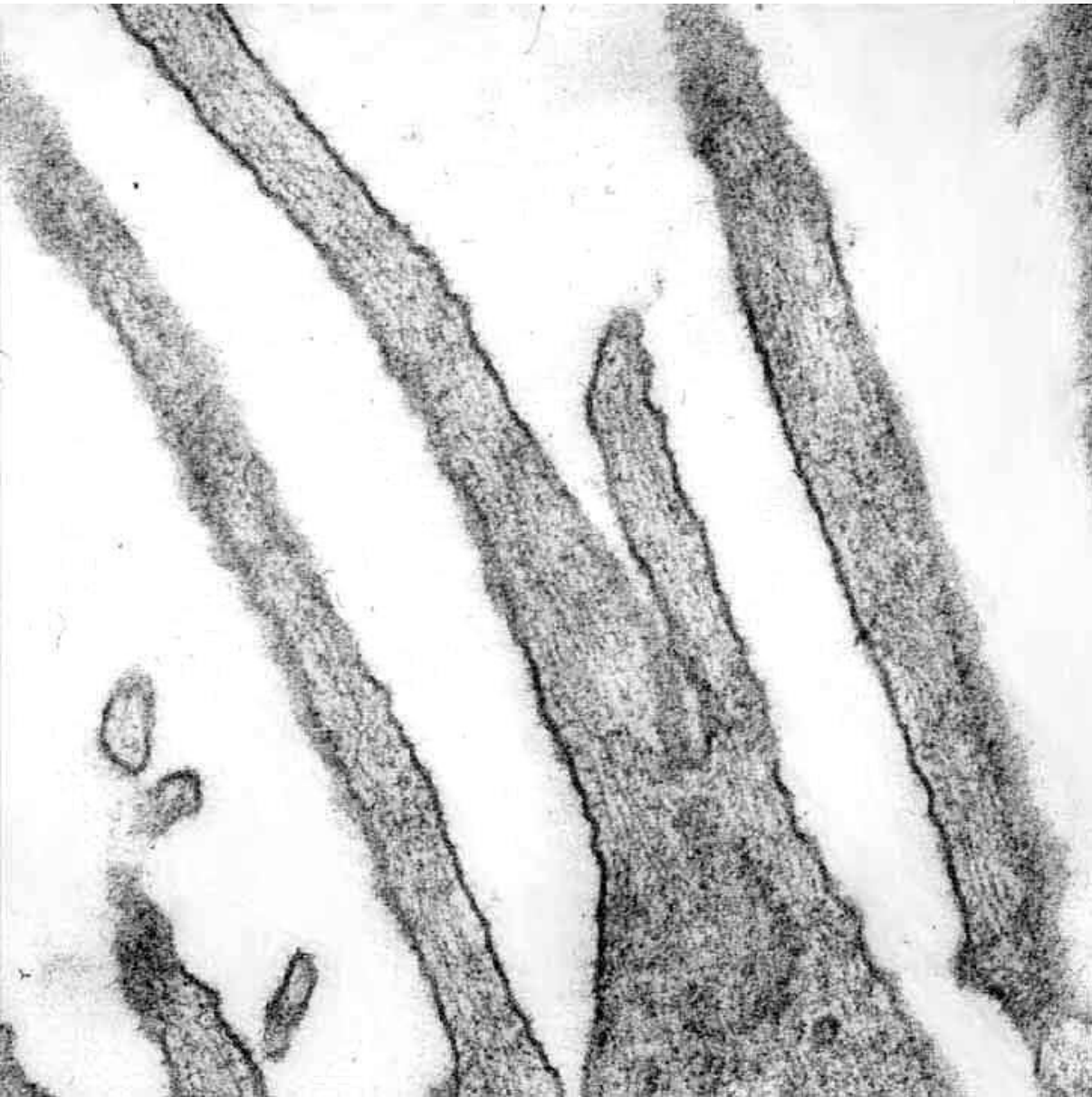
Ductus epididymidis is a single convoluted duct that takes up most of the epididymis.

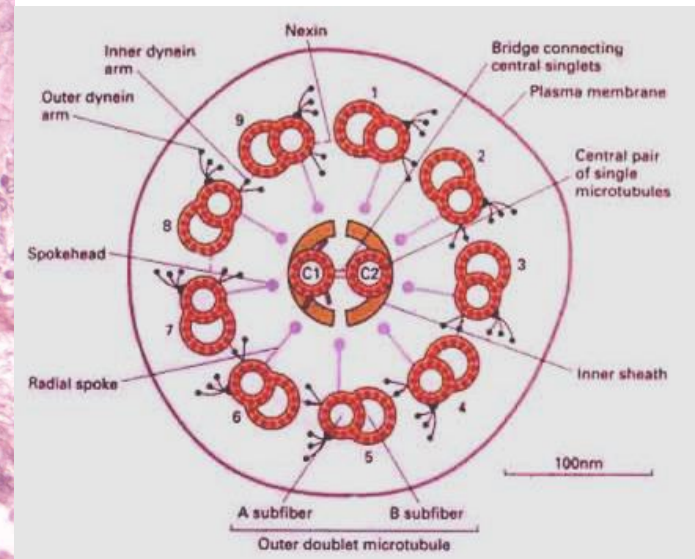
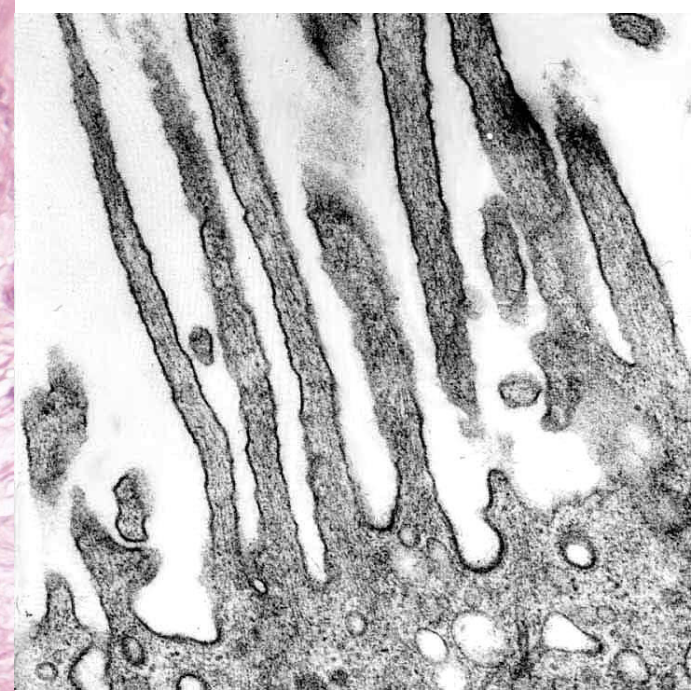
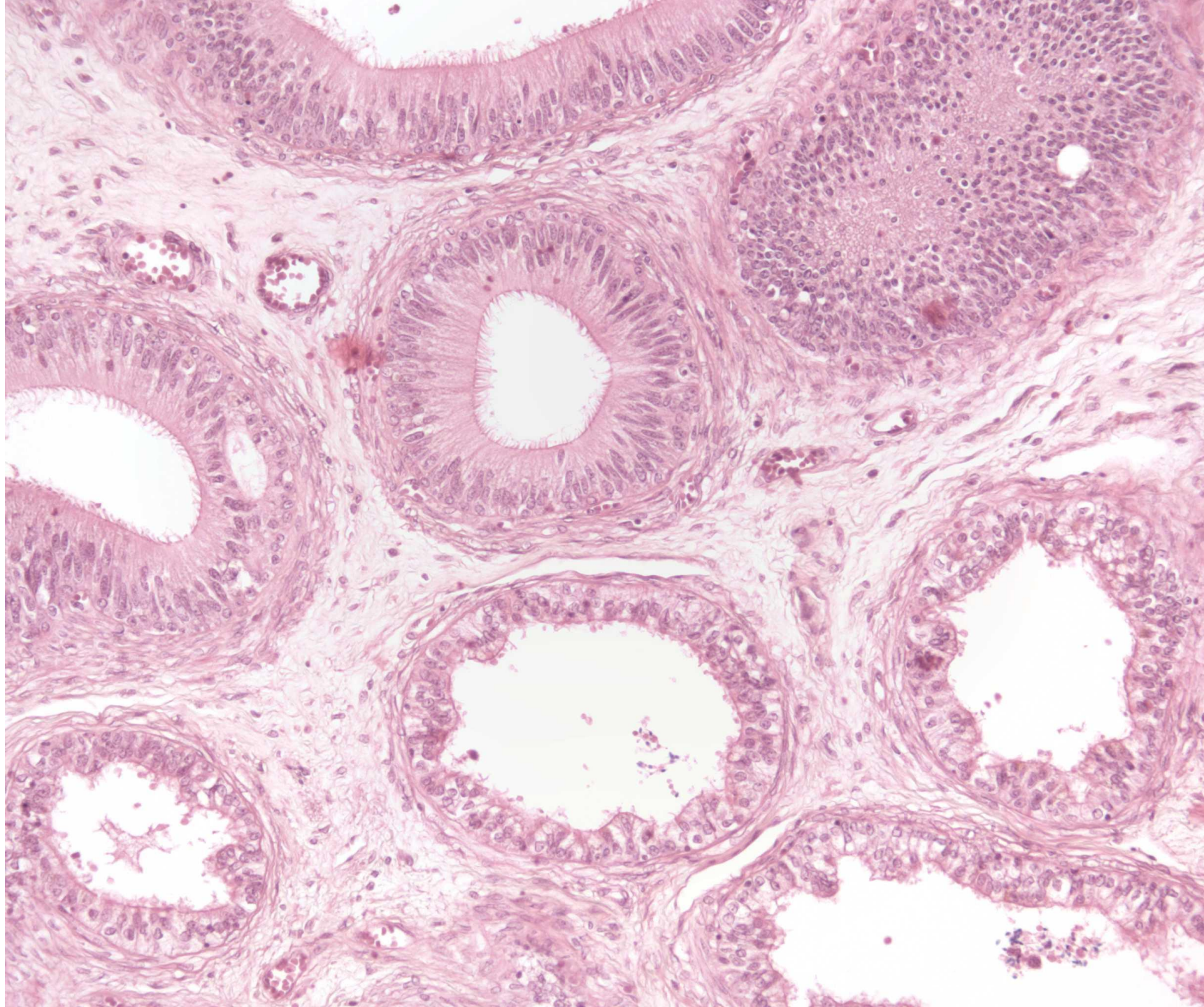


Stereocilia in ductus epididymidis

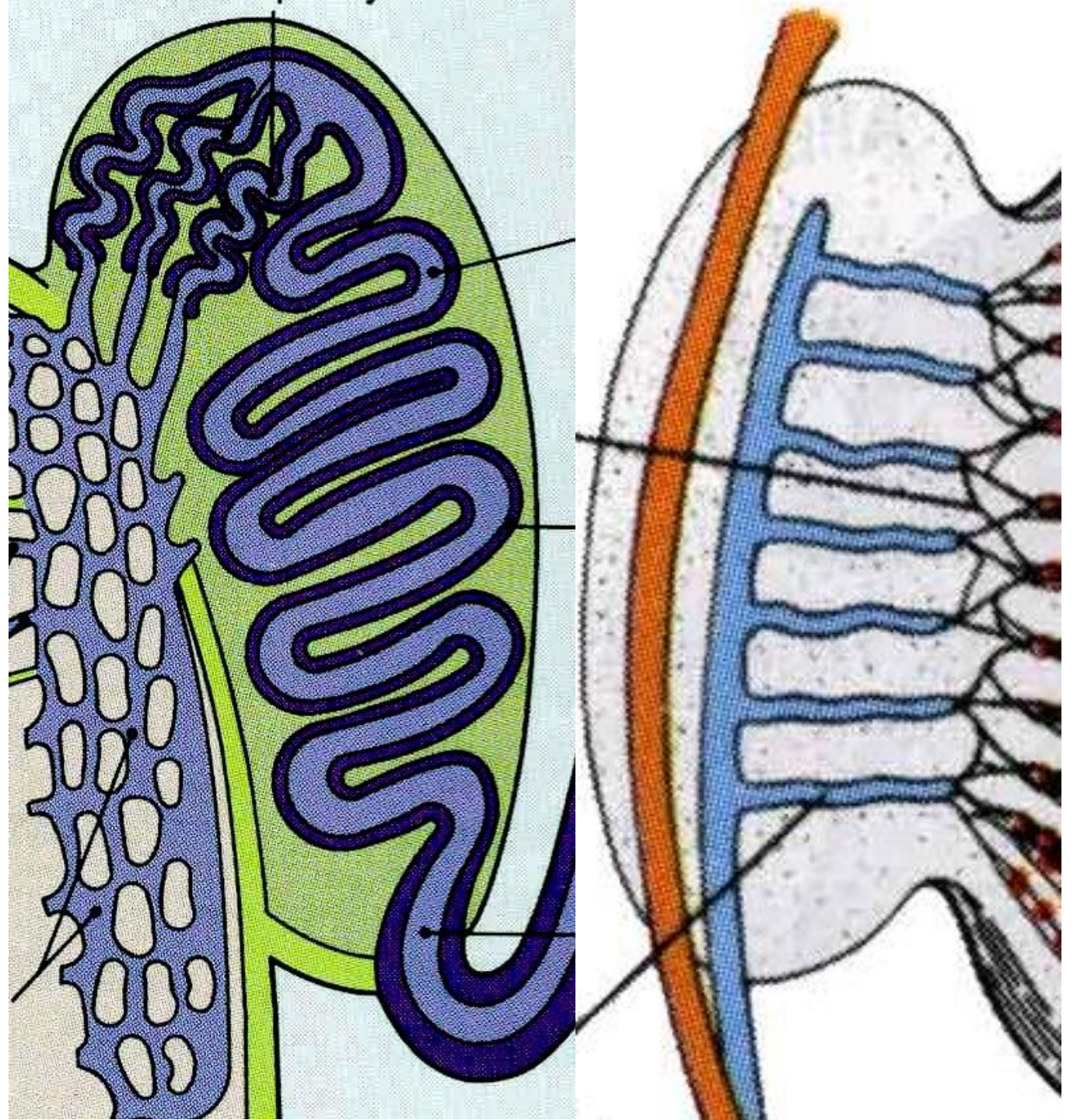


Stereocilia

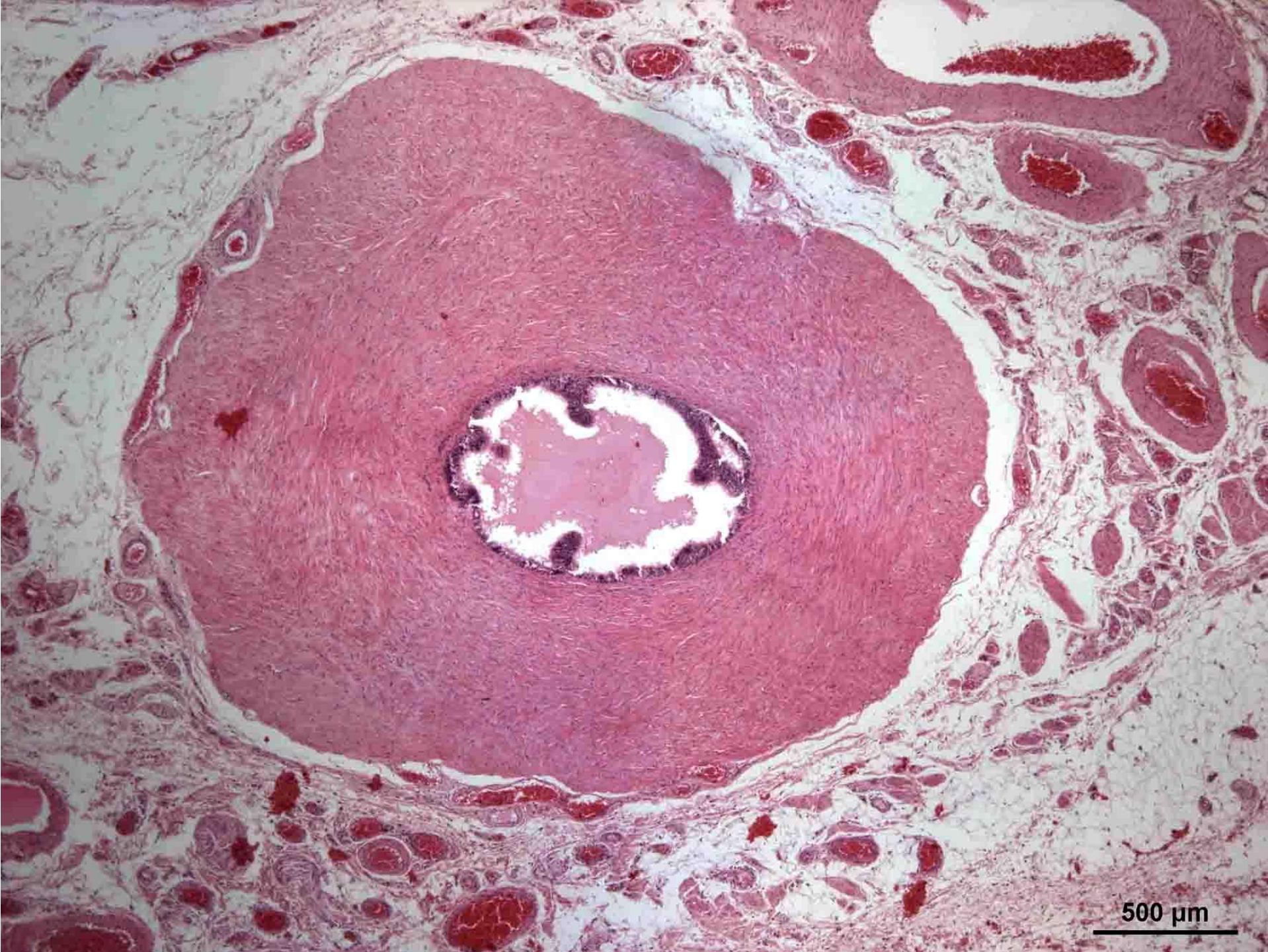




Ductuli efferentes develop from the mesonephric nephrons. Ductus epididymis develops from the mesonephric duct.

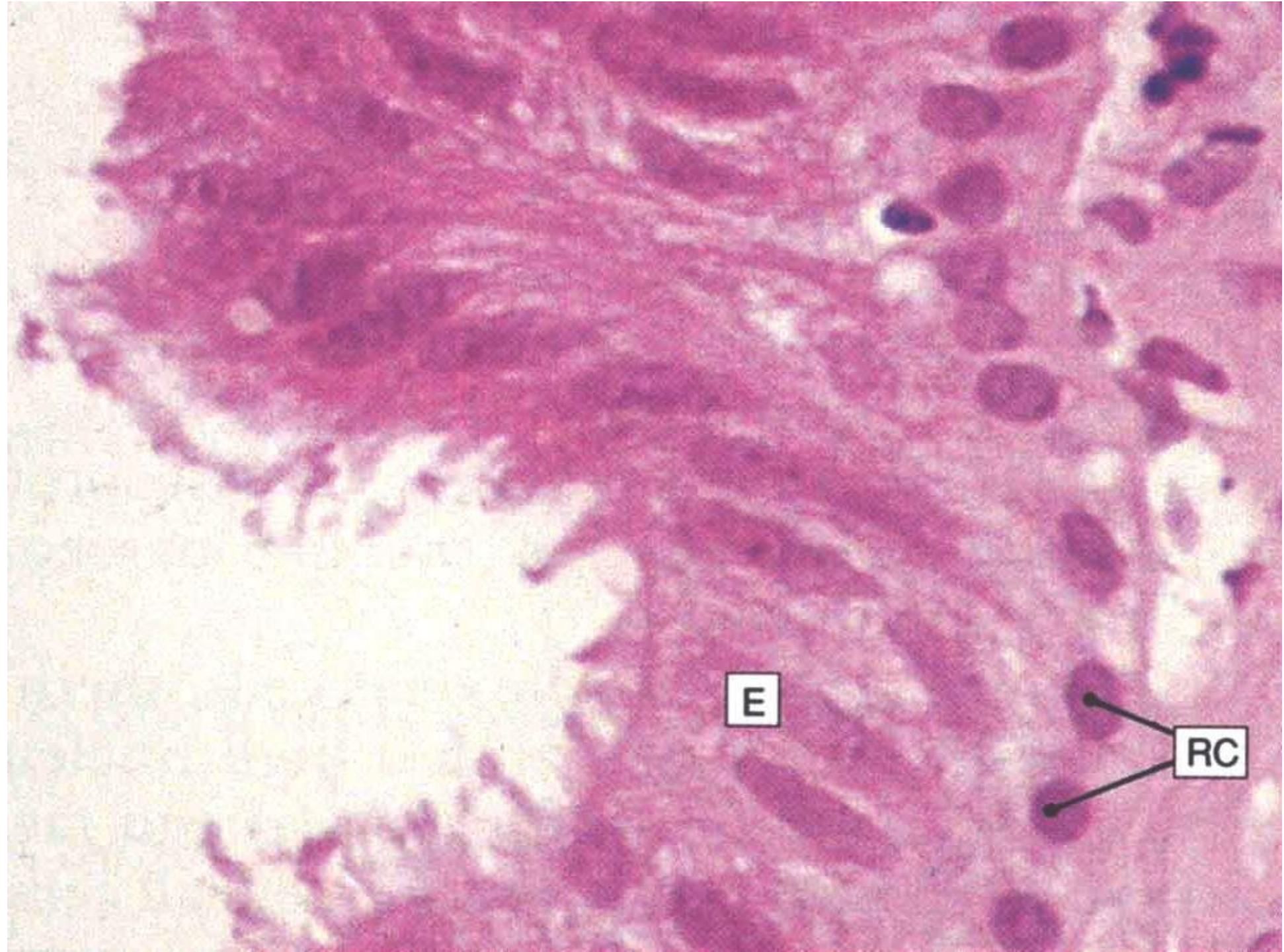


Ductus deferens

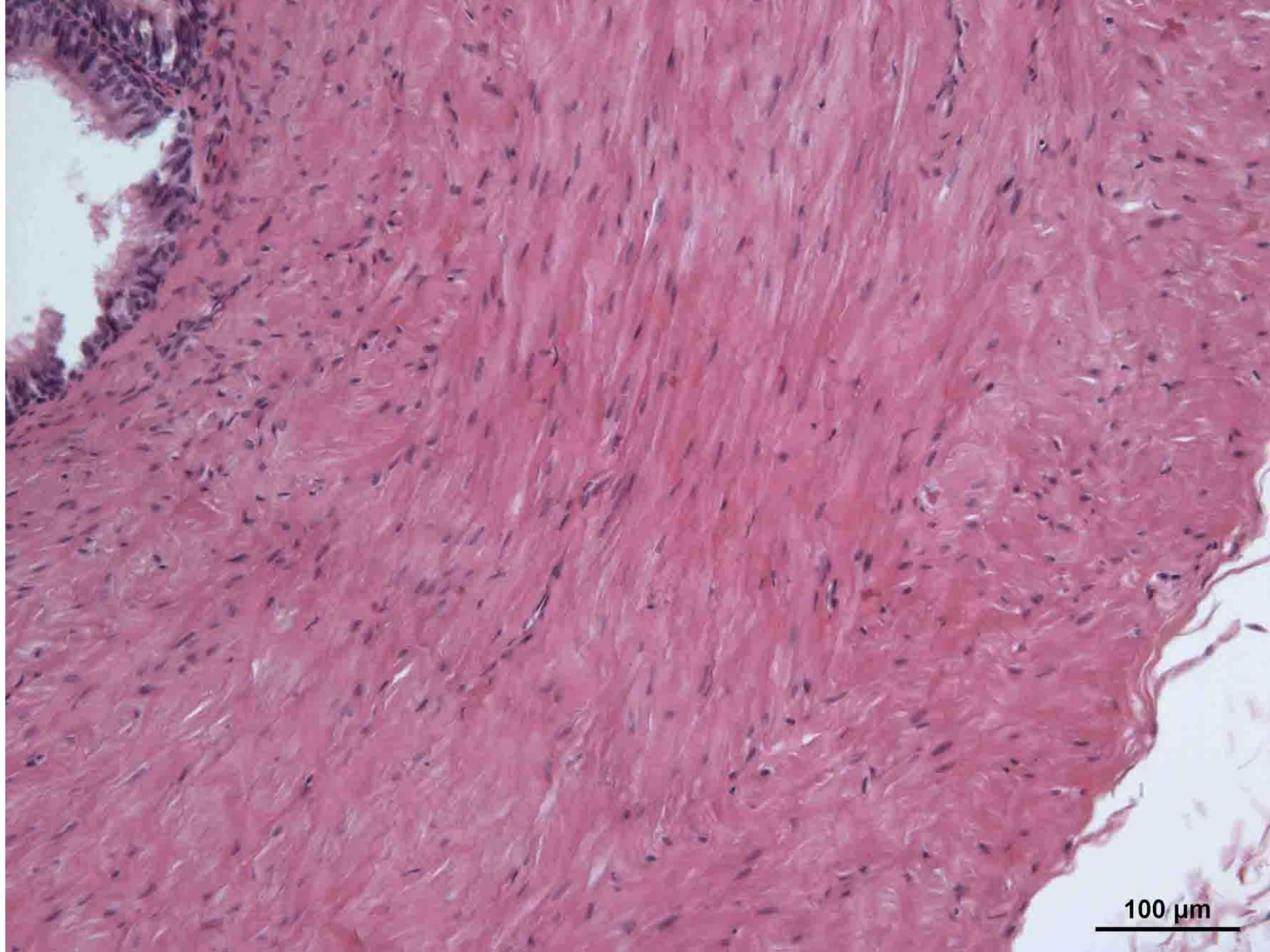


500 μ m

Ductus
deferens –
stereocilia

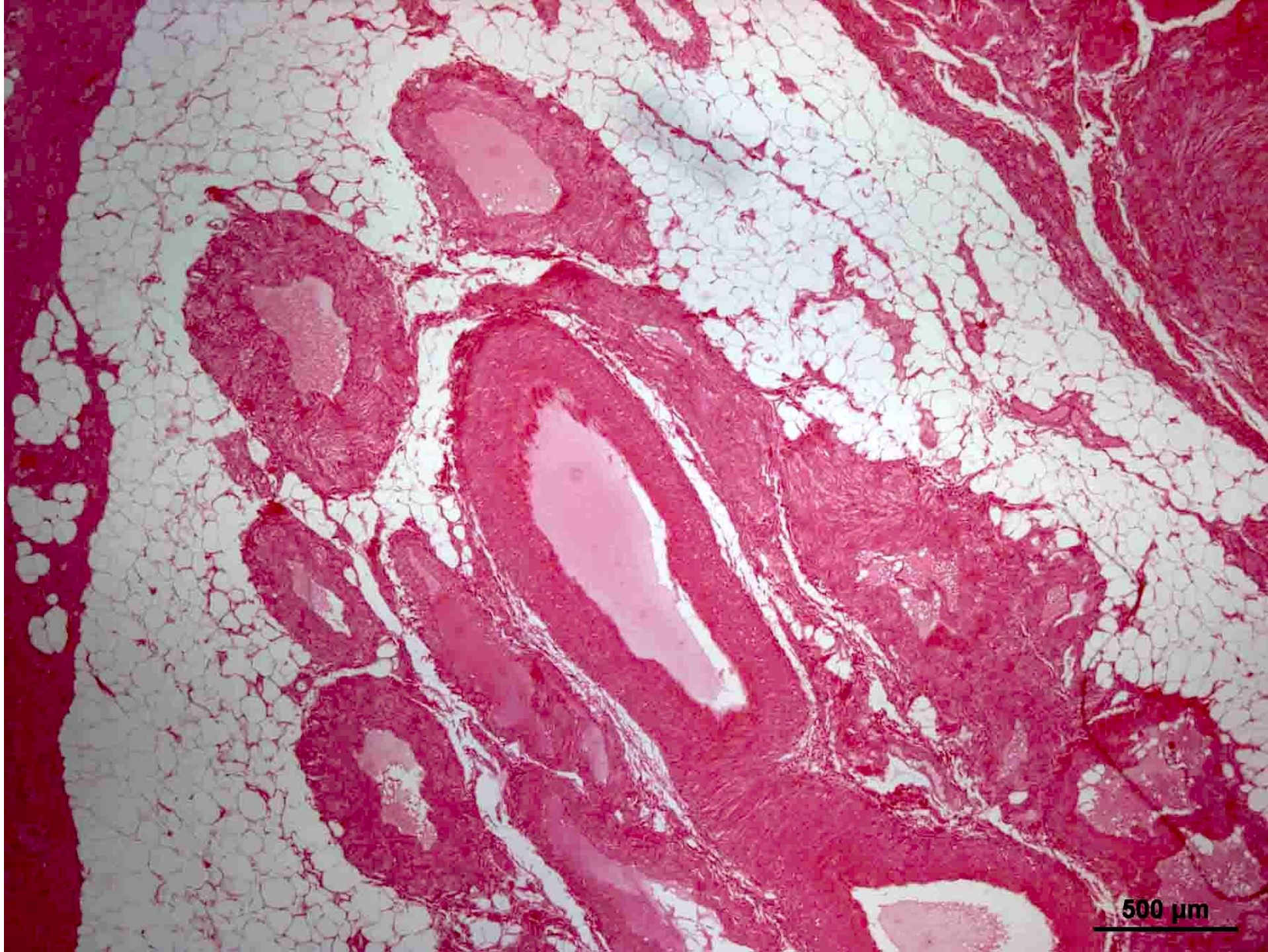


Ductus deferens
– three layers of
smooth muscle



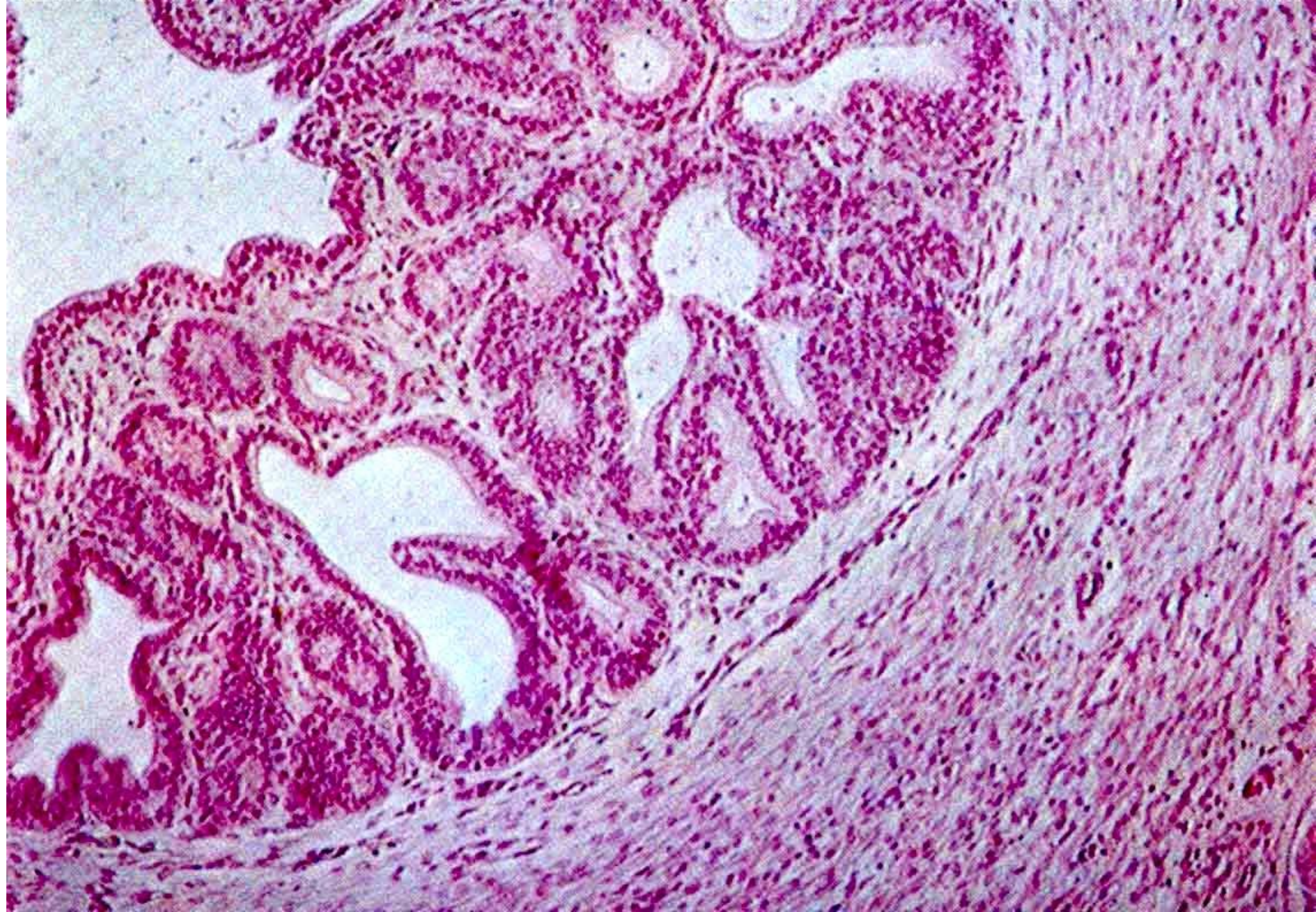
100 μ m

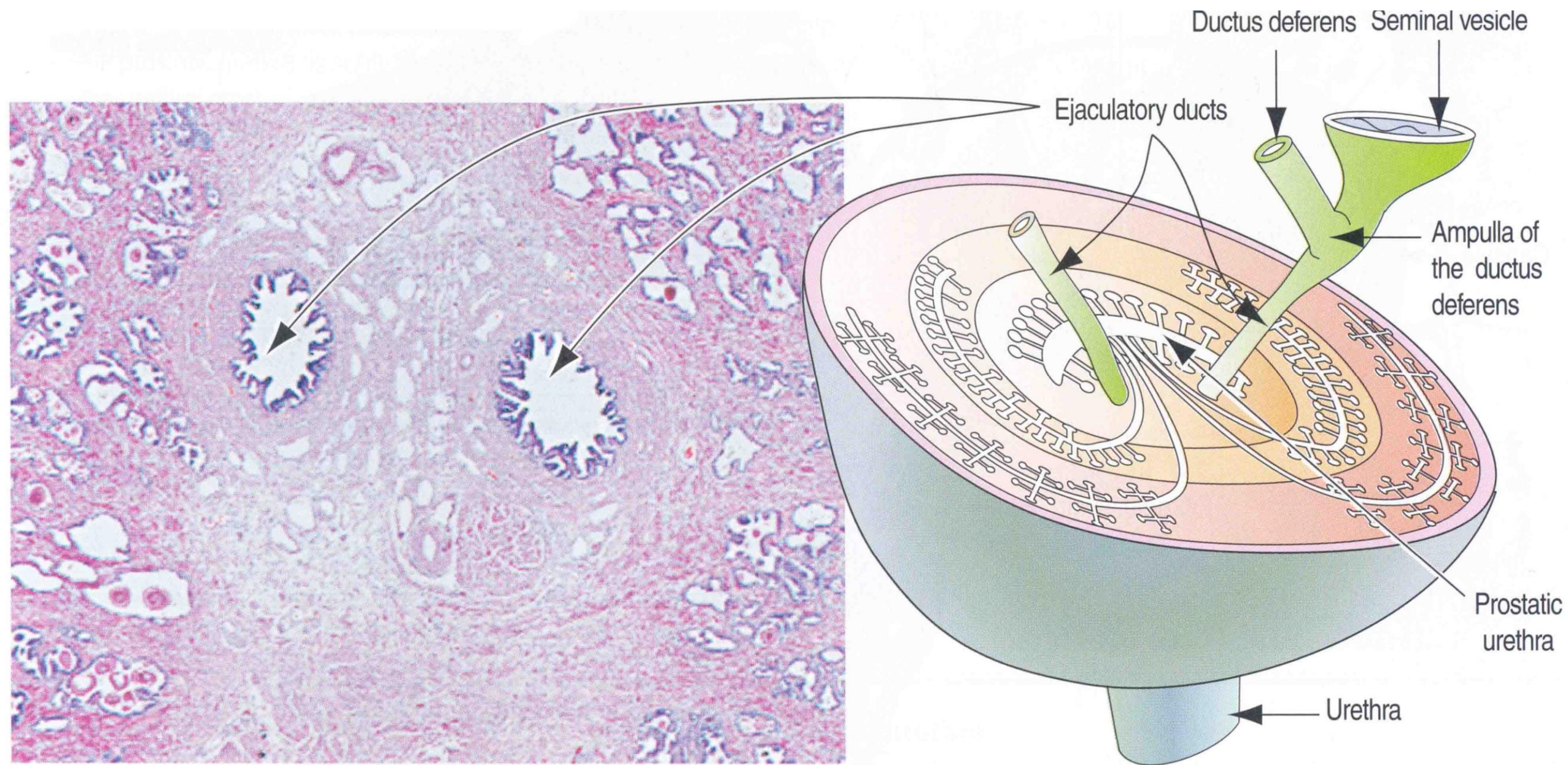
Spermatic cord
contains abundant
vessels (plexus
pampiniformis)



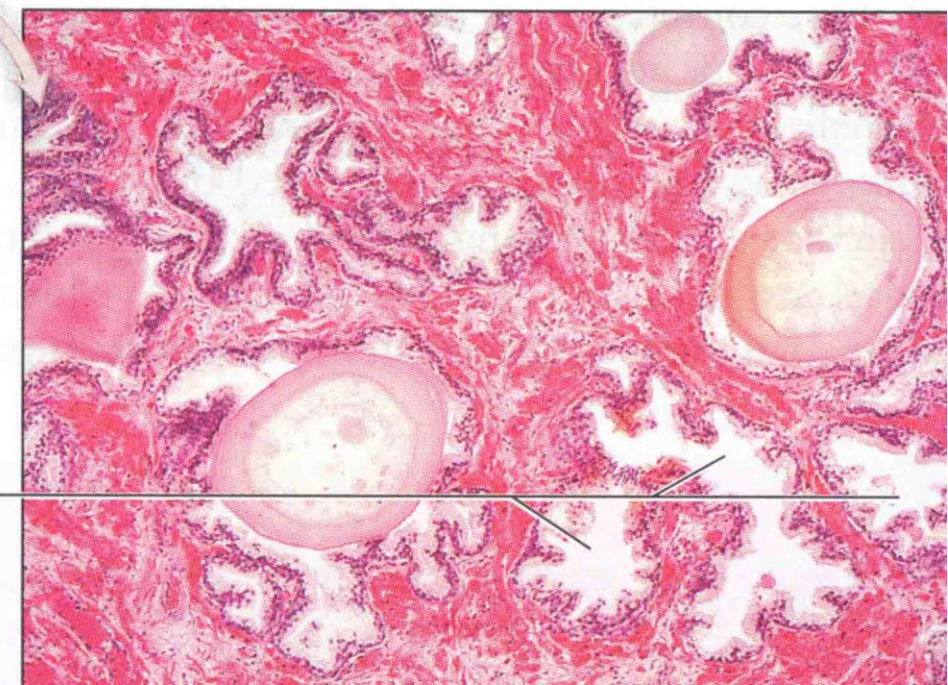
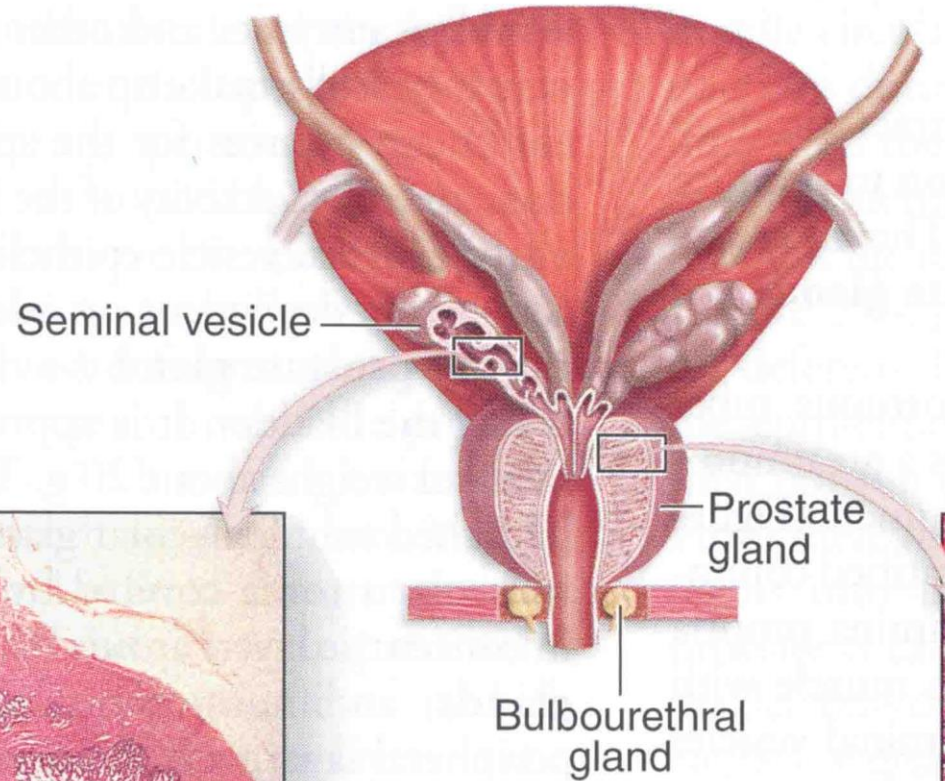
500 μ m

Ductus
deferens –
ampulla



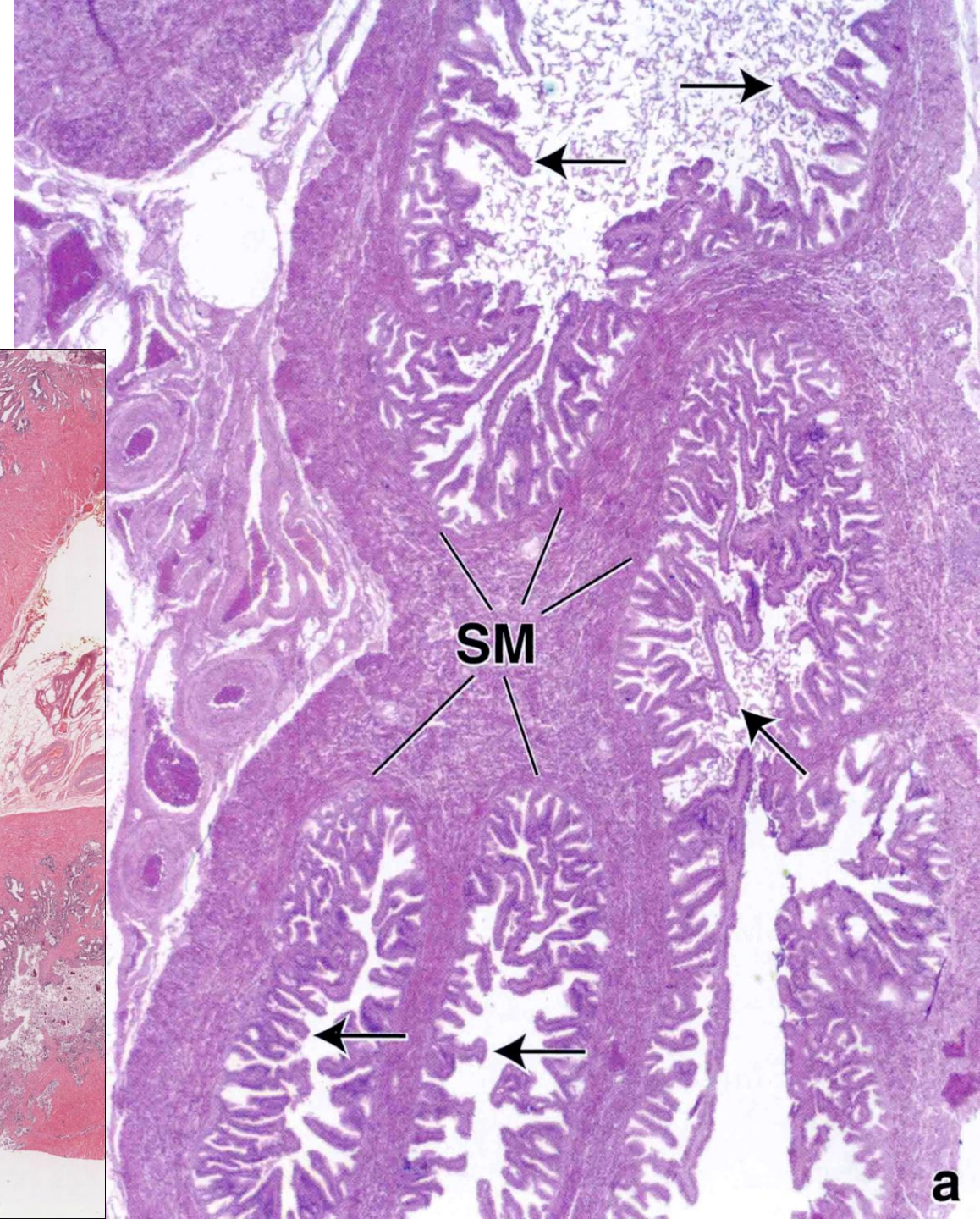
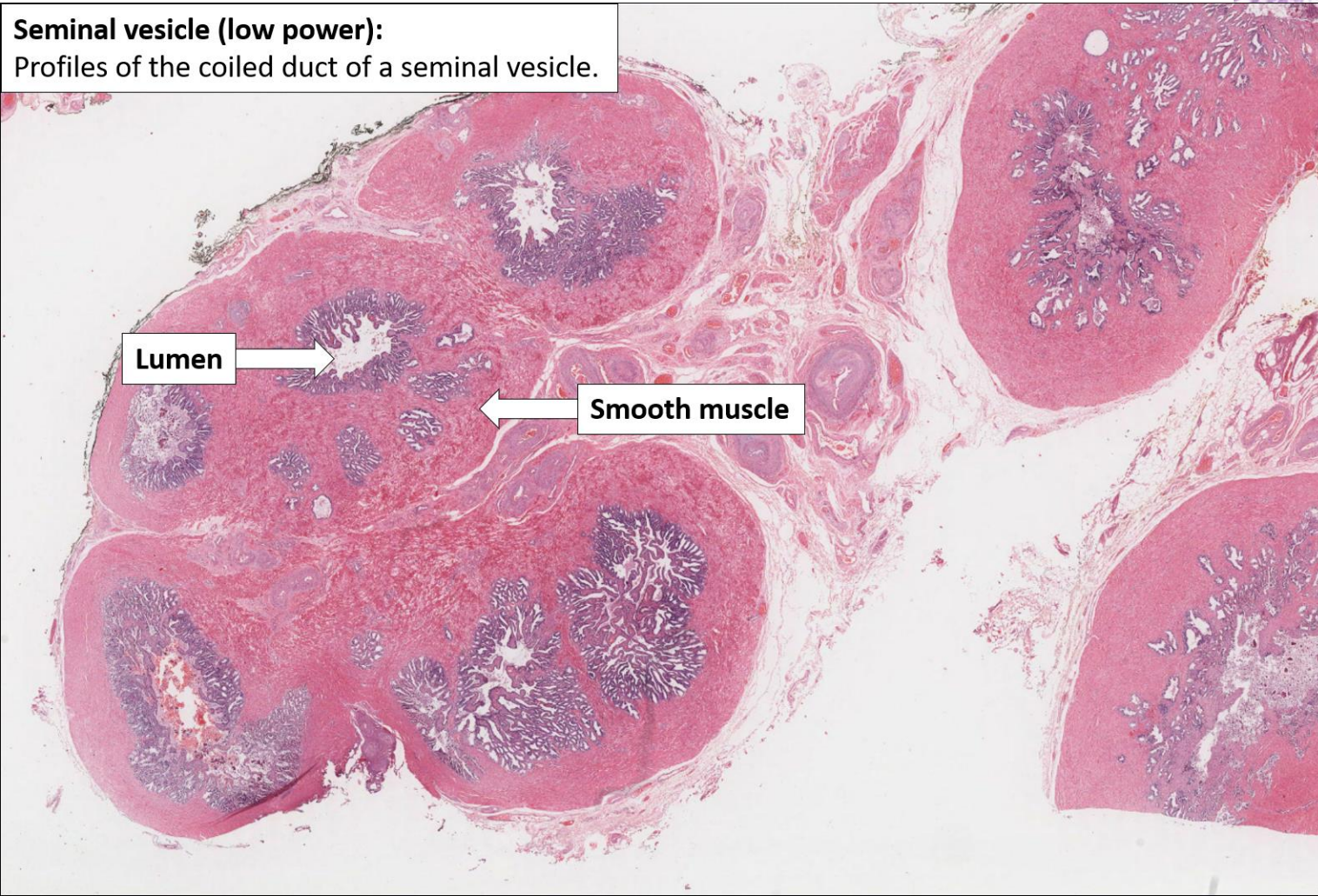


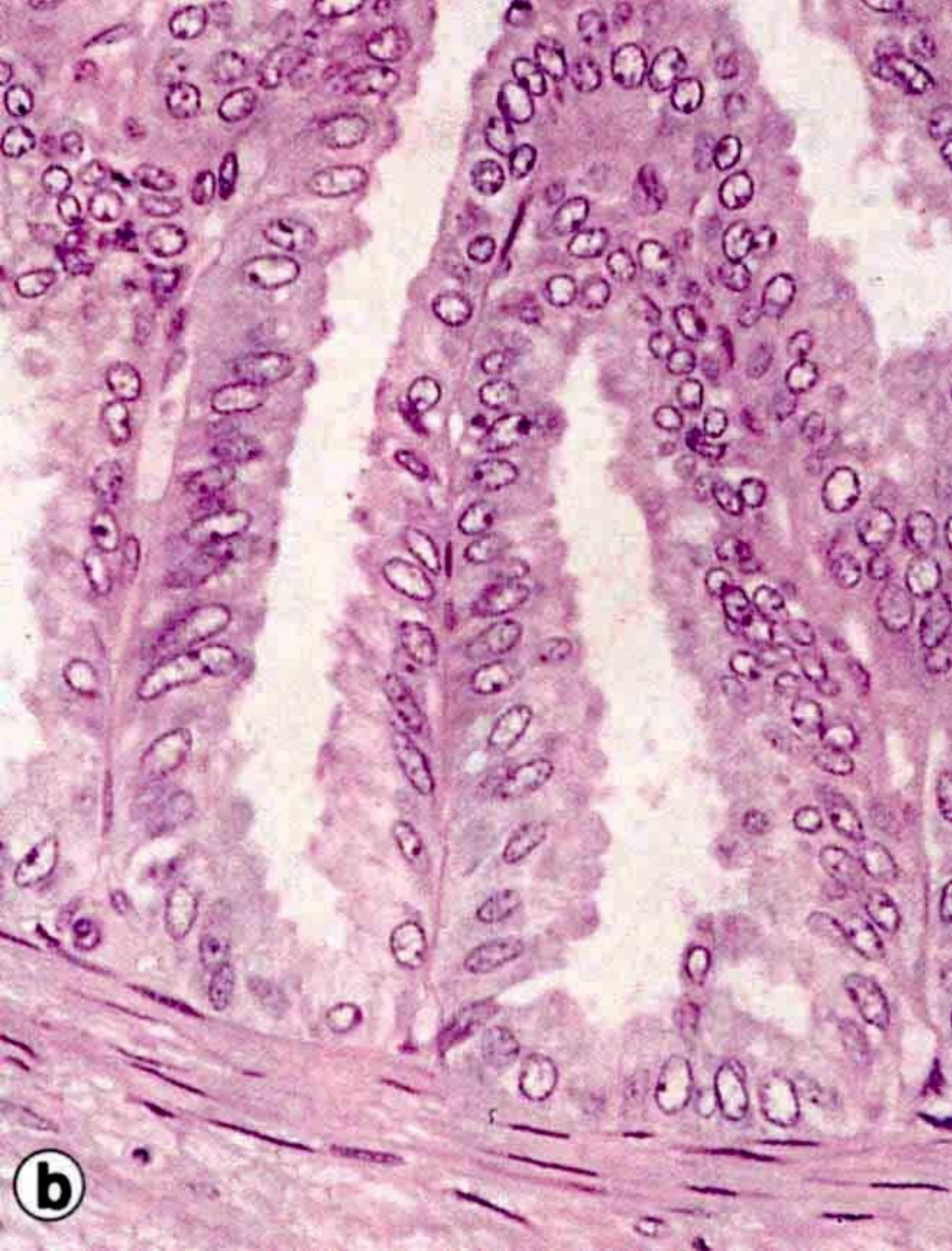
Accessory glands produce over 95% of the ejaculate.



The vesicular gland (the seminal vesicle) is a simple tubular gland that is highly folded.

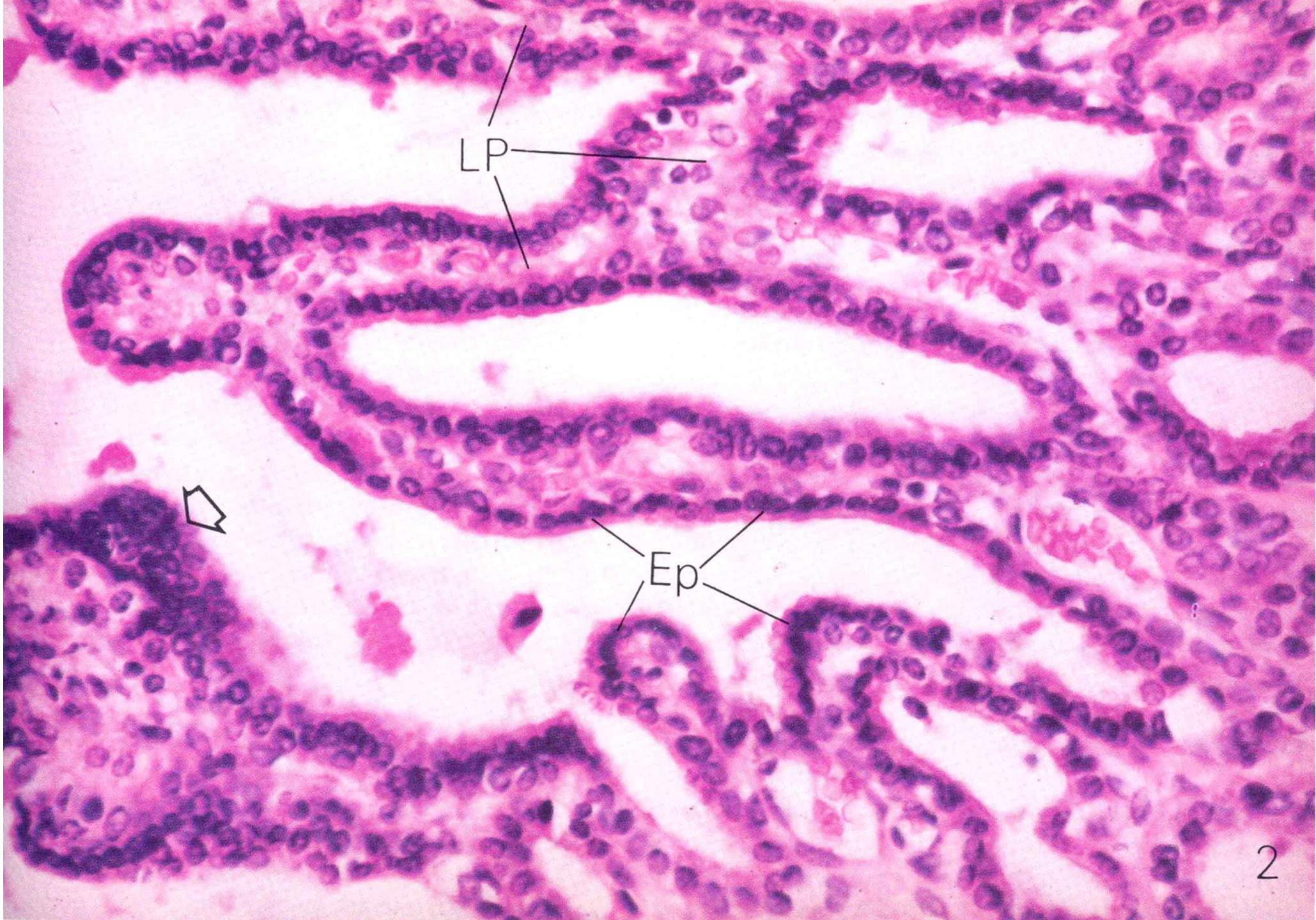
Seminal vesicle (low power):
Profiles of the coiled duct of a seminal vesicle.

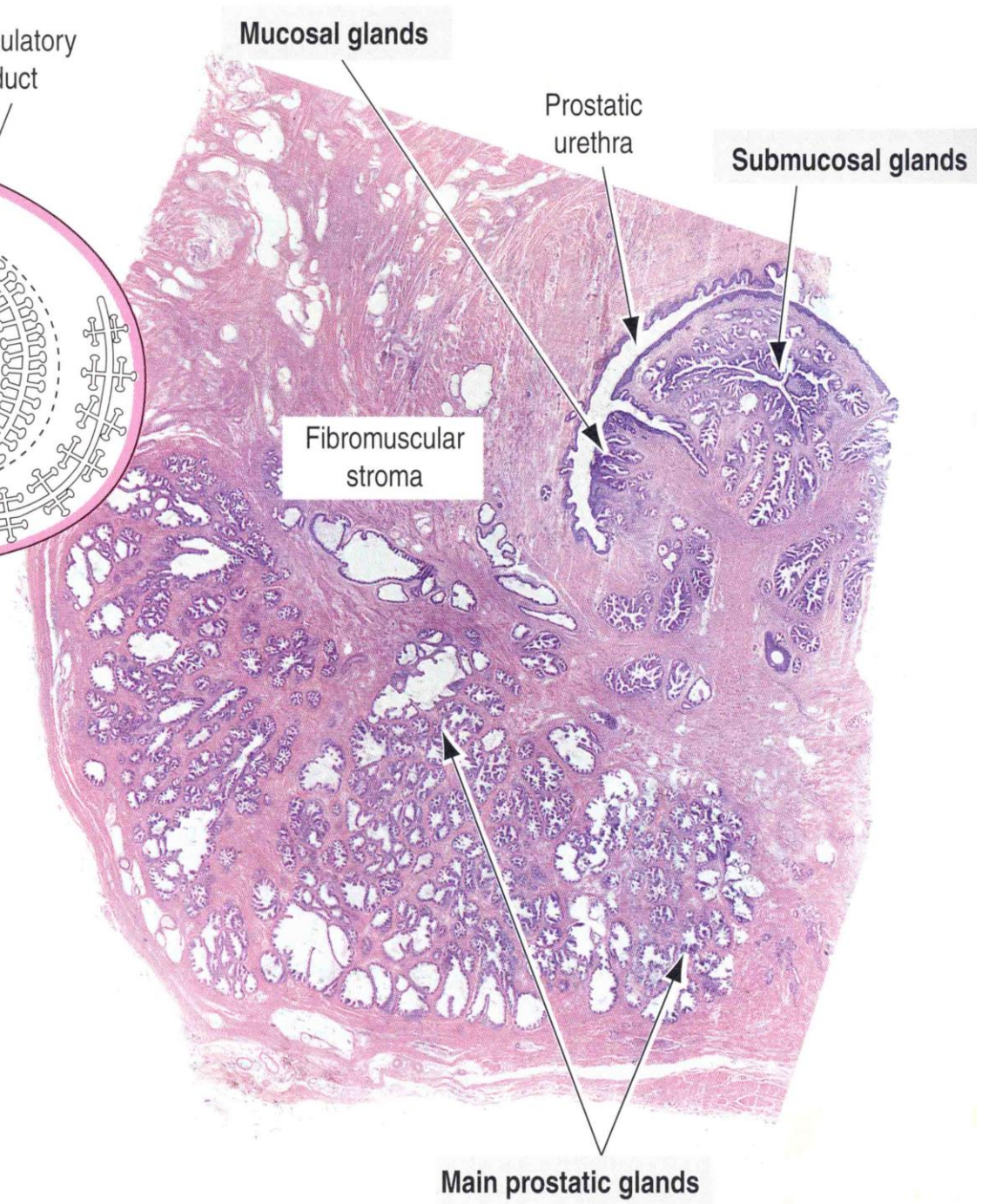
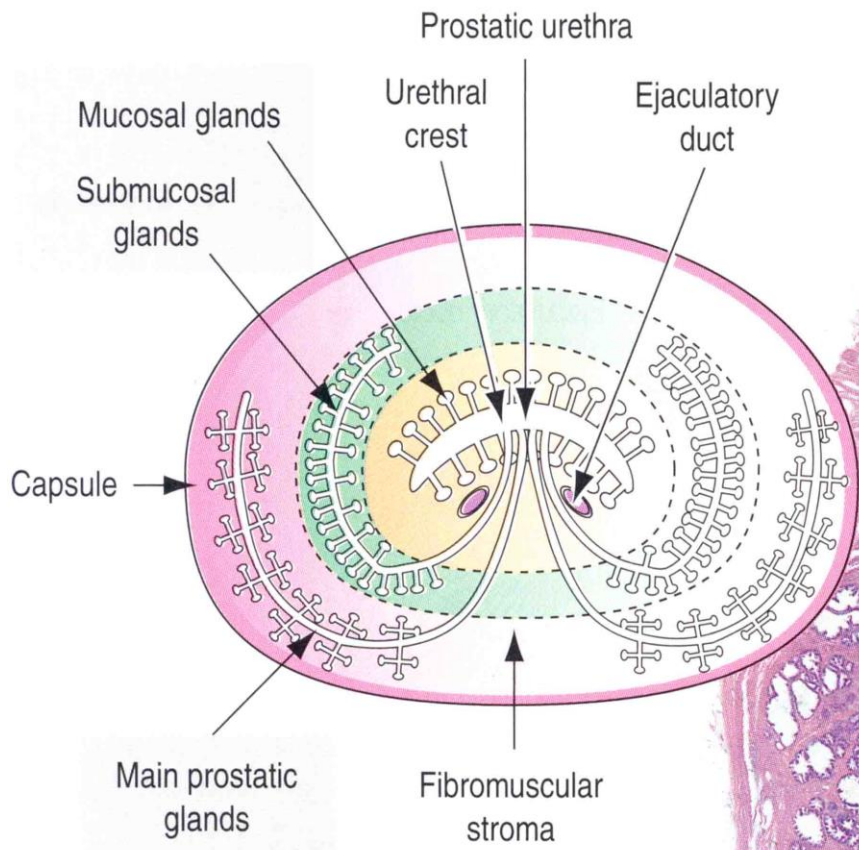


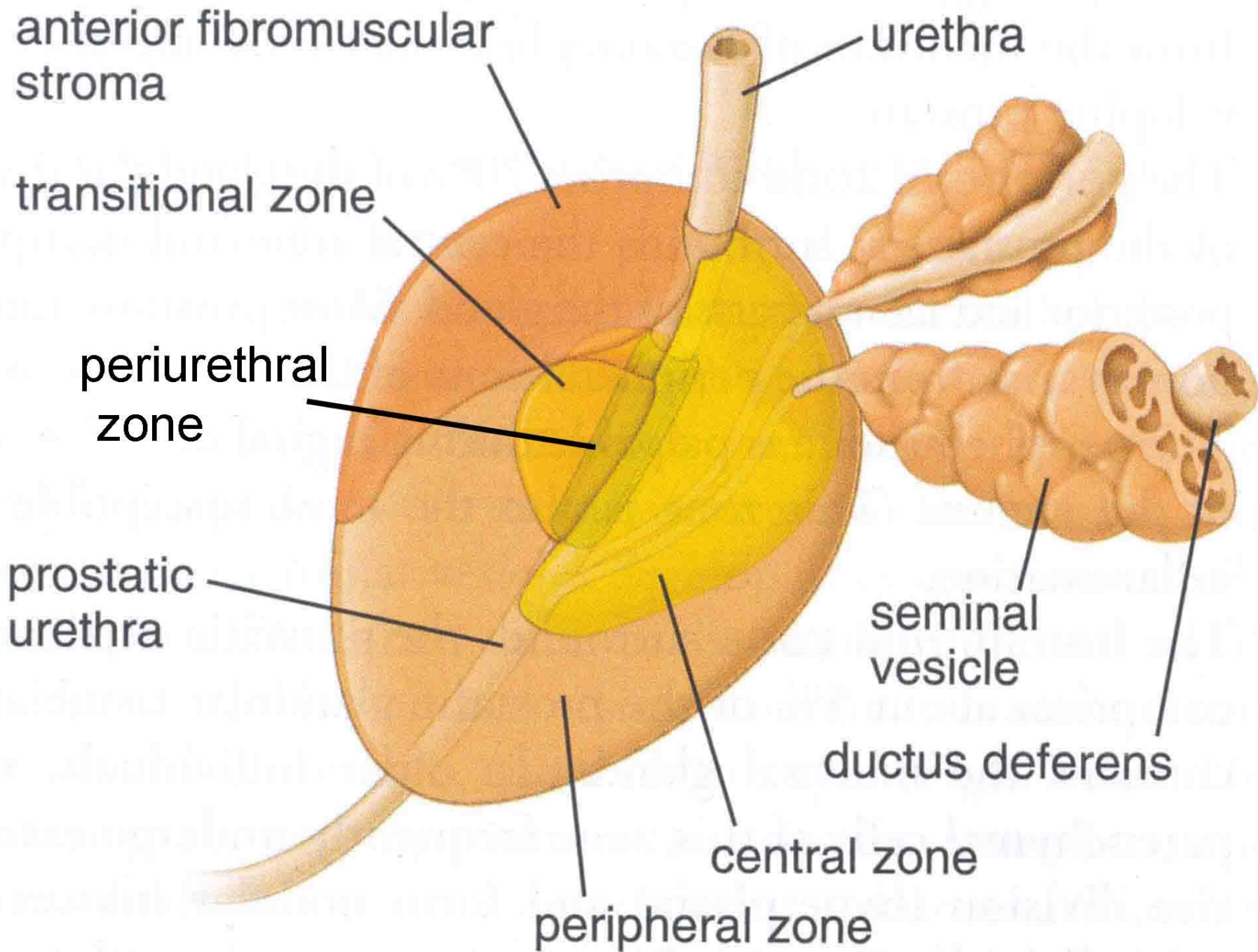


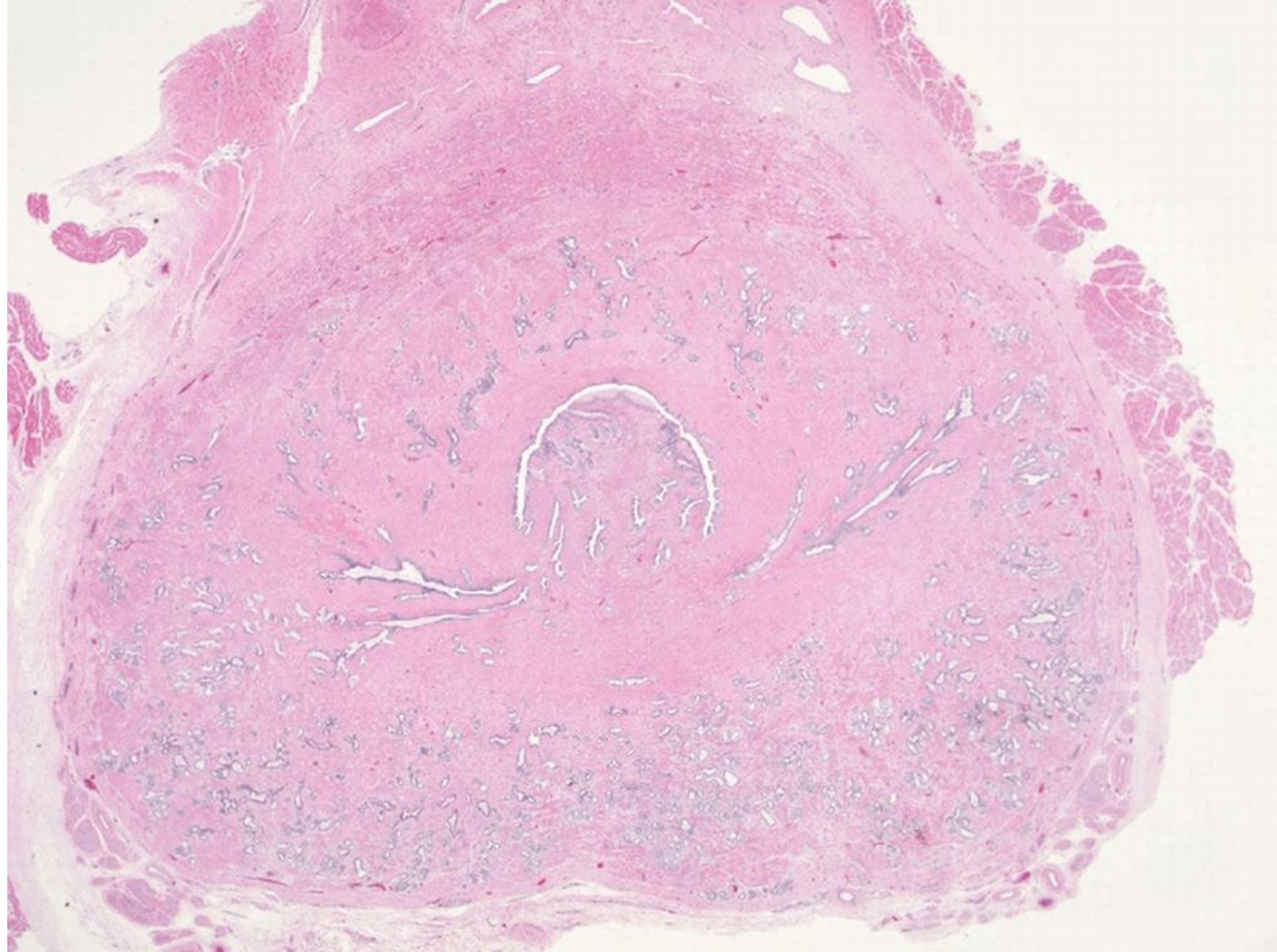
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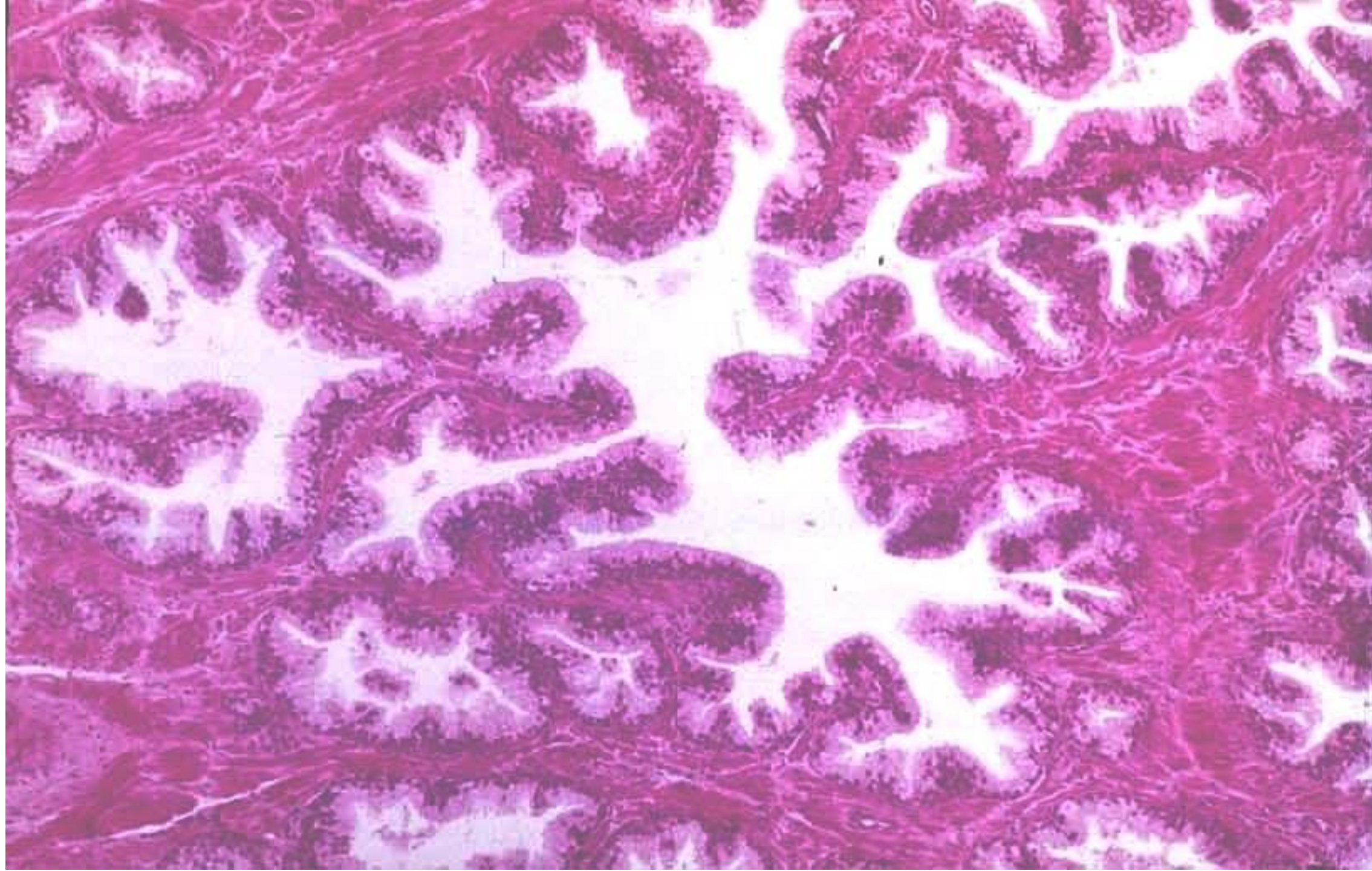
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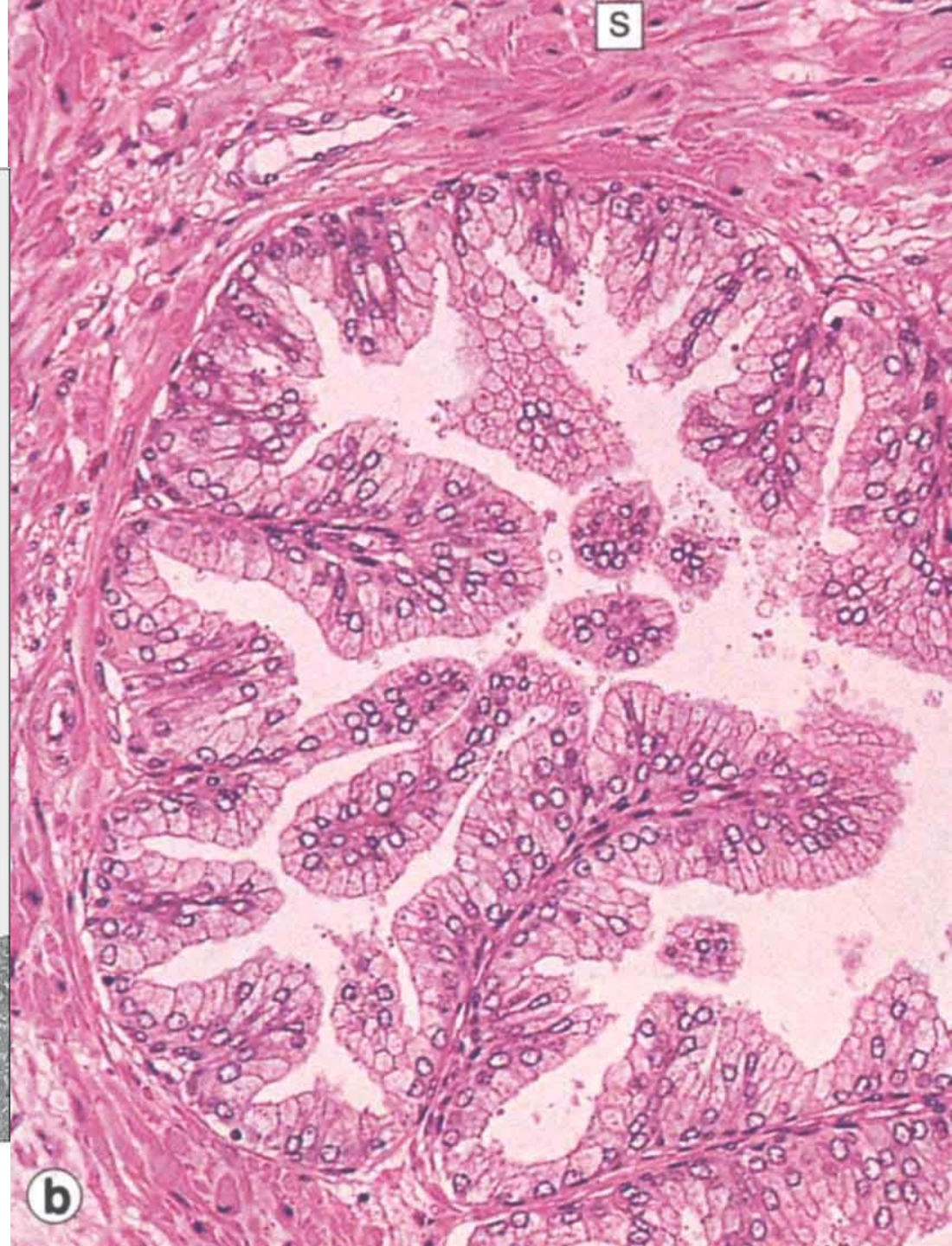
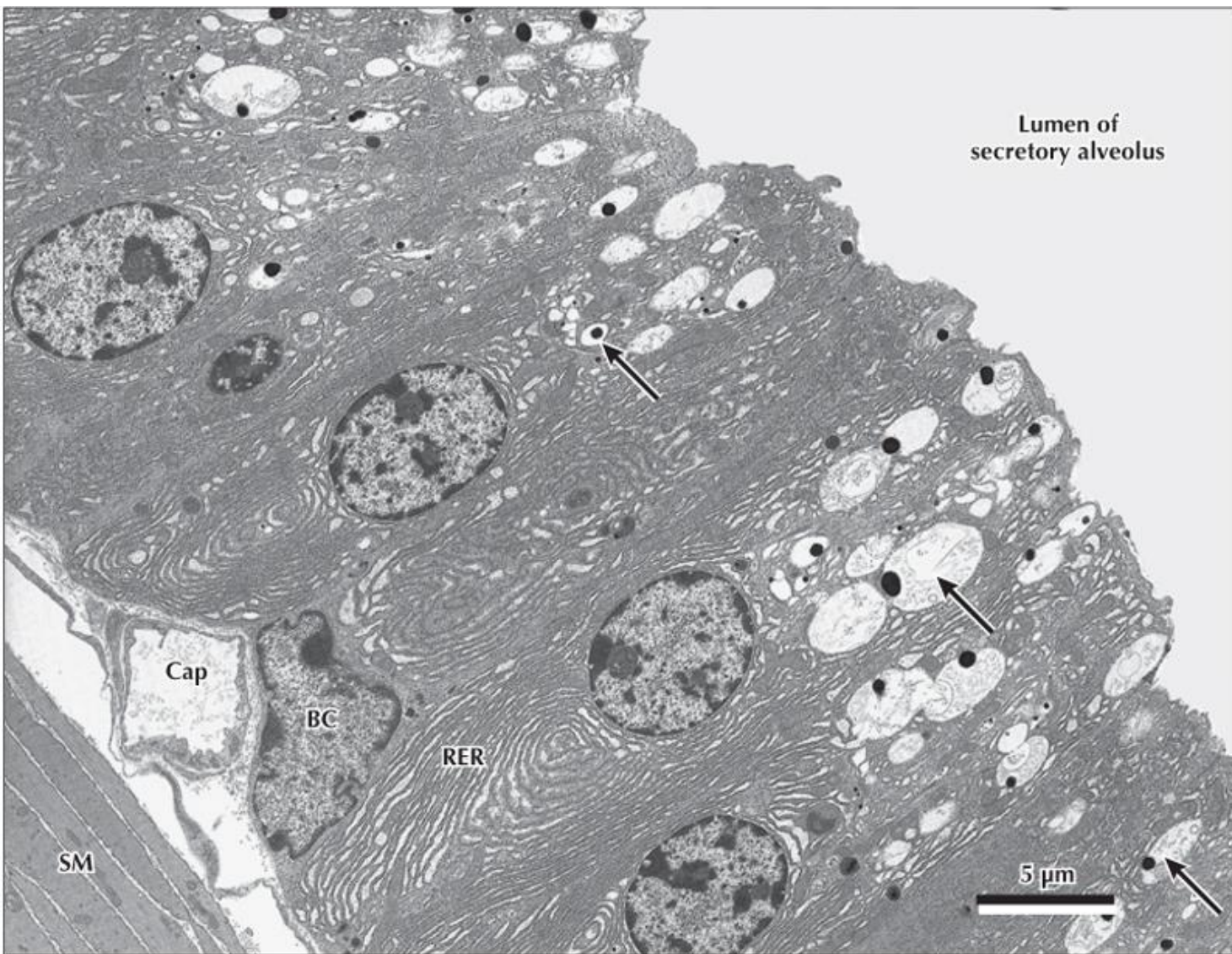




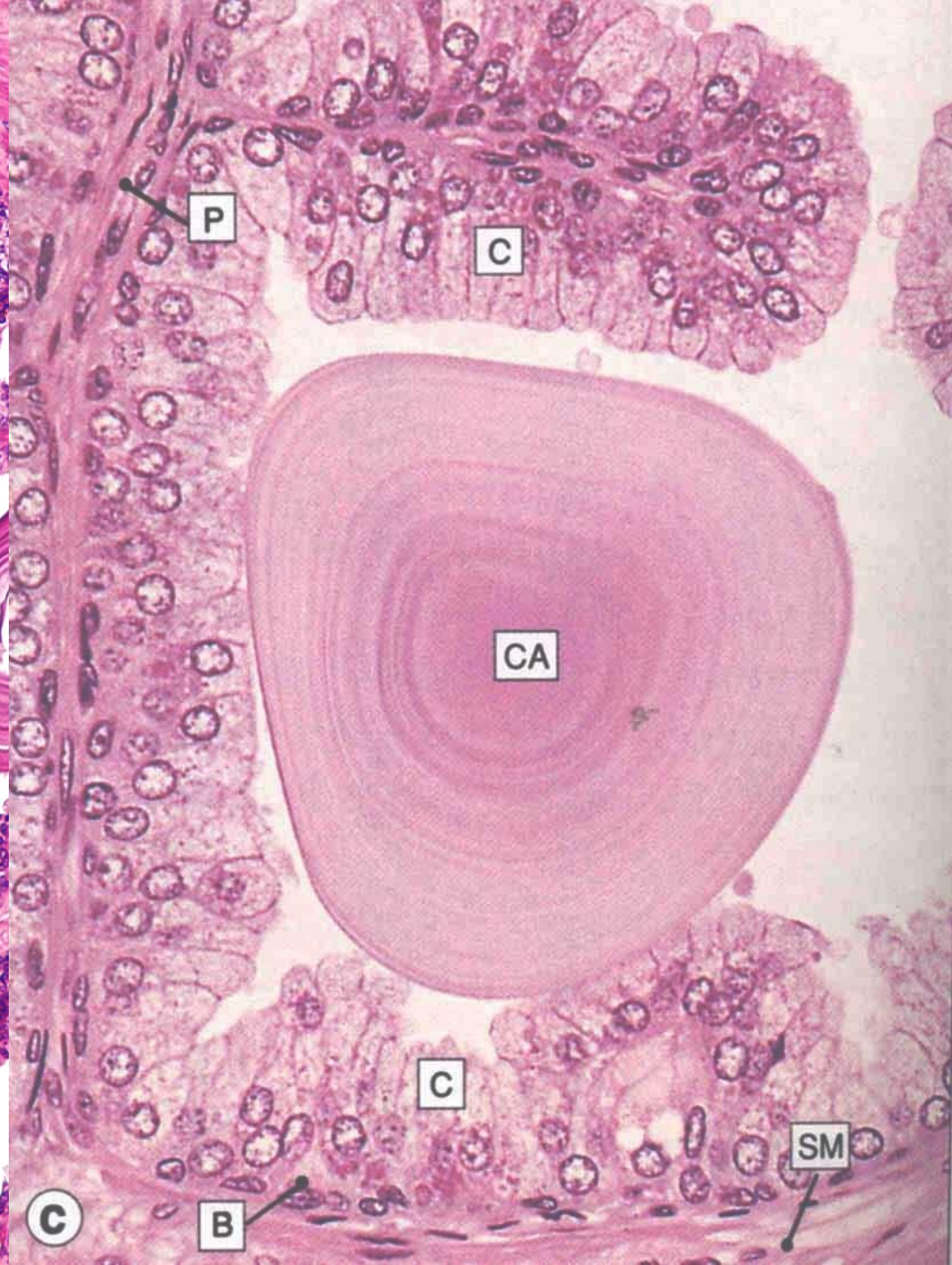
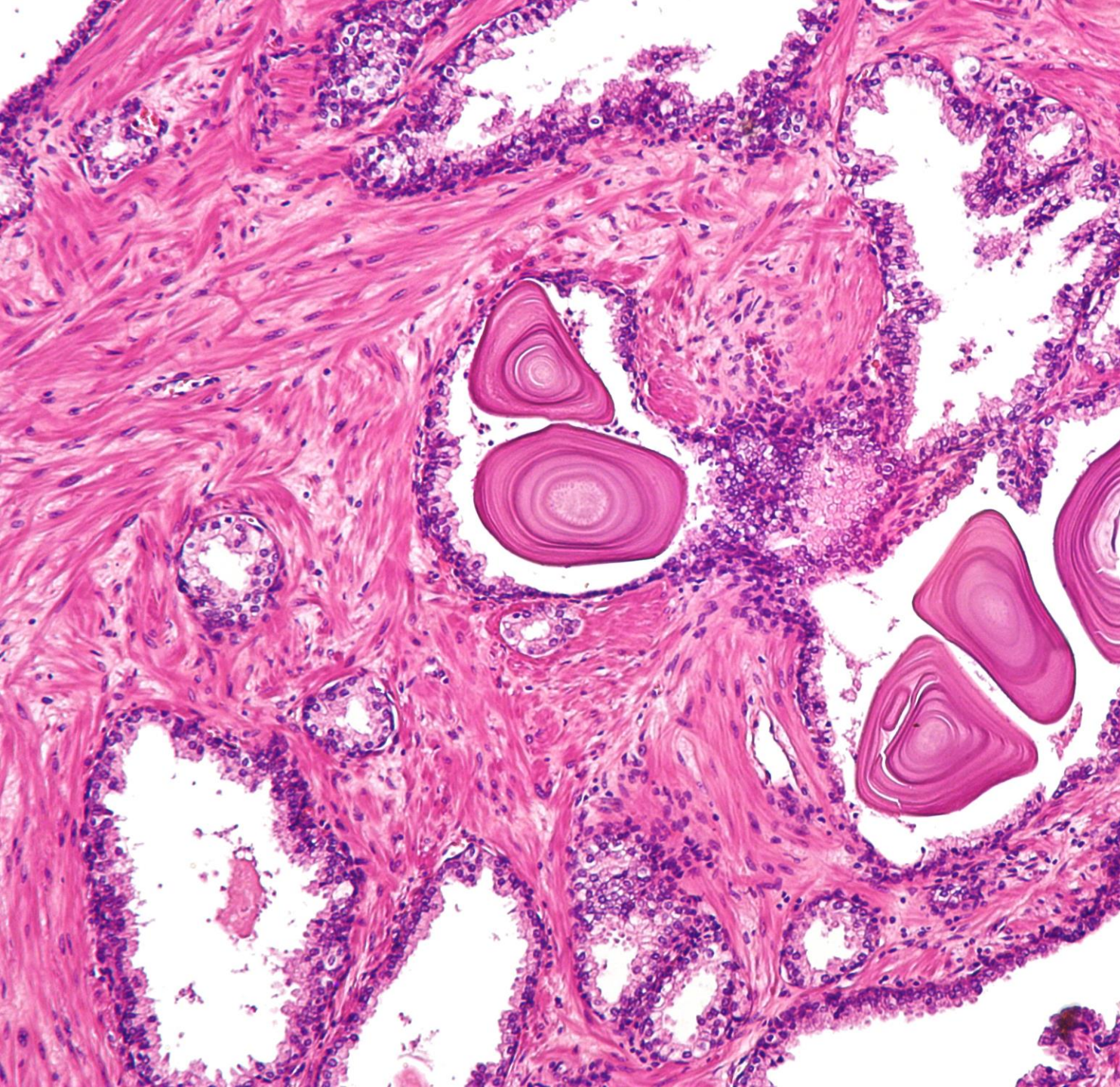


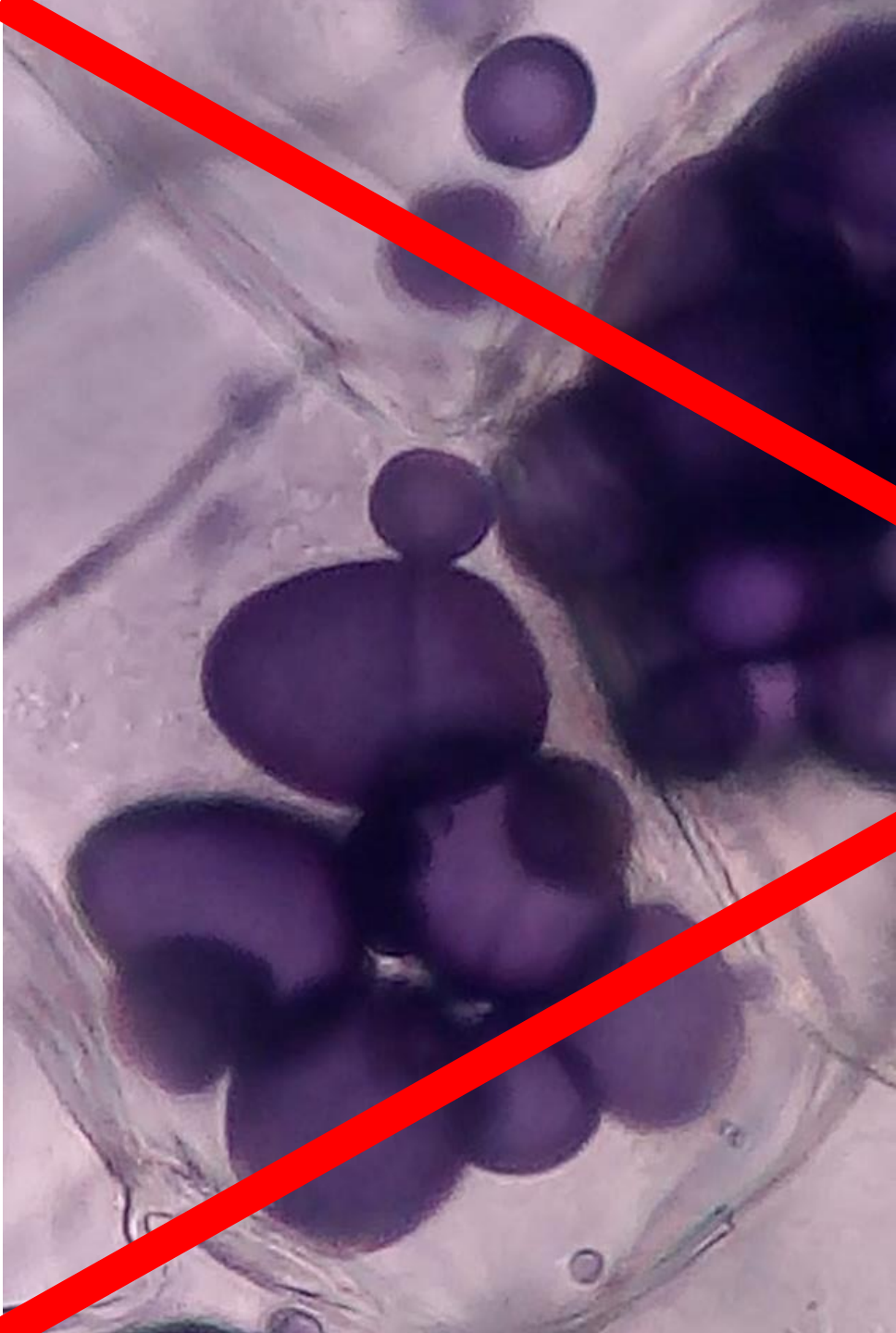


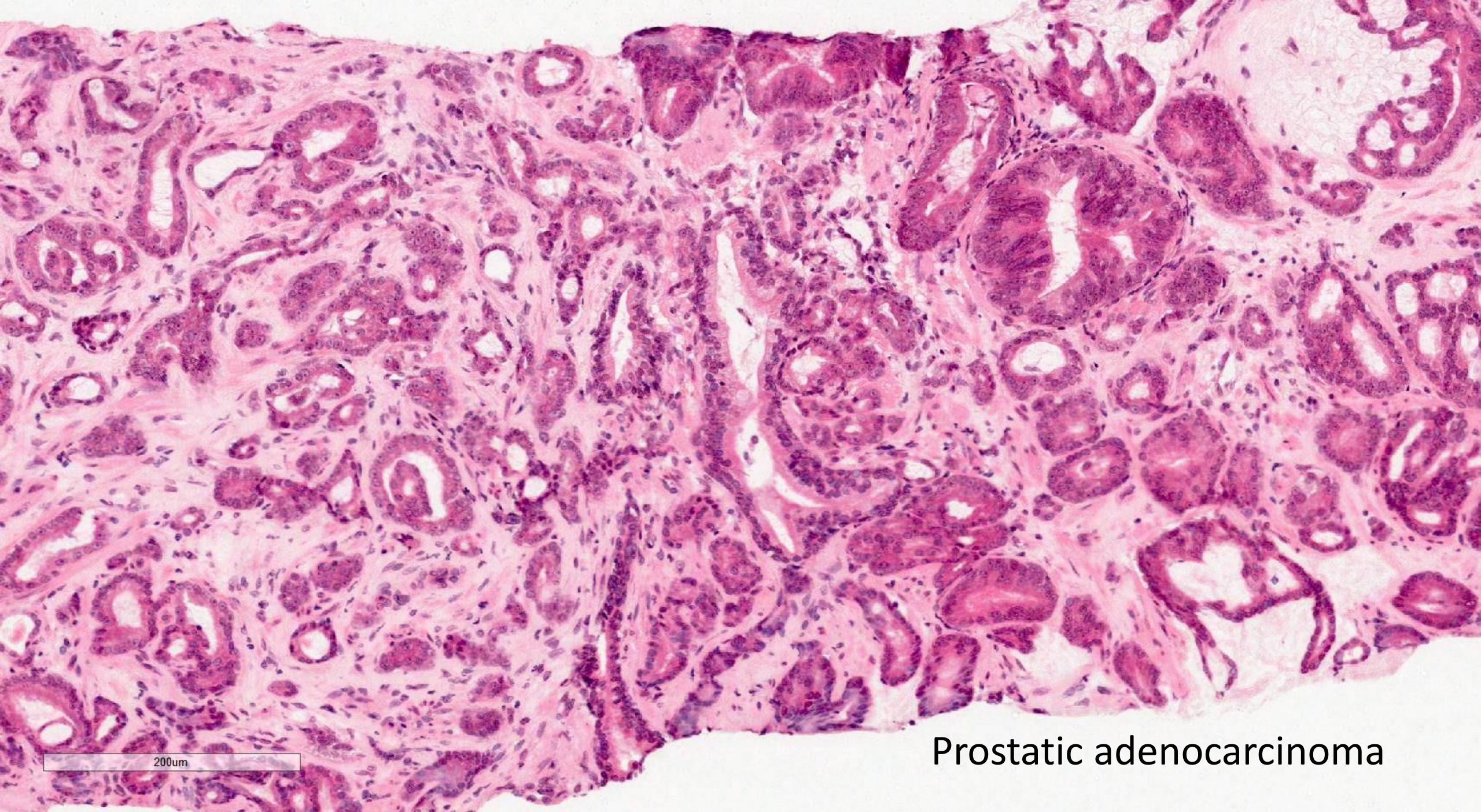




▲ **Survey EM of mouse prostatic epithelium.** The secretory nature of the columnar epithelial cells is clear, even if individual cell borders are difficult to distinguish. Multiple **RER** cisternae occupy basal cytoplasm; large secretory vesicles (**arrows**) are supranuclear. Small basal cells (**BC**) are next to the basement membrane. Underlying lamina propria contains a fenestrated capillary (**Cap**) and smooth muscle cells (**SM**). 4000 \times .

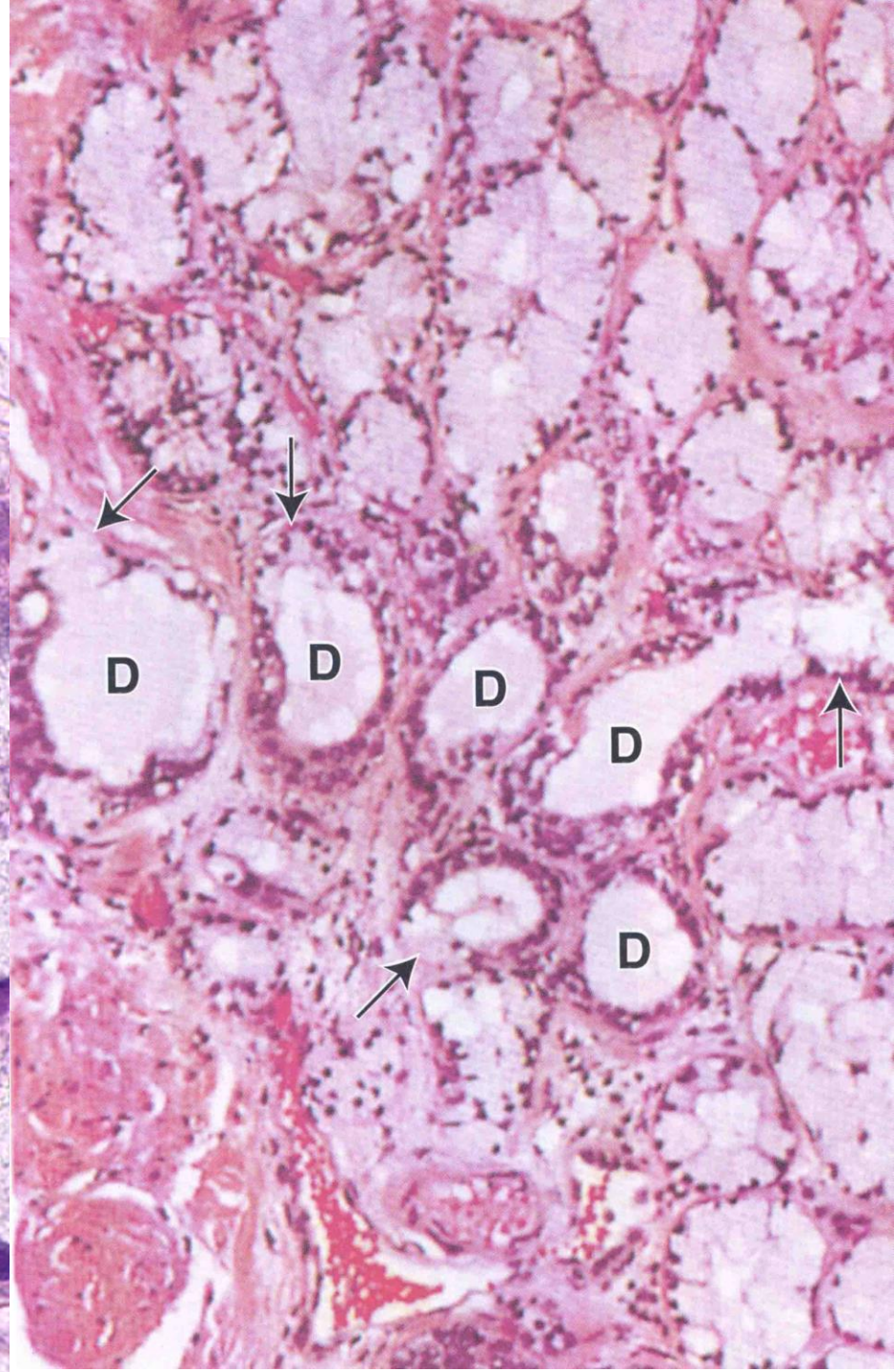
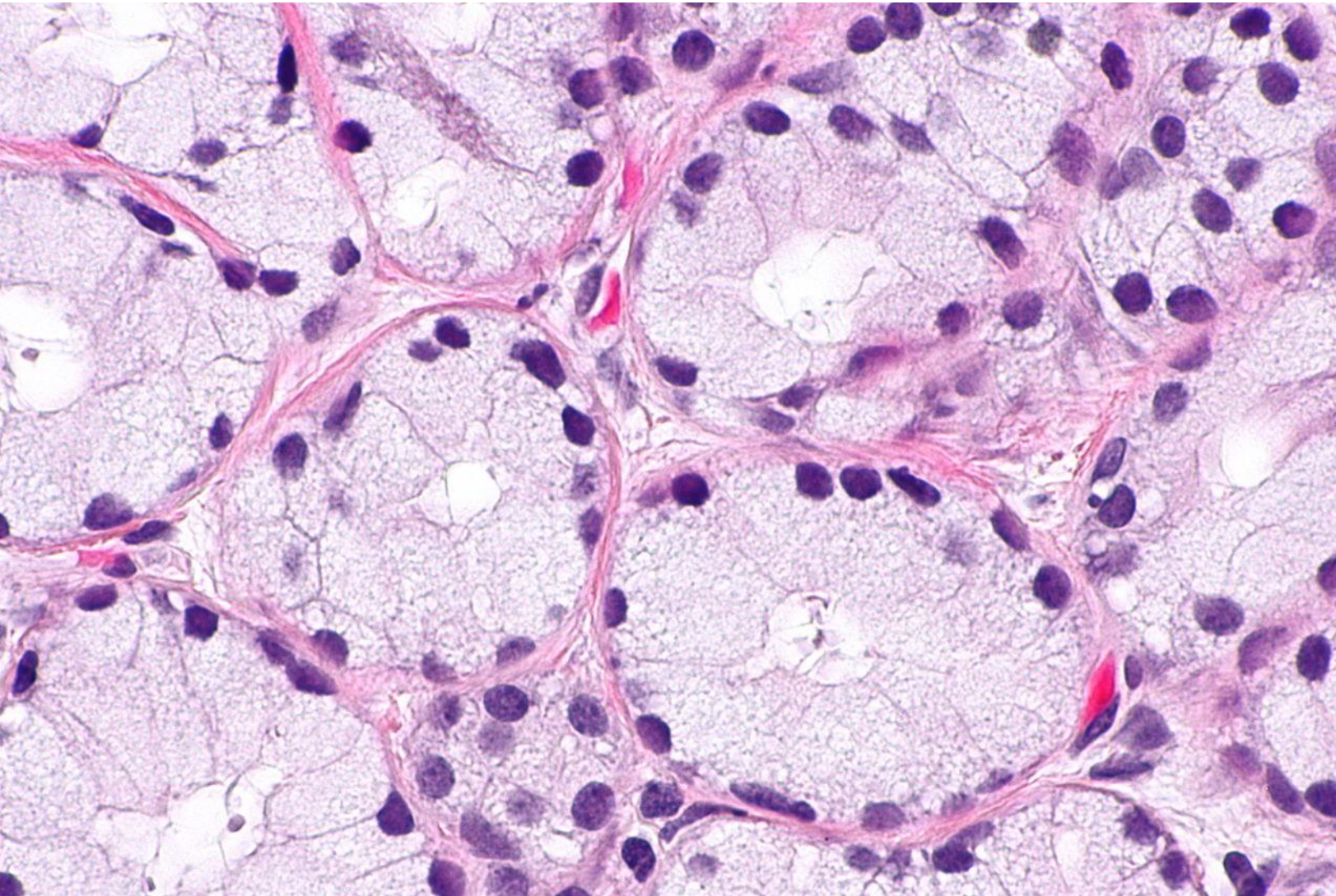


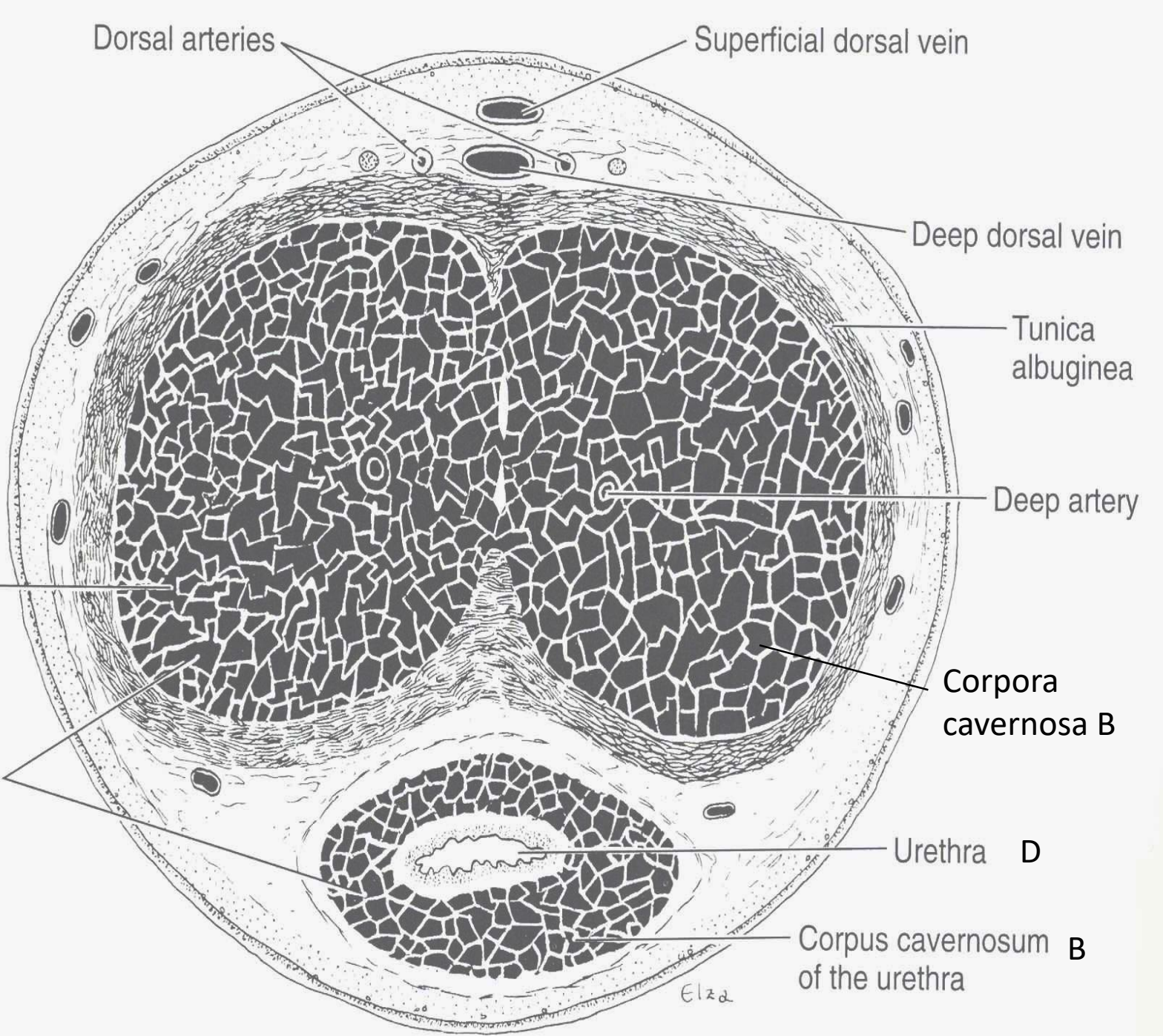
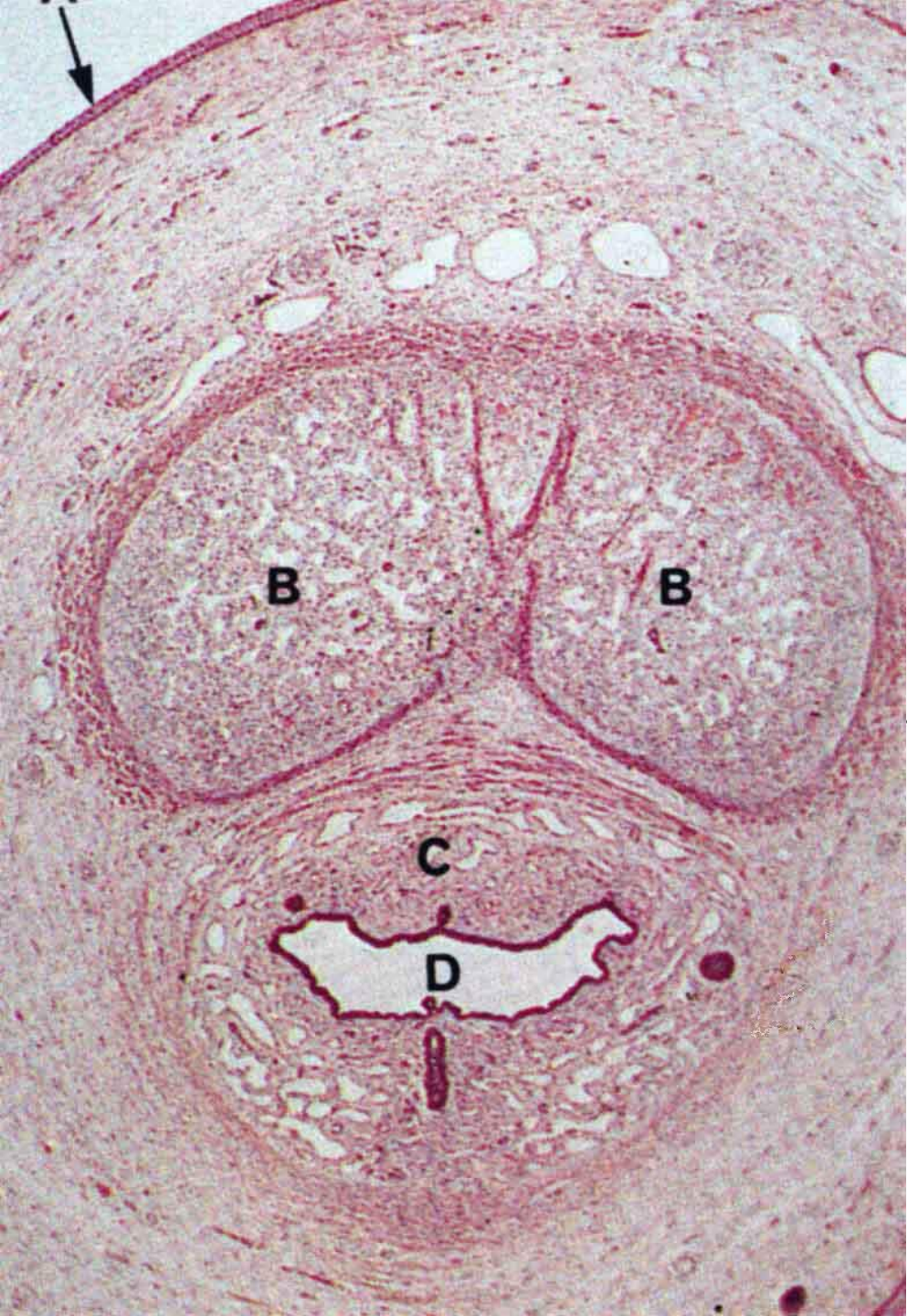


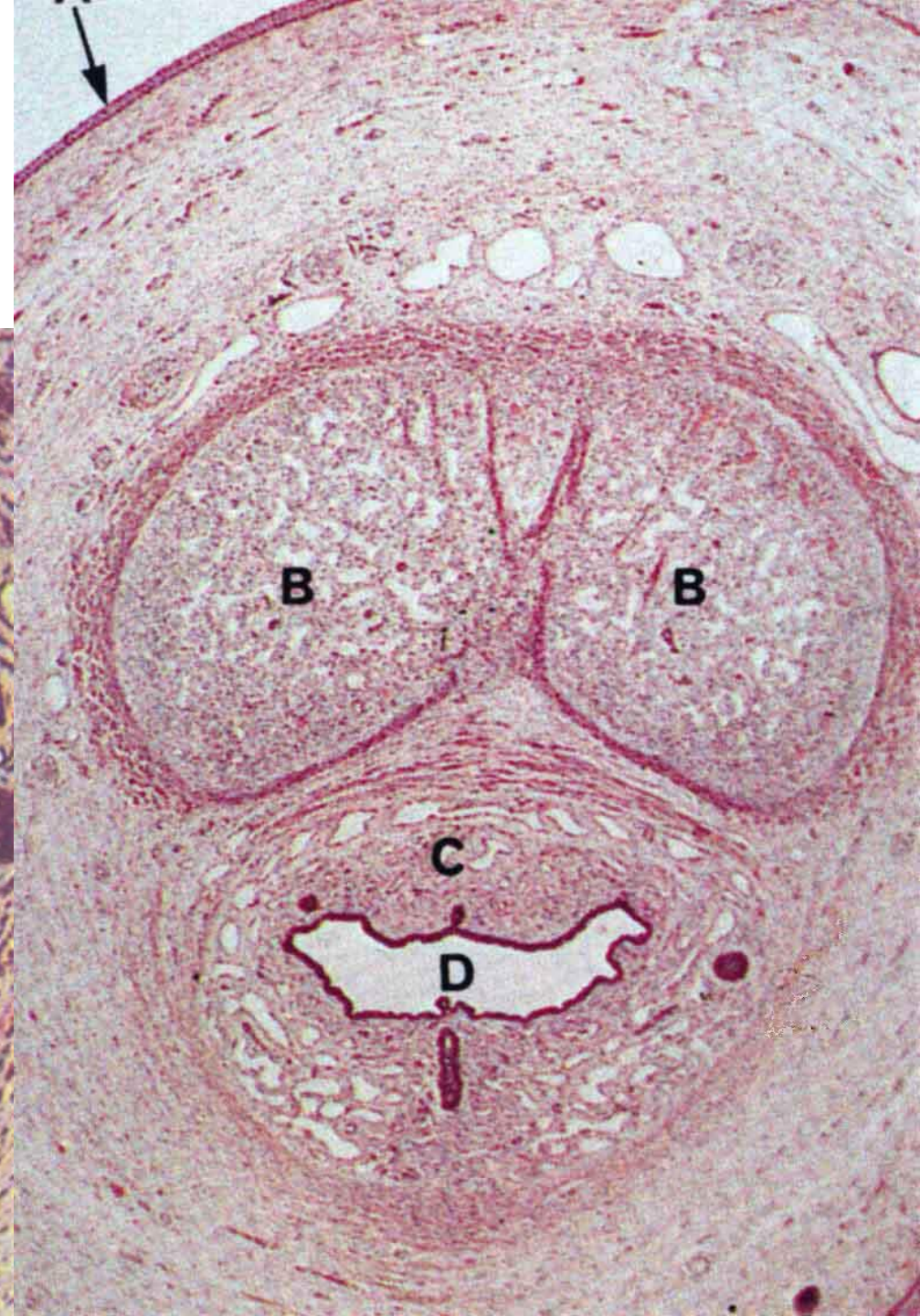
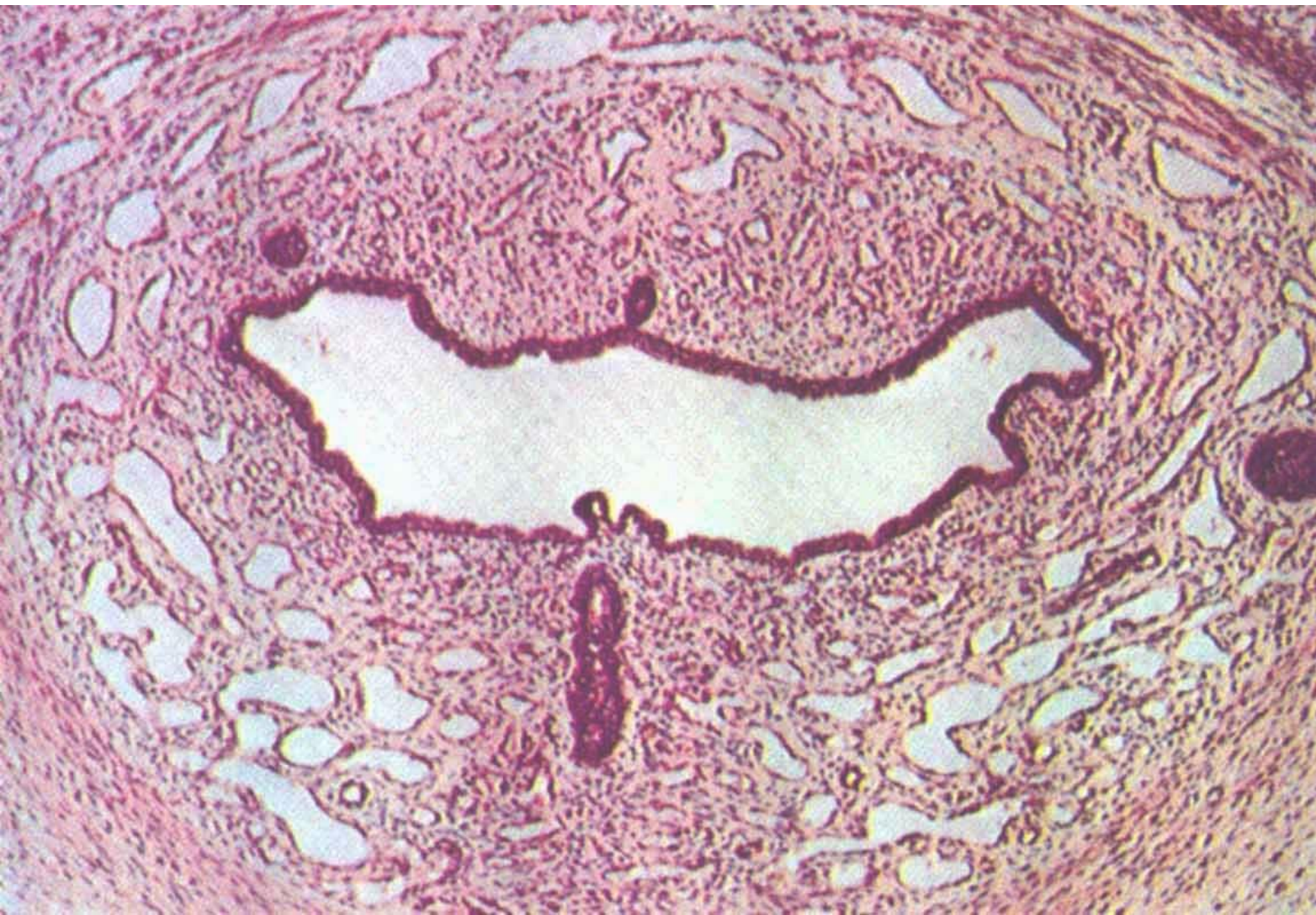


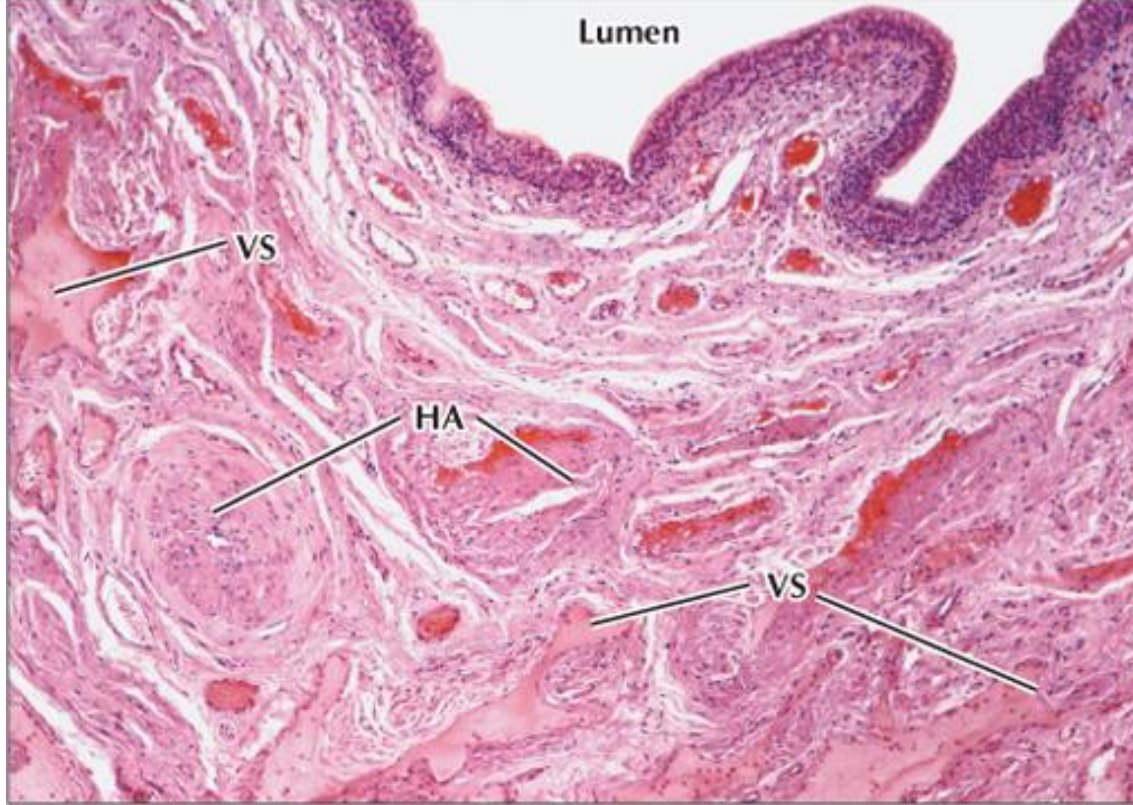
Prostatic adenocarcinoma

Bulbourethral gland









▶ **LM of the corpus spongiosum.** The mucosa lining the urethral lumen is corrugated. Erectile tissue in deeper layers contains helicine arteries (HA), veins, and venous sinuses (VS). 110 \times . H&E.

▶ **LM of the penile urethra at higher magnification.** The stratified columnar nature of the epithelium, with an underlying basement membrane (arrowheads) is clear. The lamina propria is loose connective tissue and contains several venules close to the surface. 400 \times . H&E.

▼ **LM of helicine arteries in the corpus spongiosum.** These highly coiled arterioles have a thick tunica media with an inner layer of longitudinally oriented smooth muscle that forms thickenings (arrows) of tunica intima. Contraction of this smooth muscle constricts the arteriolar lumen. These arteries drain directly into venous sinuses. 300 \times . H&E.

