Sexual Development

Body
Brain
Disorders
Variations

Sexual Development of the Body

___________________ development

XY = male
XX = female

Prenatal stages of development

Development of ___________________

Development of internal organs

Development of ___________________

Pubertal development

Prenatal stages of development

Up until 6 weeks of development, no sexual ________________ has occurred
- Ovaries and testes are both able to develop

At 6 weeks, Sex-determining region of the ________________ (SRY) becomes active
- Produces ______________________________________
- Causes the development of male genitalia

Without expression of the SRY gene, _______________________

If the SRY gene is inserted into female mice,

____________________________

Stage 2: internal organ development

Prior to 3 months of development
- All fetuses have a male Wolffian system and a female Mullerian system
- In males, the Wolffian system will develop into

____________________________

- In females, the Mullerian system will develop into

____________________________

What happens to the non-developed system?

In males, the testes secrete hormones
Degenerates the Mullerian system
In females, the ovaries do nothing prenatally of the Wolffian system remain for the entire life of the female

Main trend of sexual development
The development of a female is considered the

Without extra hormones changing development, a will develop: steroid hormones that change development toward a more masculine system

Development of external genitalia
Male: ____________________________
Female: ____________________________, outer part of the vagina
In females, this occurs automatically, with no activity from the ovaries
Males require 5-alpha-dihydrotestosterone
    Product of testosterone and 5-alpha-reductase
    Without it, ____________________________

Pubertal Development
Secondary sexual characteristics develop
    Male: ____________________________________________

    Female: ____________________________________________

Puberty
Gonadotropin-releasing hormone (GnRH)
    Released by ____________________________ at onset of

    Causes the release of two more hormones
        ____________________________ (FSH)
        ____________________________ (LH)

Pubertal Development
FSH and LH cause more production of ___________________________ (in males) and ___________________________ (in females)

**Disorders of Sexual Development**

**Genetic Stage**

____________________________

XO chromosomes

____________________________

XXY chromosomes

Male: require hormone therapy to stop female characteristics from showing

**Disorders of Sexual Development**

**Internal Development Stage**

____________________________

Chromosomes: XY

____________________________: develops externally as a female

Anti-Mullerian Hormone prevents internal female system from forming

**Disorders of Sexual Development**

**External Development Stage**

____________________________

Female exposed to excess androgens prenatally

Born with ambiguous external genitalia

**Disorders of sexual development**

5 alpha reductase deficiency

Males born with

____________________________

At puberty, the high levels of testosterone cause development of male genitalia

**So… gender differences in sexual development exist**

Are there differences between the genders in the development of the brain?

____________________________

Are there differences between the way male and female brains develop sexually?
Pfeiffer (1936) Observed that ____________________________in neonatal female rats blocked ovulation

Attributed this difference to hormones
Concluded that there are ____________________________between males and females
Since the ____________________________releases the hormones, males and females must have different pituitary glands

So, is the pituitary gland where sexual differences exist?
A later study transplanted adult male rat pituitary glands into ____________________________

Found that ovulation ____________________________
Both male and female pituitary glands are capable of producing the same hormones
The difference between genders must be in the ____________________________to the pituitary gland

More Animal Studies
Castrated adult male rats
____________________________: even if a female system is implanted surgically
Castrated baby male rats
____________________________ if a female system is implanted surgically
Testosterone treatment in adult females
____________________________
Able to be overcome with ____________________________ of the brain
Testosterone treatment in baby females
____________________________
____________________________ can reverse the effects

Differentiation effects behavior
____________________________
Female animals arch spine when touched on the back to aid in copulation
Male animals mount other animals to aid in copulation in baby male rats.
Leads to a suppression of mounting behaviors and an increase in lordosis behaviors.
Exposure of female baby rats to ____________________________
Leads to a suppression of lordosis behaviors and an increase in mounting behaviors.

**Structural Sexual Differences**
Sexually dimorphic nucleus of the preoptic area of the hypothalamus ____________________________ in males.
Male cortex is thicker in the ____________________________
Greater asymmetry in the male than in the female.

**Sexual Differentiation of the brain**
_____________________________seems to be the key
It’s role seems to be related to estrogen
What role does estrogen play in the developing brains?

**Estrogen**
Estrogen levels are high in ____________________________ newborns.
Why does the male brain become masculinized and the female brain not?
Females and males have a protein that binds to estrogen and stops it from crossing the
______________________________

**So how does estrogen effect the brain?**
______________________________cannot cross into the brain
______________________________CAN
Males have a lot more testosterone than females
Testosterone crosses into the brain and gets changed into
g____________
Maculins the brain.

**What is the effect of estrogen?**
Estrogen levels may play a role in the ____________________________
between male and female sexually dimorphic nuclei of the preoptic areas
It may prevent ____________________________

**In Hyenas**
Mother’s ____________________________ are allowed to pass the placenta
Results in a ____________________________ of the clitoris

**Gender Differences**
Have been found in many areas
- Regulation of ____________________________
- Social behaviors
  - Aggression

**Differences in performance**
- Males seem to have higher abilities
- Females seem to have high linguistic abilities
  - of function
    - Males seem to have stronger lateralization of function than females
    - Females use ____________________________ more often

**Sexual Hormones and Sexual Behavior**
Main hormone centers

**Hypothalamus**
Controls ____________________________ through the release of
Gonadotropin Releasing Hormone (GnRH)
- inhibits GnRH
  - Light inhibits Melatonin
  - Thus ____________________________ GnRH production
    - Responsible for the production of offspring at the “right time”
      - of the year

**What does GnRH do?**
Tells the ____________________________ to release Luteinizing Hormone (LH) and Follicle Stimulating Hormone (FSH)
- In males: LH tells the testes to ____________________________
  - FSH aids in the ____________________________
In females: FSH and LH regulate and

___________________________________

The female reproductive cycle
FSH is secreted at the beginning of the menstrual cycle
Causes the ovaries to develop
_________________________________(contain an ovum)
One follicle begins to develop more rapidly than others and
___________________________are released
________________________________prevent the other follicles from
developing

Next
Increasing ___________________________levels stimulate the release of
more LH
Increases in LH causes ____________________________
The remaining empty follicle is now called the corpus luteum
Releases _____________________________
Prevents the formation of more follicles and causes a thickening
of the uterine lining
If fertilization hasn’t occurred, progesterone levels fall and the
___________________________________

Oral Contraceptives
Some act to reduce the size of the opening of the
___________________________________, so the sperm are unable to get to the egg
Many act to not allow a fertilized egg to attach to the
___________________________________

Sexual Hormones and Female Behavior
Testosterone levels appear to moderate ____________________________
Testosterone levels appear to aid in some ____________________________
Women received their higher scores on
___________________________ when testosterone levels were
  high, and lower scores when levels were low

Sexual Hormones and Male Behavior
___________________________________appear to effect many different aspects of
behavior
Testosterone levels are higher during

____________________________

Sporting events
Single men “on the chase”

What about sex life?

____________________________levels leads to a low sex drive

Normal and high testosterone levels don’t really show a difference in __________________________

Male arousal
Triggered by a release of __________________________

Allows the penis to fill with blood and become erect

____________________________works by causing an increase in the amount of Nitrous Oxide available

A male oral contraceptive?
Administer a __________________________

Maintains the secondary sex characteristics

Unable to cross to the testes

____________________________is inhibited

Anabolic steroids
Frequently taken by athletes to become stronger

Lead to androgen levels up to ____________________________ greater than normal

Many side effects

Enlargement of __________________________

Hair loss/growth in unusual places

____________________________ in males

Some work by increasing ____________________________ levels

Some increase ____________________________ levels

Science is unsure why this seemed to work at all

Variations of sexual identity

____________________________

When one’s gender identity does not match their biological sex

____________________________

Wishes to change their gender
Believe they are “a man in a woman’s body”
Fetishes
Achieves arousal by dressing in clothes of the other gender

Other Variations of Sexual Identity

Cross dressing for the purpose of performing

Homosexuality
There is a _________________ of sexuality
Many heterosexual people engage in some _________________ at some point in their lives

Stoller and Herdt (1985)
Described a tribal culture where adolescent males were expected to _________________ until marriage to a woman
Sexual orientation of these men was predominantly heterosexual

Homosexuality: The Facts
_______________ of the male population is homosexual
_______________ of the female population
Approximately _________________ categorize themselves as bisexual

Animal studies of homosexuality
Low exposure to testosterone during a _________________ leads to a smaller sexually dimorphic nucleus of the preoptic area
    Leads to an _________________ activity in male rats
High exposure to _________________ during a critical period leads to a larger sexually dimorphic nucleus of the preoptic area
    Leads to an increase in homosexual activity in

Homosexuality: Development
Hormone levels
_______________ in homosexual women
_______________ in homosexual men
Birth order
Cantor (2002)
Found a significance in birth order for homosexuality in men
May be due to an increase in the __________________________ of the mother towards her baby
May lead to a masculinization of the __________________________, but not the __________________________

What about brain structure?
Hypothalamus area __________________________
2-3 times __________________________ in heterosexual men than in homosexual men
No difference between __________________________ and heterosexual women

Genetic issues
_________________________% correlation of homosexuality among fraternal twins
_________________________% correlation of homosexuality for identical twins
Possibly due to __________________________ genes

Environmental basis
Must be involved
The __________________________ of identical twins is 100%, but homosexuality only occurs 50% of the time
It isn’t all biological
Unsure of the environmental factors involved

Viewing of Attraction
________________________ have their own definitions of attraction
Biological mechanisms must play some role
________________________ spend more time staring at “attractive” faces than “unattractive” faces
________________________ seems to be important

Attractive Features: faces
In women
Childlike face

Wide-set eyes
May indicate a preference for youthful females

**Attractive features: faces**
In men

Prominent brows
Usually indicates higher testosterone levels
These men tend to be more quickly promoted in the military, possibly due to the perception of their ___________________________

**What about bodies?**
Men seem to focus on ___________________________ more
Preference is for waist measurements to be approx.
________________________ of their hip measurements
Highly controversial
Some researchers suggest that a __________________ is most important
Possibly because a women’s figure is more important for her reproductive fitness

**Pheromones**
Found in ants
________________________ that can transmit different signals
Alarms
________________________
________________________
Possibly in ___________________________
Highly controversial

**Love Centers in the Brain**
FMRI studies of love
Showed patients pictures of
________________________
Different areas were active
Viewing of lovers caused increases in ___________________________ (inner temporal lobe)
Basal ganglia
____________________________ (limbic lobe)