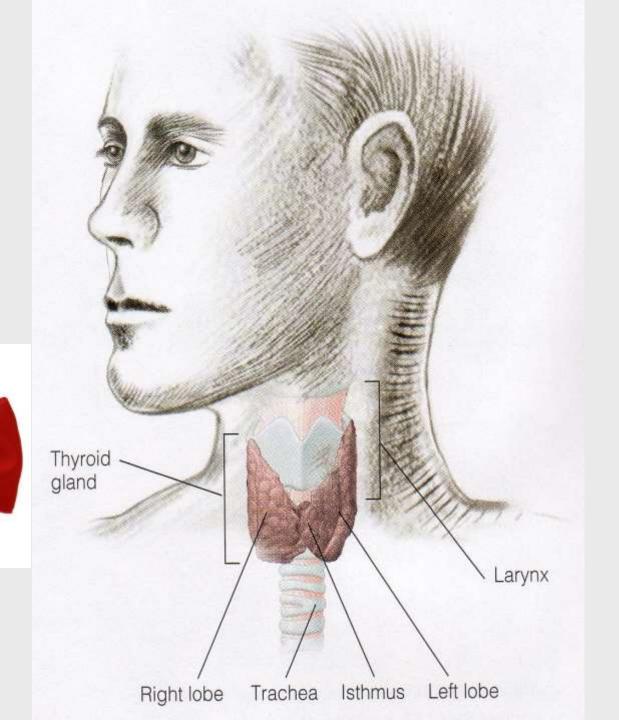
Dr. Garrett next Tuesday! Dr. Kaplan next Thursday! Hooray!!...

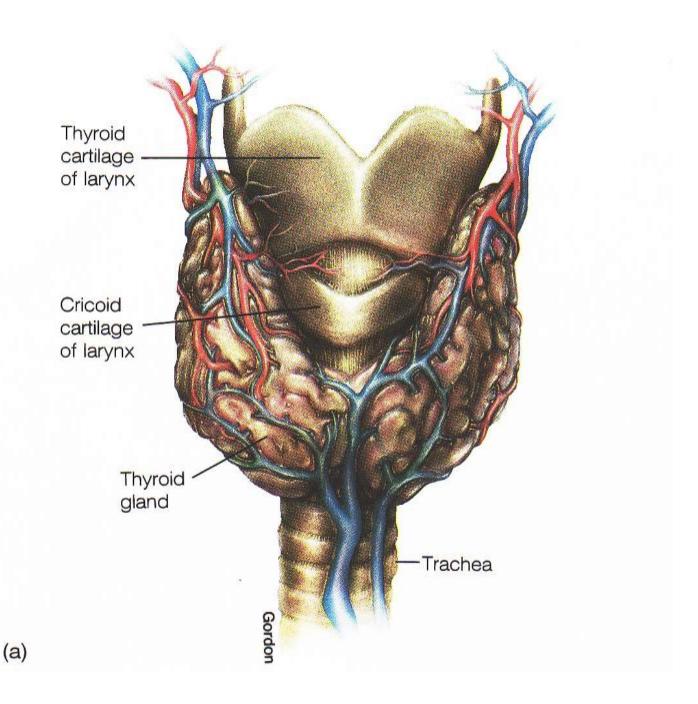
Lecture 11

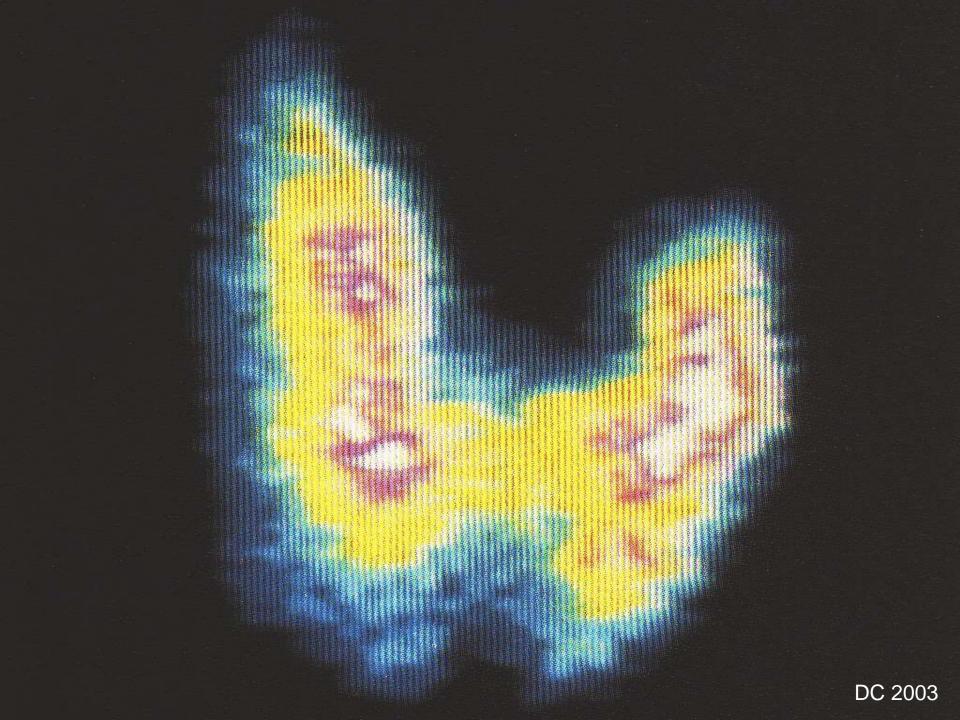


- I. <u>Announcements</u> Presentations Group I next Tuesday. Q?
 Outline comments complete. All drafts to Bella, Abbie & Mae.
- II. <u>Endocrinology Connections</u> Thyroid +Adrenals G&H ch 77, 78
- III. <u>Med Physiol News</u> Sex Allergy? Mom's eggs execute dad's mitochondria? Science News
- IV. Reproductive Physiology Primer G&H ch 82,81 +L Sherwood...
 - A. Female reproductive system fig 82-1, 82-2
 - B. Ovarian hormones +FB: estrogen, progesterone pp 1042-7
 - C. Follicle growth & ovulation mechanism fig 82-5, 82-3
 - D. Plasma gonadotropin & ovarian hormone [] in female sexual cycle fig 82-4
 - E. Female sexual cycle, menstruation fig 82-4, 82-9
 - F. Estrogen [] throughout lifespan, menopause fig 82-12
 - G. Birth control techniques L Sherwood + G&H
 - H. Male reproductive system fig 81-1 A & B
 - I. Sperm & development fig 81-2, 81-7, 81-3, 81-4, 81-5
 - J. Feedback regulation in males fig 81-10
 - K. Plasma testosterone [] throughout lifespan fig 81-9



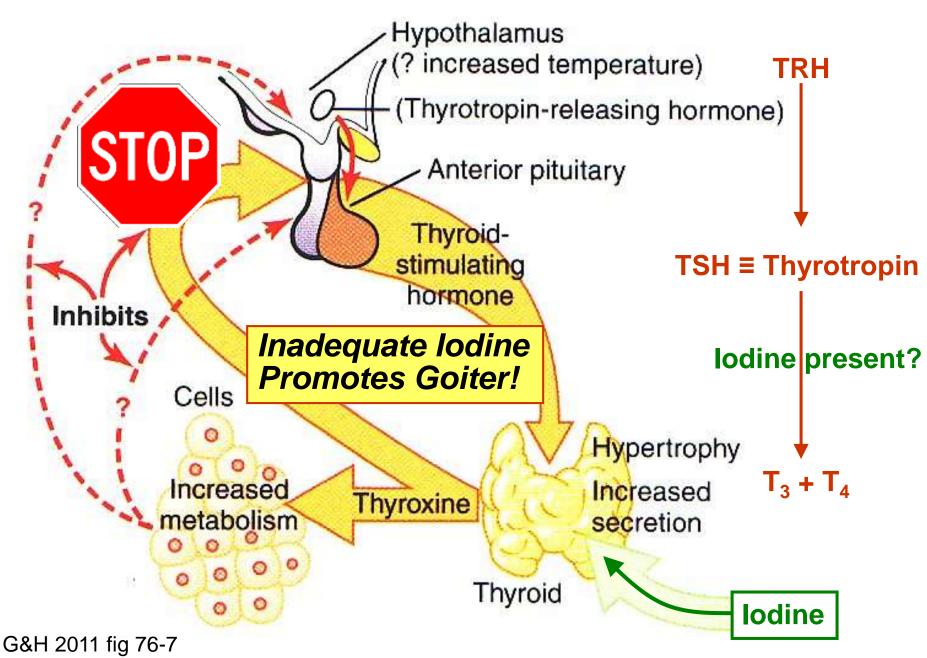




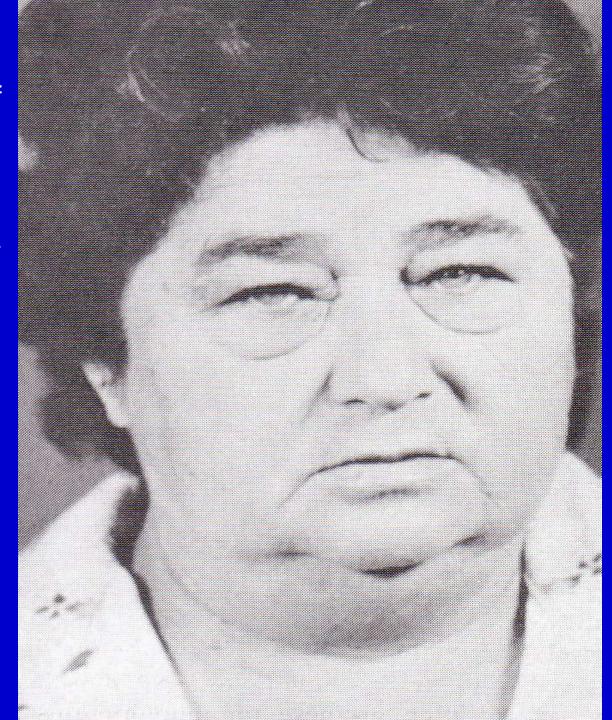








G&H 2011 fig 76-7 G&H 2016 fig 77-7 Near absence of thyroidhormone function + myxedema



G&H 2016 fig 77-9, G&H 2011 fig 76-9

Adrenal gland

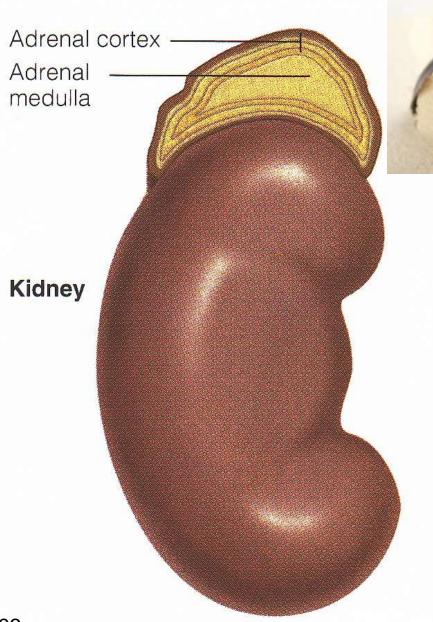
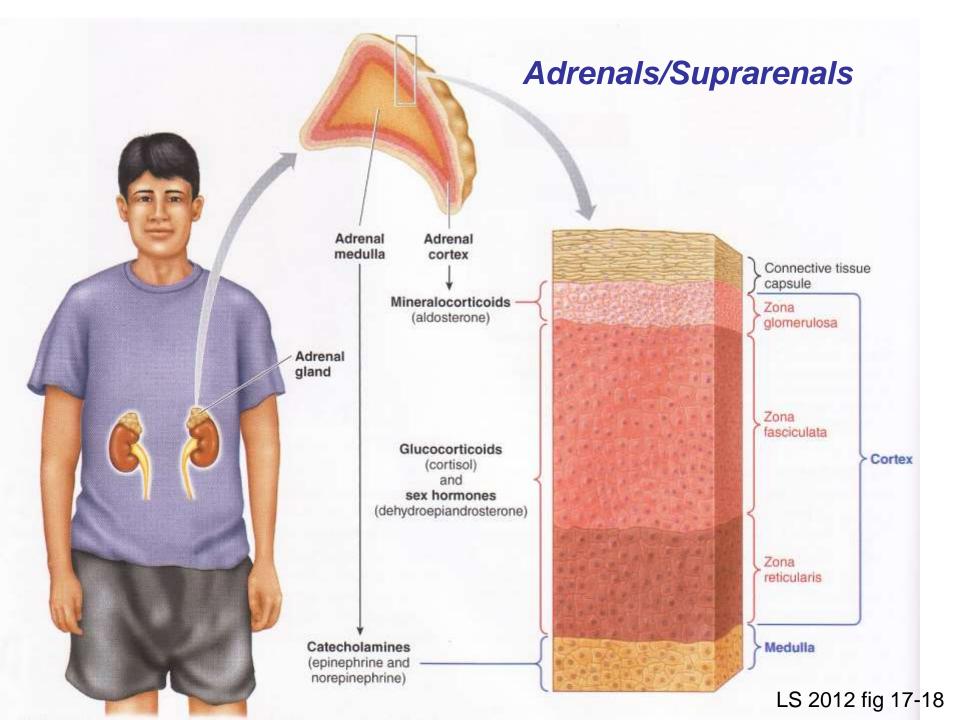


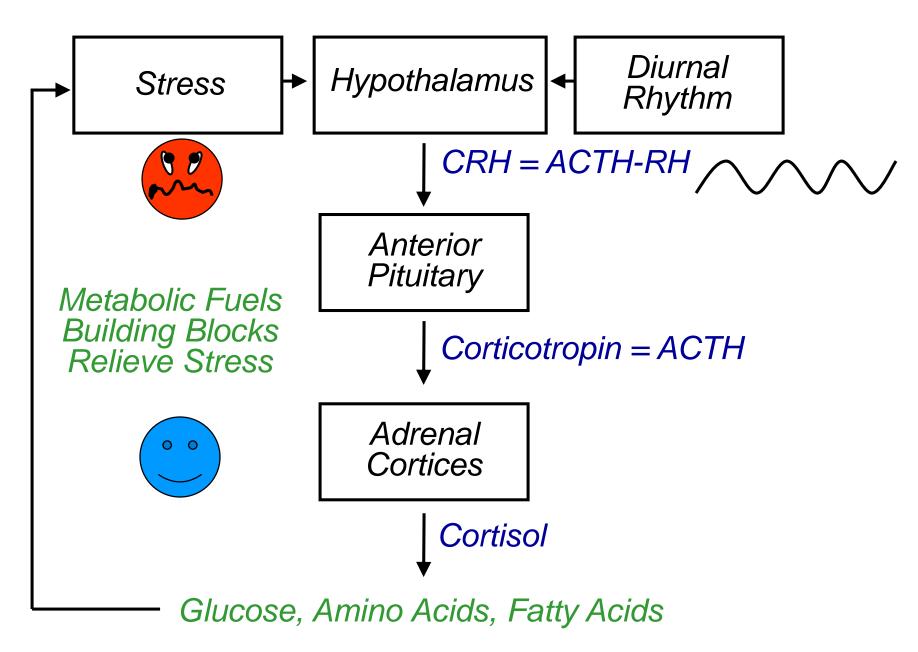




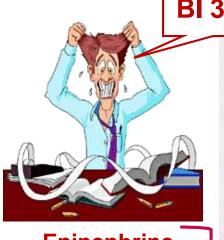
FIGURE 13-12 Adrenal Gland The adrenal glands sit atop the kidney and consist of an outer zone of cells, the adrenal cortex, which produces a variety of steroid hormones, and an inner zone, the adrenal medulla. The adrenal medulla produces adrenalin and noradrenalin.

DC 2003





SOURCE: Modified after D Chiras 2003

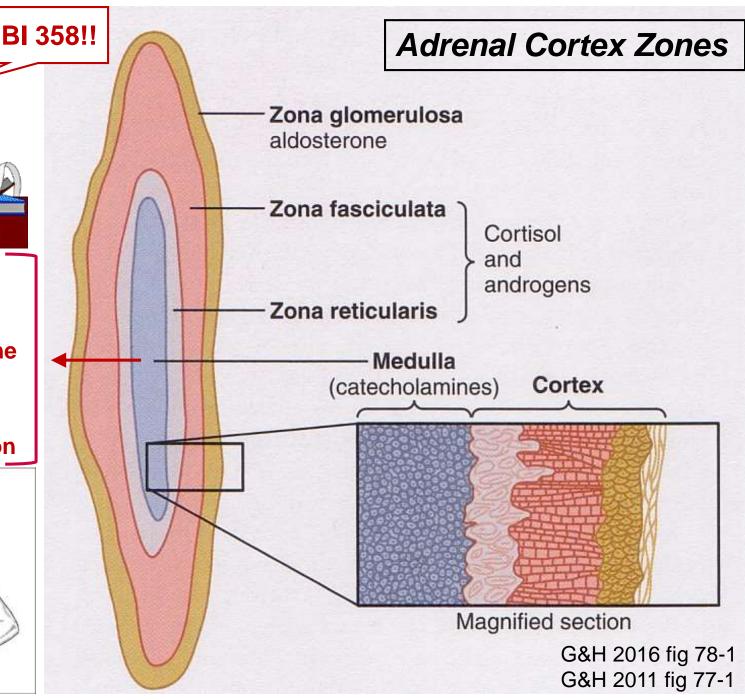


Epinephrine 80%

Norepinephrine 20%

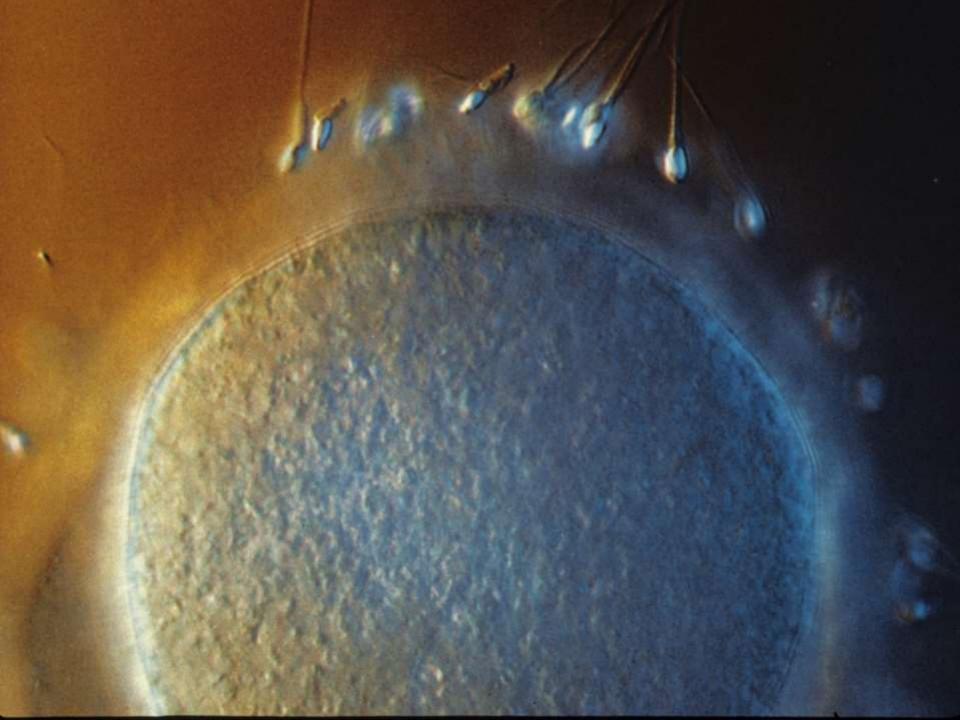
Fight/Flight Alarm Reaction





Questions + Discussion





Biomedicine

Sex allergy: No laughing matter

The phrase "Not tonight, dear" may be a deadly serious matter for women who suffer from an allergy to their husband's seminal fluid, the liquid that carries sperm. In rare cases, such an allergic response can cause death.

The first case of an allergy to human seminal fluid was documented in 1958. Since then, the disorder has been diagnosed in a small number of cases. However, allergists believe the disorder is not readily recognized by gynecologists.

Some women with this condition report a dramatic, wholebody reaction to seminal fluid. Their symptoms include wheezing, vomiting, diarrhea, unconsciousness, or complete circulatory collapse. Other women experience a localized reaction, such as vaginal burning or swelling.

Researcher Jonathan A. Bernstein of the University of Cincinnati College of Medicine and his colleagues decided to study the prevalence of the disorder. They administered a questionnaire to 1,073 women who had reported symptoms consistent with the allergy.

Bernstein's team found that 12 percent of the women they studied met the diagnostic criteria for an allergy to seminal fluid. This result indicates that the disorder is much more common than previously suspected. The team reports its findings in the January Annals of Allergy, Asthma, & Immunology.

Allergists can treat the condition, the researchers point out. Regular injections of purified seminal proteins can prevent the relationship-stopping symptoms, says Bernstein. — K.F.



Semen? G&H 2016 p 1024
G&H 2011 p 976

~60% seminal vesicle fluid mucoid, PGE₂, fructose,
fibrinogen
~30% prostatic fluid NaHCO₃, clotting enzyme,
Ca²⁺, profibrinolysin
~10% sperm + vas deferens fluid

Mom's eggs execute Dad's mitochondria

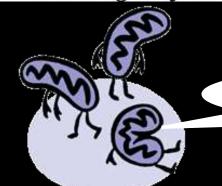
In "Hamlet," Rosencrantz and Guildenstern deliver a letter to the rulers of England that carries the ill-fated duo's own death sentence. Perhaps Shakespeare knew a bit about reproductive biology.

Scientists have now found that during a sperm's creation, its mitochondria—energy-producing units that power all cells—acquire molecular tags that mark them for destruction once the sperm fertilizes an egg. This death sentence, a protein called ubiquitin, may explain why mammals inherit the DNA within mitochondria only from their mothers, a biological curiosity geneticists have used to trace human evolution (SN: 2/6/99, p. 88). The finding may also have implications

species mitochondrial inheritance. Sperm mitochondria sometimes avoid destruction when two different species of mice mate, and Schatten's team has shown this also holds true in cattle. It's hard to understand how an egg distinguishes between paternal mitochondria of closely related species, says Schon.

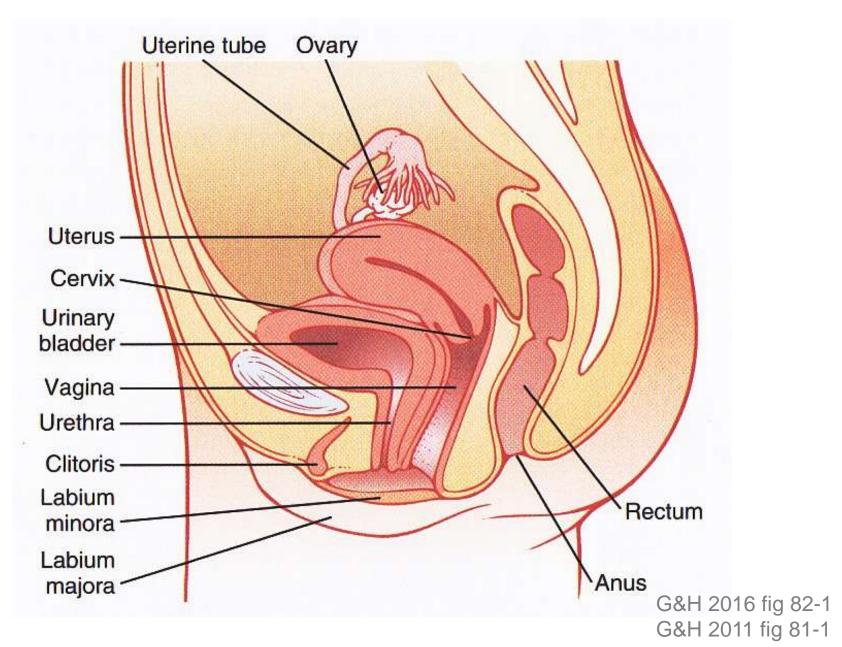
When paternal mitochondria escape destruction in normal mating, the resulting embryo may suffer. Schatten notes that a colleague has found sperm mitochondria in some defective embryos from infertility clinics.

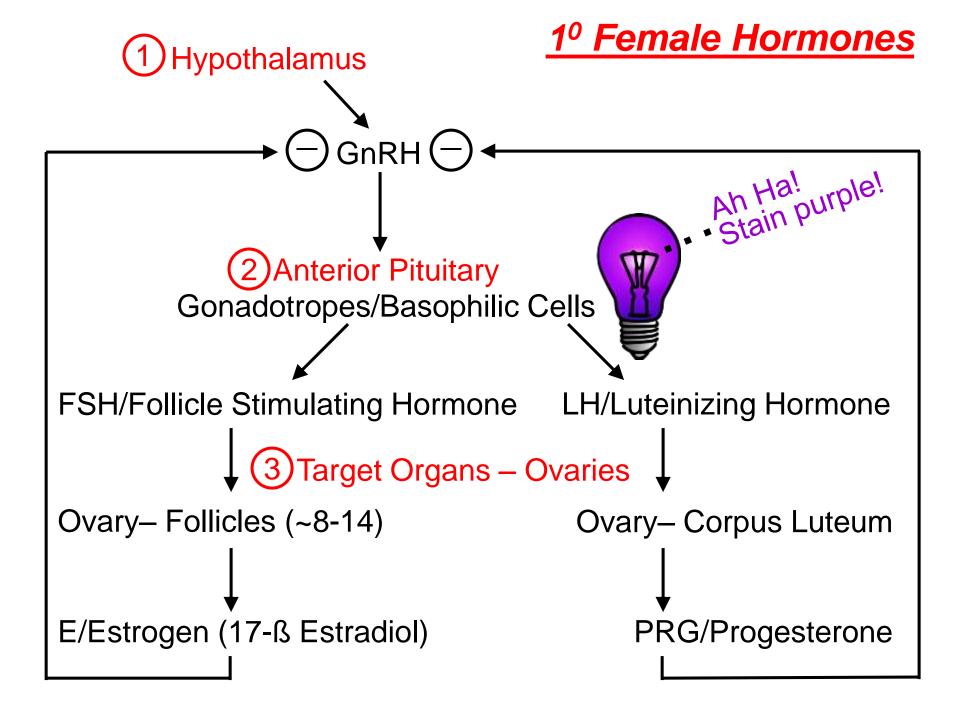
The success of cloning may depend on an egg's ability to destroy foreign mitochondria. In the technique used to create



May Day! May Day! We're doomed!!

Female Reproductive System





What Do Estrogen & Progesterone Do?

Estrogen – E

Growth & Development of:

- Ovaries, fallopian tubes, uterus, vagina, external genitalia
- 2. <u>Breasts</u> stroma, ductile systems, adipocytes

3. <u>Skeleton</u> → osteoblastic activity

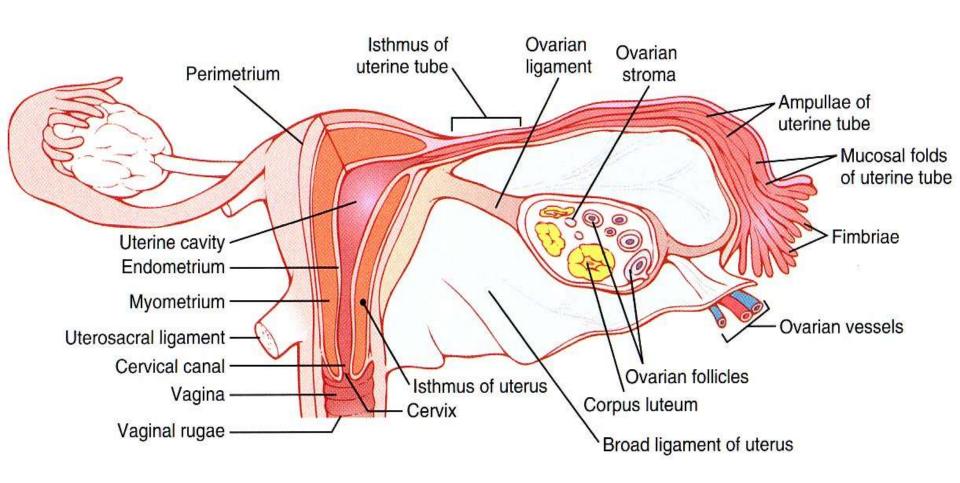
activity

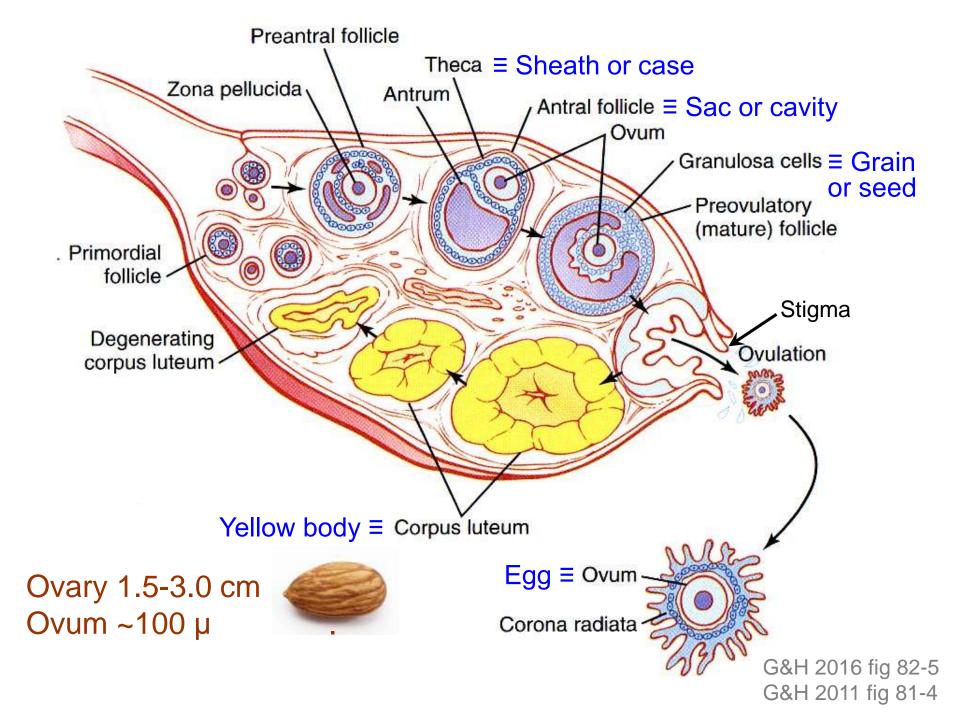
<u>Progesterone</u> – PRG

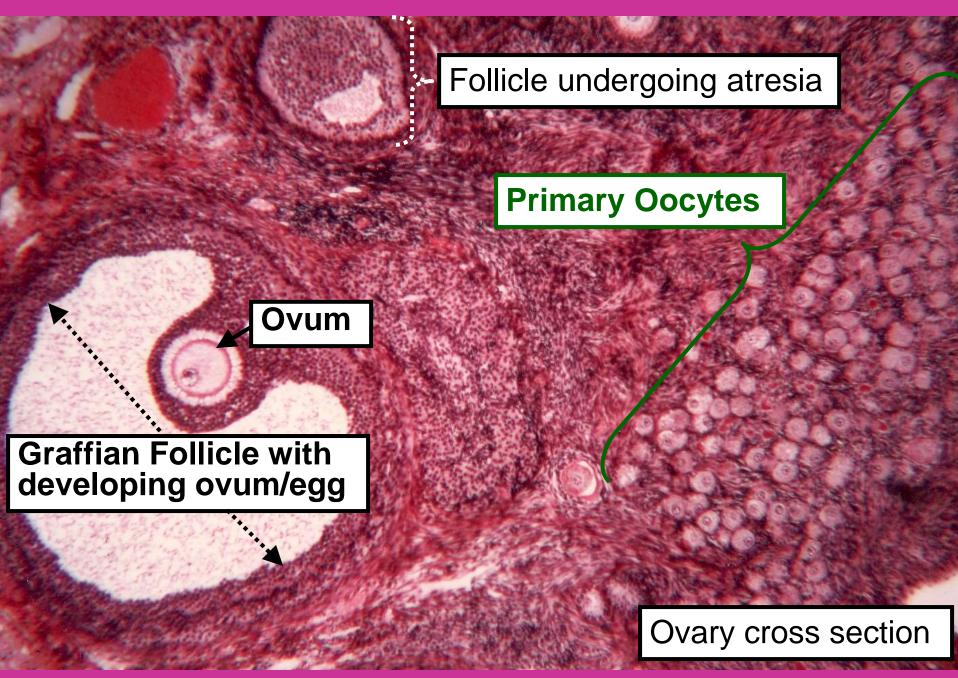
Promotes Progestation!

- Uterus: endometrium Secretory Δ during last ½ of monthly cycle
- 2. Breasts: 1 lobules & alveoli
- 4. <u>Hypothalamus</u>: †body temp ~ 0.5 °F

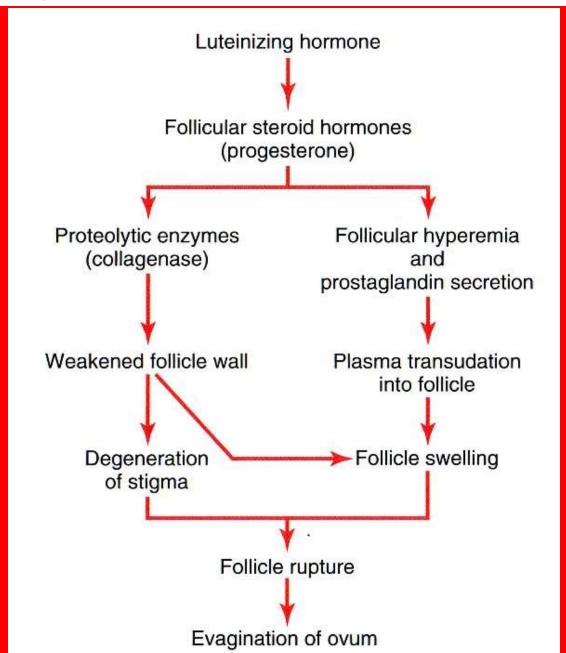
Uterus, Ovary & Uterine/Fallopian Tube



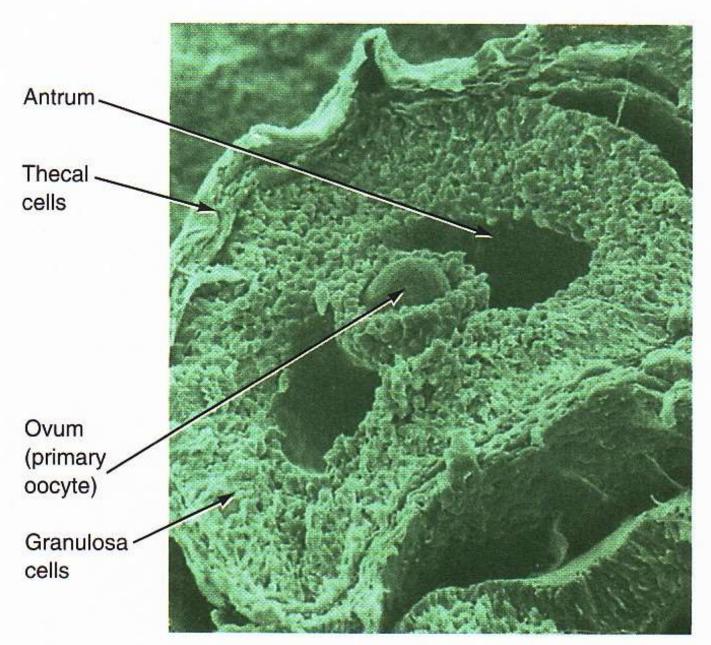




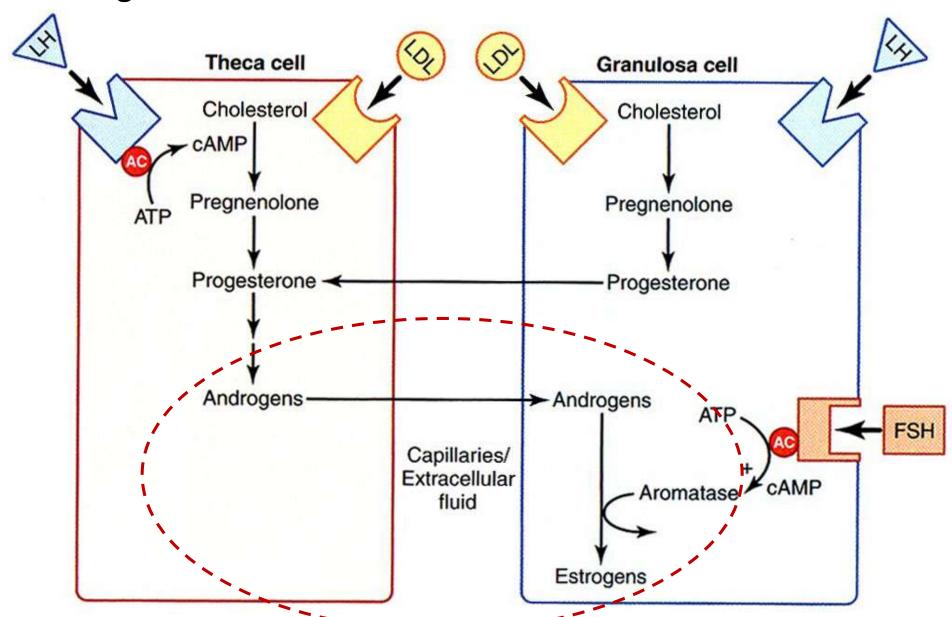
Proposed Ovulation Mechanism



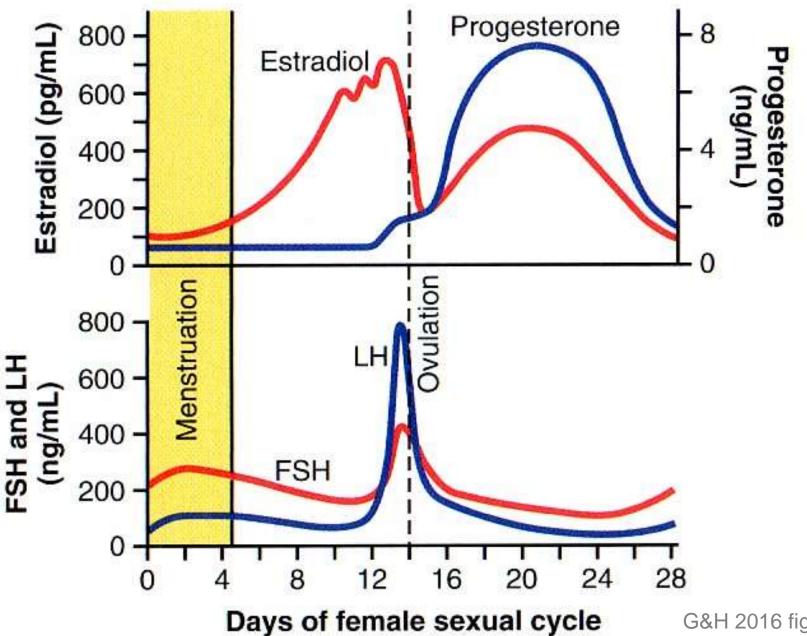
G&H 2016 fig 82-6 G&H 2011 fig 81-5



Estrogen Production: Theca & Granulosa Cell Interaction



G&H 2011 fig 81-7



G&H 2016 fig 82-4 G&H 2011 fig 81-3

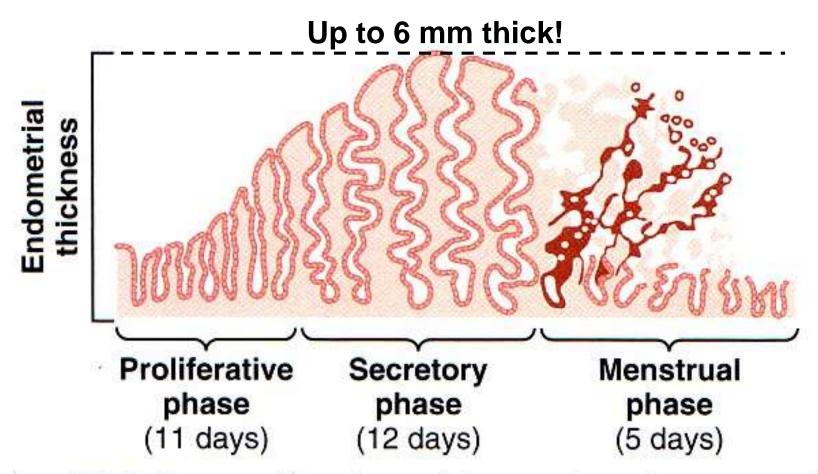
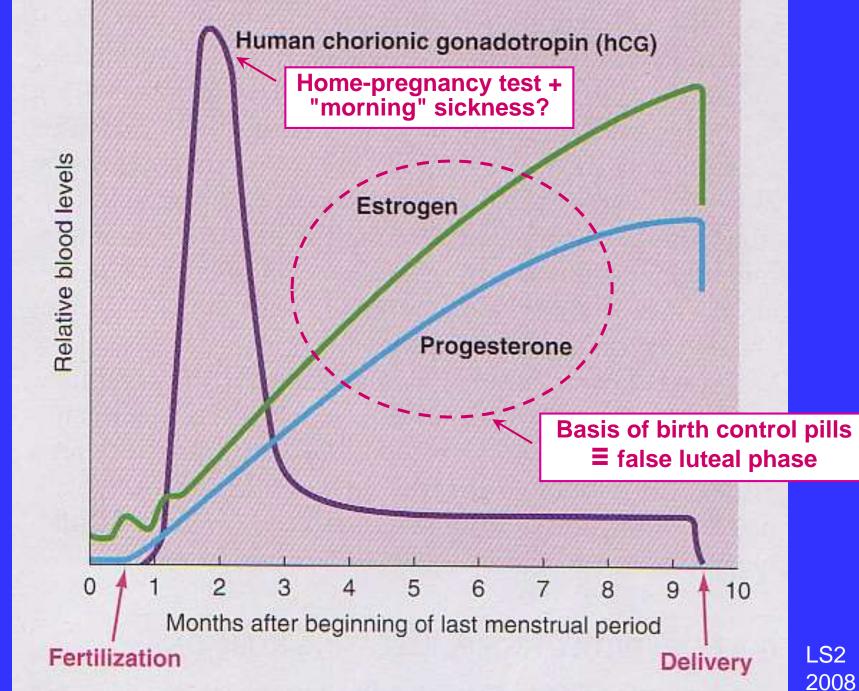
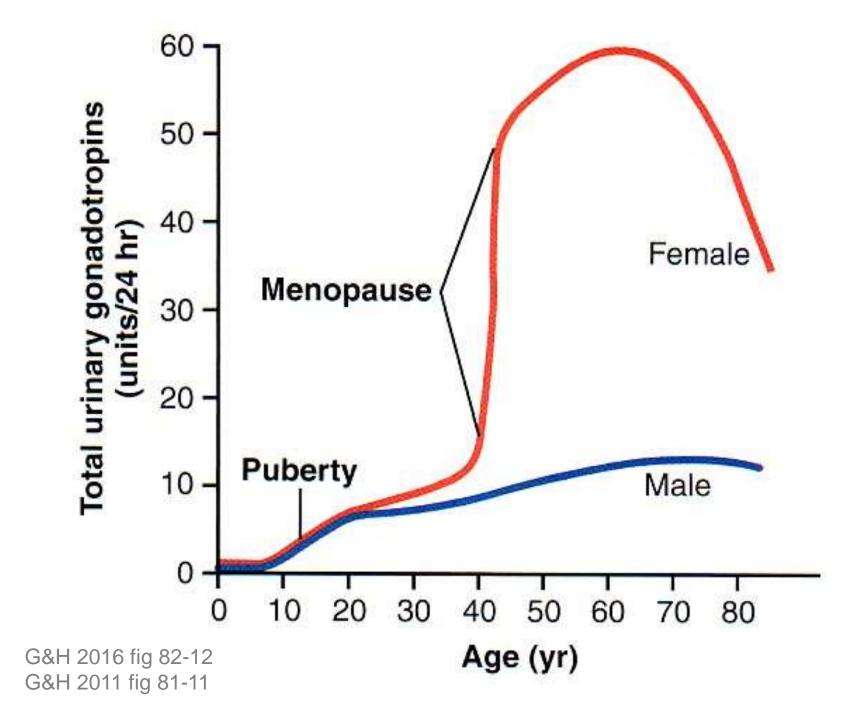


Figure 81-8 Phases of endometrial growth and menstruation during each monthly female sexual cycle.





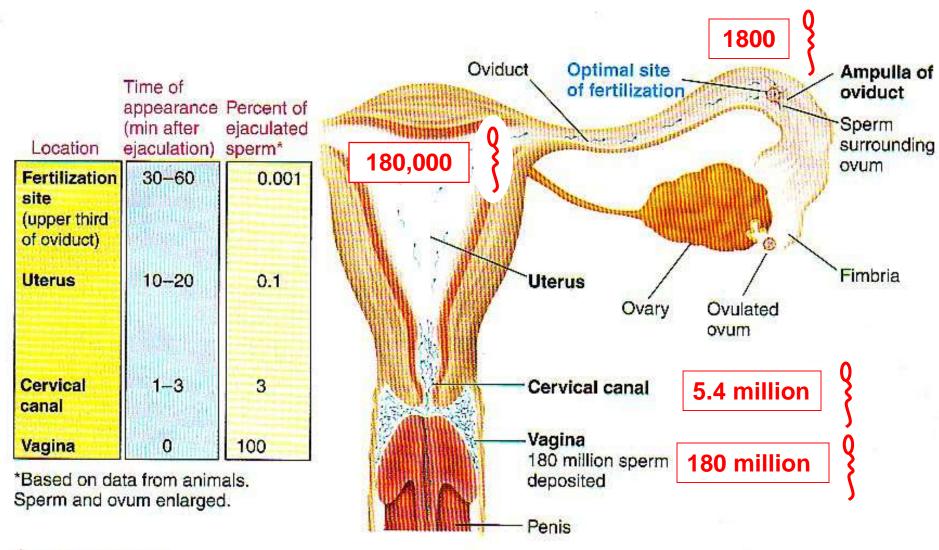


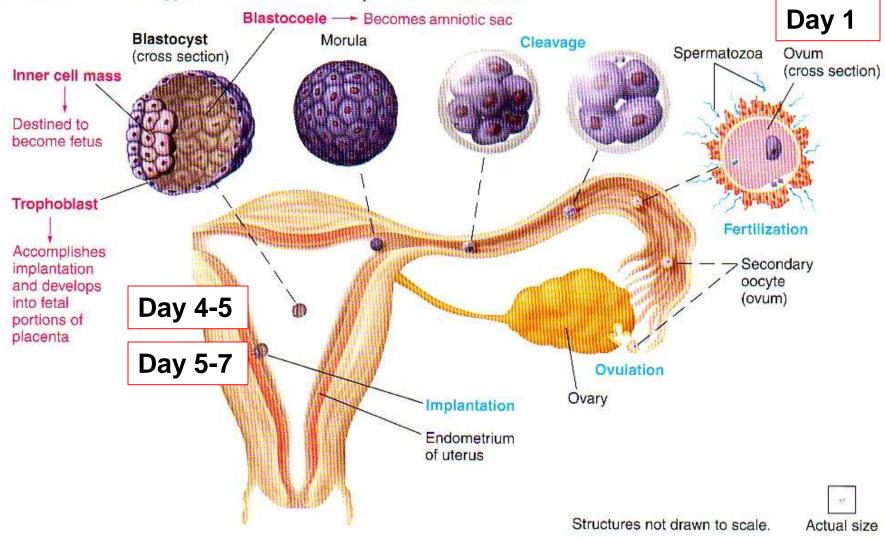
FIGURE 20-20

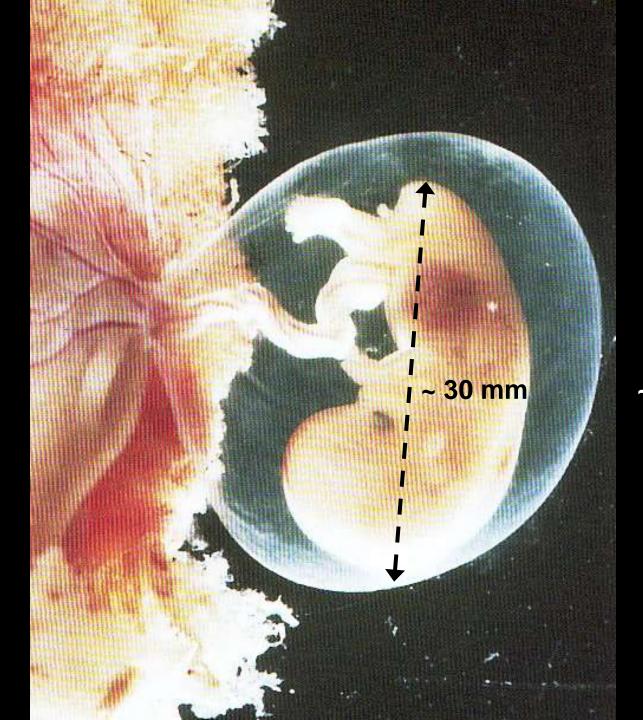
Ovum and sperm transport to the site of fertilization

FIGURE 20-23

Early stages of development from fertilization to implantation

Note that the fertilized ovum progressively divides and differentiates into a blastocyst as it moves from the site of fertilization in the upper oviduct to the site of implantation in the uterus.





~ 56 days

Abstinence works best!

Average Failure Rate of Various Contraceptive Techniques

0 0

Contraceptive Method

Yikes!

Natural (rhythm) methods

Coitus interruptus

None

Chemical contraceptives

Barrier methods

Oral contraceptives

Implanted contraceptives

Intrauterine device













Average Failure Rate (annual pregnancies/ 100 women)

90

20 - 30

23

20

10-15, 20!

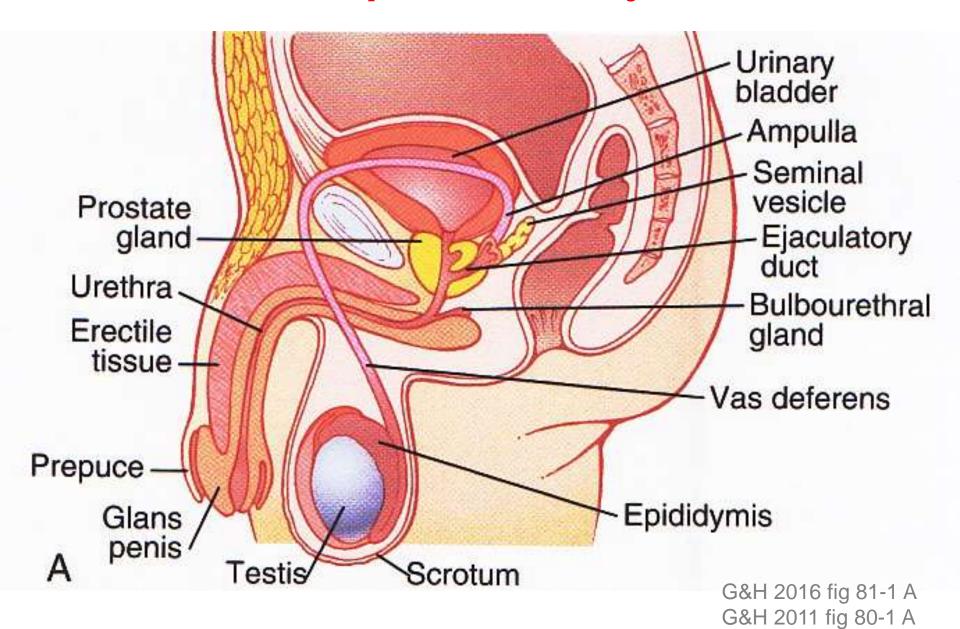


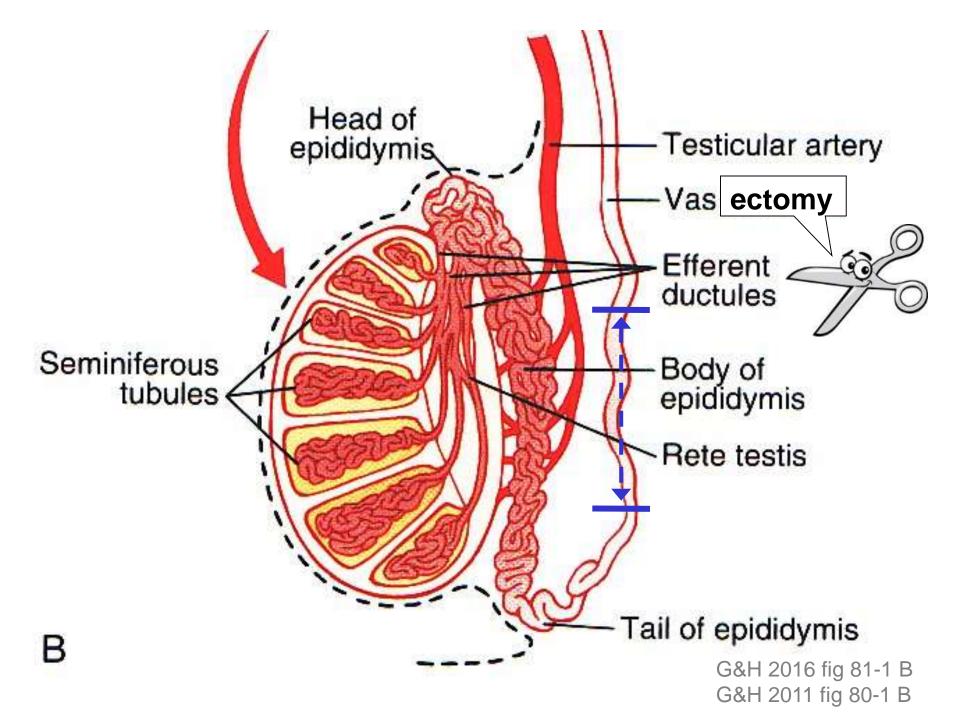
Important Facts

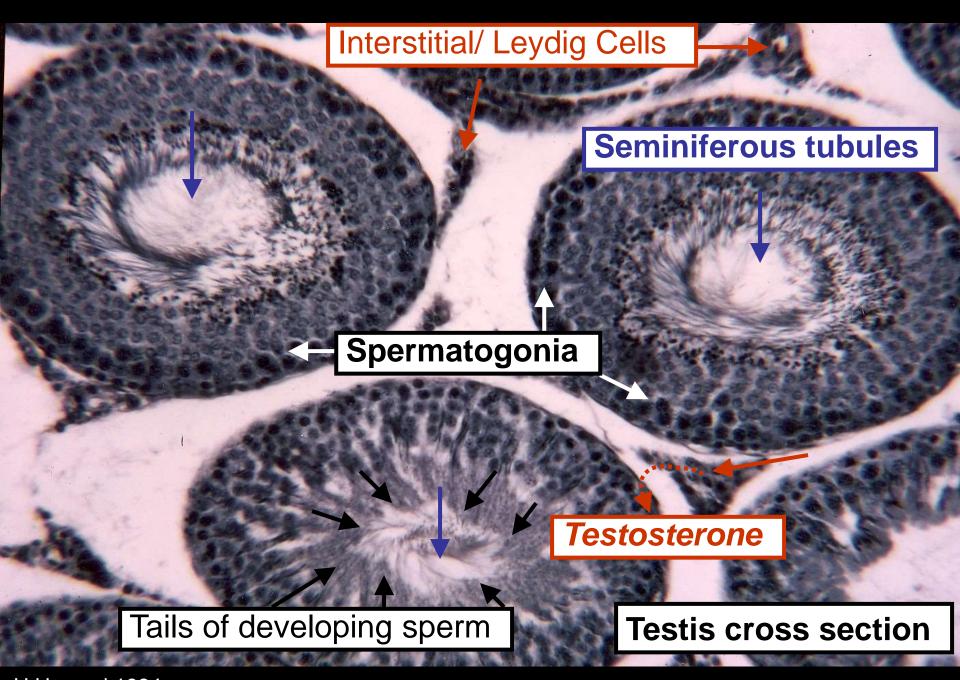
- 4 Million births in the US per yr
- 200 abortions per 1000 live births /
- 638,169 legal abortions reported in 2015
- Sperm survive for 48 hr to 5 d in female reproductive tract
- Eggs start to disintegrate 12-24 hr > ovulation
- Ovulation varies & may be tough to predict...

<u>http://www.cdc.gov/nchs/fastats/births.htm</u>
<u>https://www.cdc.gov/mmwr/volumes/67/ss/ss6713a1.htm</u>
<u>http://www.who.int/reproductivehealth/en/</u>
<u>https://kinseyinstitute.org/research/index.php</u>

Male Reproductive System







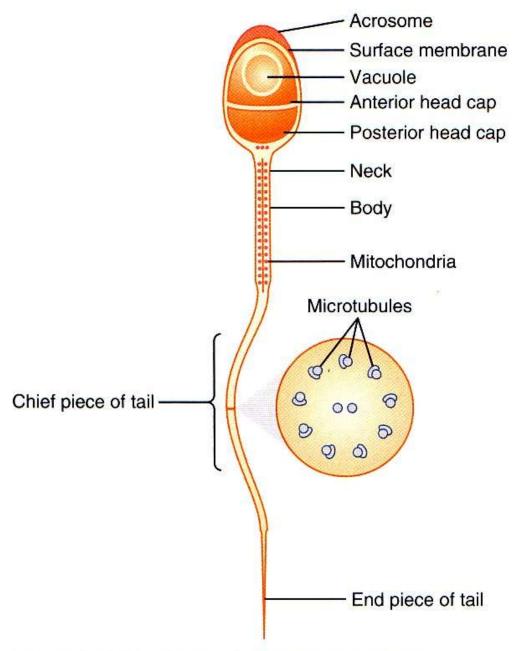


Figure 80-4 Structure of the human spermatozoon.

G&H 2016 fig 81-4 G&H 2011 fig 80-4

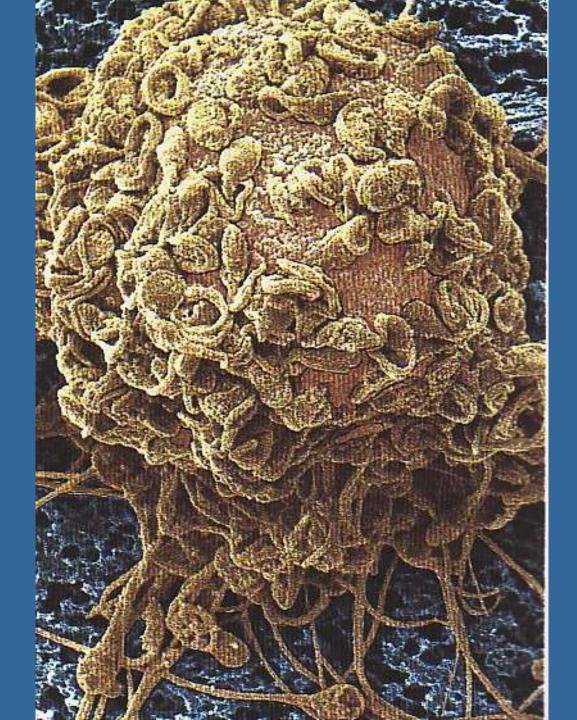






Figure 80-5 Abnormal infertile sperm, compared with a normal Sperm on the right.

G&H 2016 fig 81-5 G&H 2011 fig 80-5

