I. Sex and Society
   • Jane Goodall’s observations of chimps in Tanzania = sex is a major binding force in their social life
   • Females use their sexual attractiveness to build alliances with high-ranking males

II. Advertising Availability
   • When a female chimp nears the fertile part of her cycle,
   • The change is induced by hormones

III. An Orchestra of Hormones
   • Hormones influence the growth, development, and reproductive cycles of nearly all animals
   • They influence behavior, physical appearance, and well-being

IV. Hormones
   • Secreted by endocrine glands, endocrine cells, and certain neurons
   • Animal hormones travel through the bloodstream to nonadjacent target cells
   • Other signaling mechanisms:

V. Endocrine System - Main Sources
   • Pituitary gland
   • Adrenal glands
   • Thyroid gland
   • Parathyroid glands
   • Pineal gland
   • Thymus gland

VI. Responses to Hormones Vary
   • Different hormones activate different responses in the same target cell
   • Not all types of cells respond to a particular hormone

VII. Two Main Hormone Types
   • Steroid hormones:
   • Peptide hormones

VIII. Steroid Hormones

IX. Protein Hormone
   • Hormone binds to a receptor at cell surface
   • Binding triggers a change in activity of enzymes inside the cell

X. The Hypothalamus
XI. Pituitary Gland
   • Pea-size gland at base of hypothalamus
   • Two lobes
     – Posterior lobe stores and secretes hormones that were synthesized in the hypothalamus
     – Anterior lobe produces and secretes its own hormones

XII. Normal Hormone Production
   • Generally, the body produces only very small amounts of hormones
   • To isolate 1 milligram of TRH, researchers dissected 7 metric tons of hypothalamic tissue

XIII. Feedback Control of Ovaries
   • Pituitary produces hormones (LH, FSH) that stimulate egg maturation and ovulation in the ovary
   • They also stimulate ovary to produce progesterone and estrogen
   • After ovulation, rising levels of these hormones inhibit further secretion of LH and FSH

XIV. Control of Glucose Metabolism

XV. Diabetes Mellitus
   • Disease in which excess glucose accumulates in blood, then urine
   • Effects include:

XVI. Two Types of Diabetes

XVII. The Pineal Gland
   • Photosensitive gland embedded in brain
   • In the absence of light
   • Controls seasonal
   • Affects the human
   • May also play a role in

XVIII. Deformed Frogs
   • The number of deformed frogs is increasing worldwide
   • One factor may be water pollutants that interfere with thyroid function
   • In one study, frogs from polluted water developed normally when they were given

XIX. Control of Molting
   • In arthropods, molting is controlled by the steroid hormone ecdysone
   • In crustaceans, molting glands produce and store this hormone
   • Hormone-secreting neurons control its release
   • The neurons respond to environmental cues

XX. Male Reproductive System
XXI. Cells in Seminiferous Tubules of Testis
   • Spermatocytes - undergo meiosis to form sperm
   • Sertoli cells =
   • Leydig cells =

XXII. Semen = Sperm + Secretions
   Epididymis - 7 m long (takes 2 weeks for sperm to travel along its length)
   Vas Deferens - contains smooth muscle which propels semen
   Seminal vesicle - seminal fluid - 60% of semen volume
   Prostate gland - produces 30% of semen volume
   Bulbourethral gland
   Semen -

XXIII. Female Reproductive System
   Oogenesis - occurs in ovaries
   Ovulation - occurs in ovaries (once a month)
   Fertilization - occurs in Fallopian Tubes (= oviduct)
   Implantation of embryo - occurs in endometrium of uterus; defines the beginning of a pregnancy.
   Cervix - entrance into uterus
   Vaginal Canal - Birth canal; menstrual fluid; semen insertion

XXIV. Ovarian Cycle - Oogenesis

XXV. Oocytes Arrested in Meiosis I
   • Girls are born with primary oocytes already in ovaries
   • Each oocyte has entered meiosis I and has stopped
   • Meiosis I resumes, one oocyte at a time, with each menstrual cycle
   • Meiosis II is not completed unless fertilization has occurred

XXVI. Fertilization = Conception
   • Sperm penetrates egg cytoplasm (enzymes in acrosome allow sperm to get through follicle cells to egg)
   • Secondary oocyte undergoes meiosis II to form mature oocyte (egg)
   • Egg and sperm cell membranes fuse allowing sperm DNA to move into egg cytoplasm.
   • Egg and sperm DNA start functioning together (in zygote) and then go through mitosis (= cleavage)

XXVII. Pregnancy = Implantation of Embryo in Uterine Wall
   • Two weeks after fertilization, blastocyst forms and embeds in uterine wall
   • Avg. 38 weeks from fertilization to birth

XXVIII. How do Hormones Control Production of Gametes and Maintenance of Pregnancy?
   • Male Hormones - Brain and Testis
   • Female Hormones - Brain, Ovary, Uterus

XXIX. Menstrual Cycle Overview

XXX. Birth Control Options:
XXXI. Human Chorionic Gonadotropin (HCG)

- Hormone secreted by the blastocyst (=embryonic tissues)
- Stimulates corpus luteum to keep making progesterone and estrogens, which maintains endometrium
- Can be detected by week 3 with a home pregnancy test

XXXII. How to Prevent Pregnancy

Prevent ovulation via hormonal manipulation:
- "The Pill,”
  - withdraw one week per month to induce menstruation (so implantation is possible
  - also prescribed to regulate cycle and prevent endometriosis
  - Ineffective when paired with antibiotics
- Norplant (implant),
- DepoProvera (injection - contains estrogen and progesterone, which prevents LH surge)
- These are reversible

Prevent fertilization:
- Abstinence - the only 100% effective method for preventing pregnancy
- Tubal ligation - tie off Fallopian tubes OR Vasectomy - tie off vas deferens - BOTH are largely permanent
- Barrier methods (condom, diaphragm, cervical cap, cervical sponge) - prevent sperm from reaching egg. (>90% effective if used properly and consistently)
- Spermicide - kill sperm that are ejaculated (chemical)
- Withdraw - remove penis before ejaculation (risky, ineffective)
- Rhythm Method - depends on knowledge of menstrual cycle (risky, ineffective)

Prevent implantation:
- Intrauterine device (IUD) =

Induce Breakdown of Endometrium =

XXXIV. Pregnancy Termination

XXXV. Birth Success

XXXVI. In Vitro Fertilization

- = Conception outside the body ("test tube baby")
- Woman receives hormone injections to stimulate ovulation of more than one oocyte (increase chances of successful fertilization
- Male provides sperm
- Oocyte is removed using a needle and combined with sperm in petri dish for fertilization to occur
- After fertilization and a few divisions, ball of cells is implanted in uterus (or frozen for future use)

XXXVII. Sexually Transmitted Diseases (STDs)

- Worldwide epidemic of STDs
- Women are most affected
- Can cause infertility, pain, and even death

XXXVIII. Causative Agents of STDs

- Viruses
- Bacteria