

A Physiological Perspective on the Continuum of Sexuality and Gender

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Mythical Norm



Male



Intersex



Female



Continuum of Gender

- Gender = How a person perceives themselves
 - > Gender identity
 - > Social role
- Sexuality = Biological makeup
 - > Gametes
 - > Chromosomes
- Sexual Orientation = A pattern of emotional, romantic, and/or sexual attractions

American and European Society



- ◉ Gender is a topic that has been normalized to a binary system of male or female.
- ◉ Social construction
- ◉ He/she language conventions
- ◉ Male vs. Female social roles
 - > Males are expected to play a provider role.
 - Strength, courage, ambition, intelligence, and confidence.
 - > Females are expected to play a domestic and nurturing role.
 - Vulnerable, sensitive, emotional, passive, fastidious



Gender Development

○ **Nurture:** Psychosexually neutral at birth

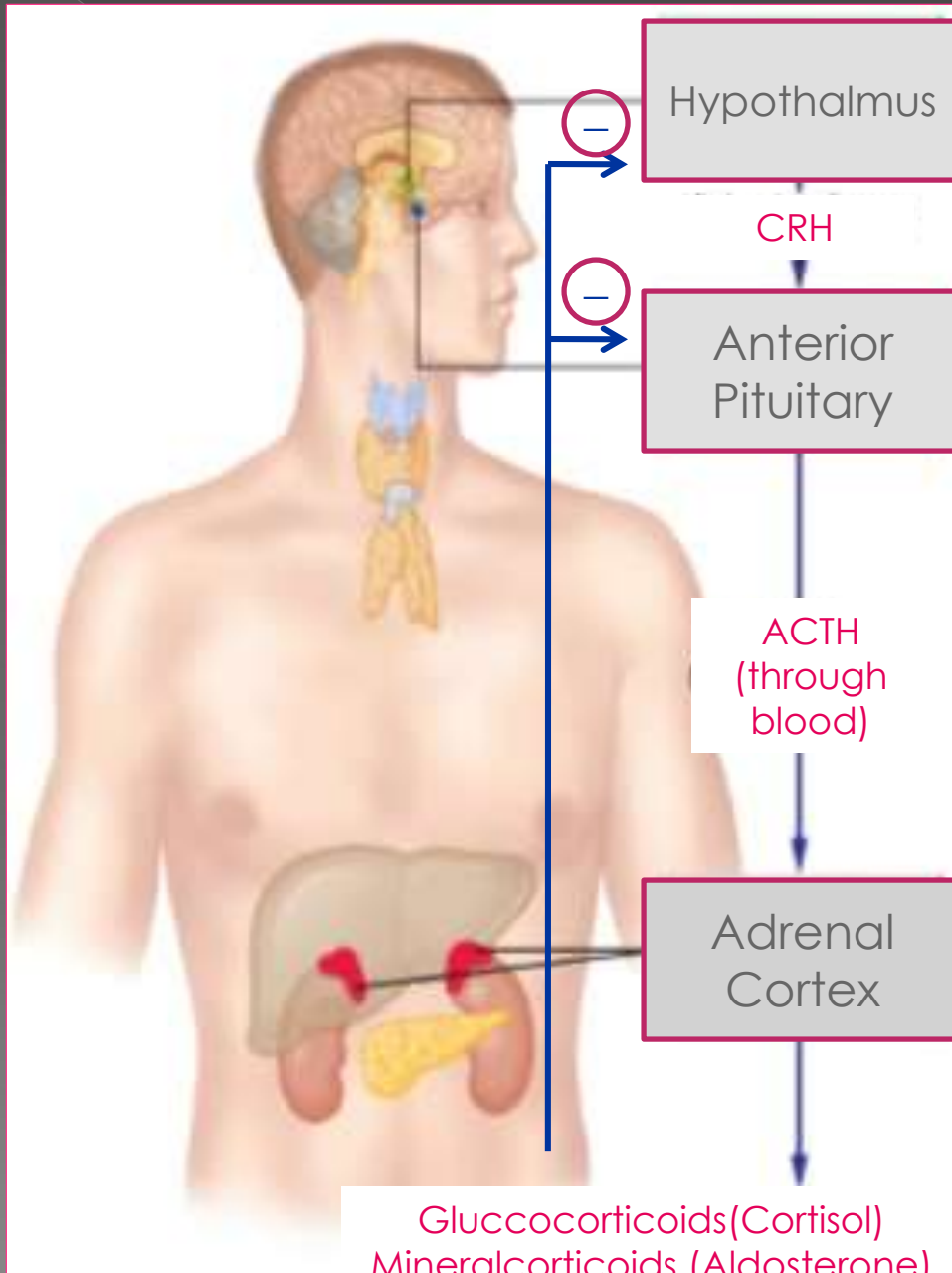
- > Personal experiences
- > Parental rearing
- > Taught



○ **Nature:** Biological determinism

- > “Wirings” of the brain
- > Receptor functionality
- > Hormonal stimulation may influence gender perception



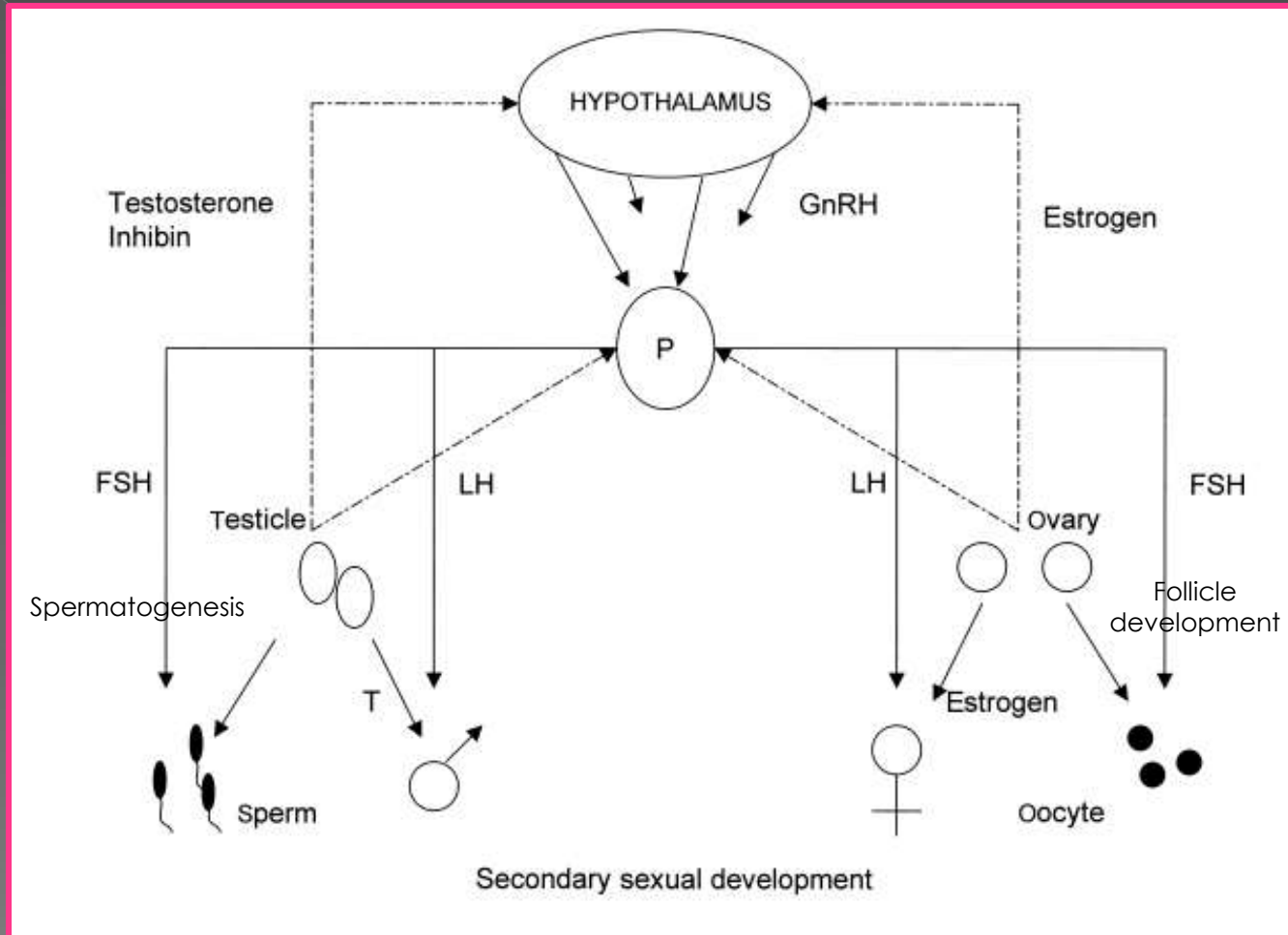


Glucocorticoids (Cortisol)
Mineralcorticoids (Aldosterone)
Sex hormones (Testosterone)

Hypothalamus Pituitary Adrenal Axis

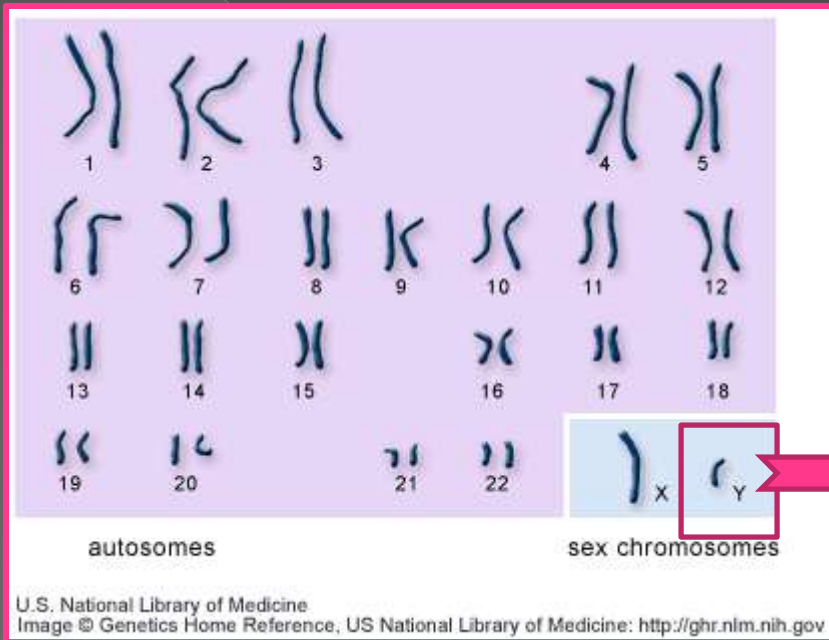
- CRH: Corticotrophin-releasing hormone
- ACTH: Adrenocorticotropin hormone
- Negative feedback maintains homeostasis

Hypothalamus Pituitary Gonad Axis

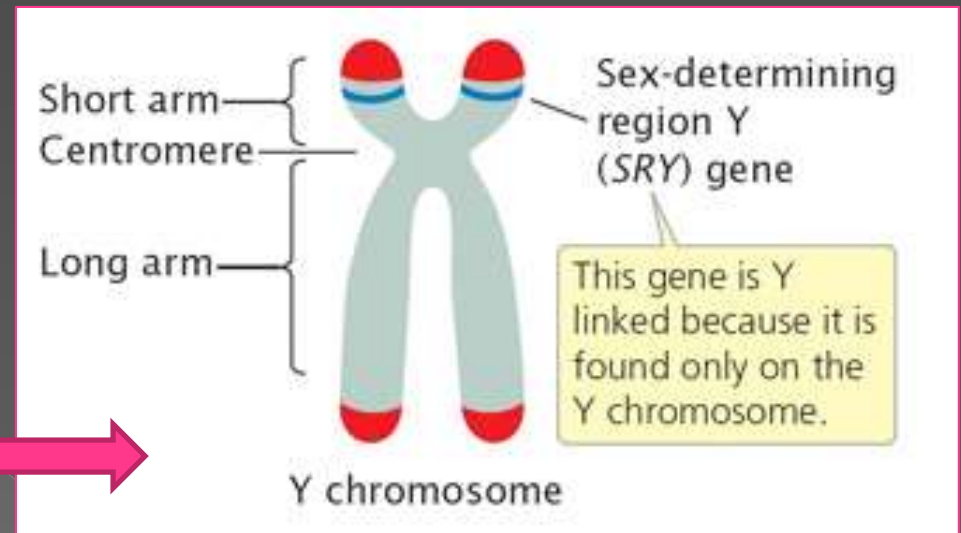


GnRH: Gonadotropin-releasing hormone
FSH: Follicle Stimulating Hormone
LH: Leutinizing hormone

Chromosomes



Human Karyotype



SRY Gene:

● Genotype:

- Genetic constitution
 - Males: XY
 - Females: XX

● Phenotype:

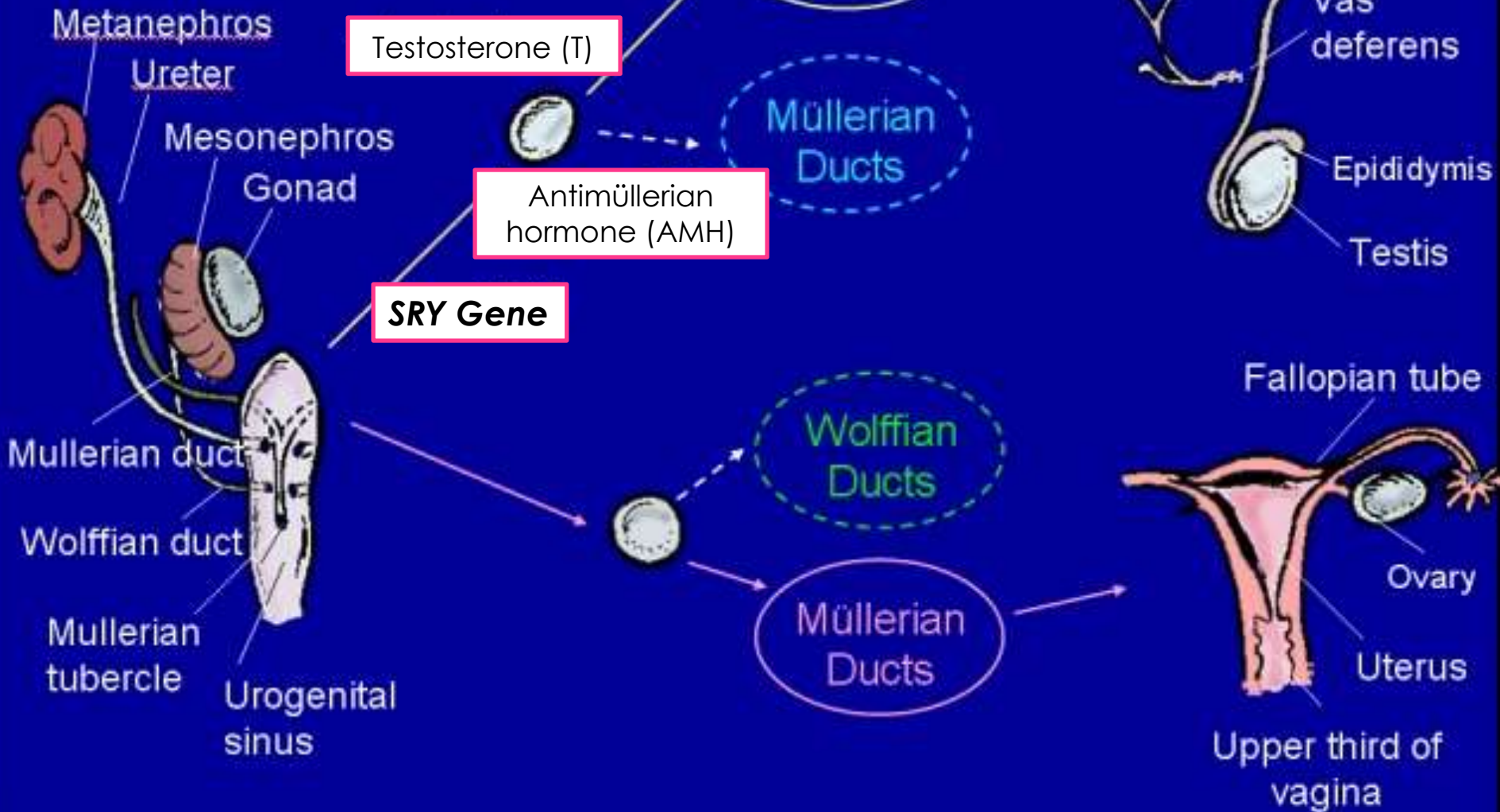
- Expressed traits

- Produces testis-determining factor

- Cell differentiation

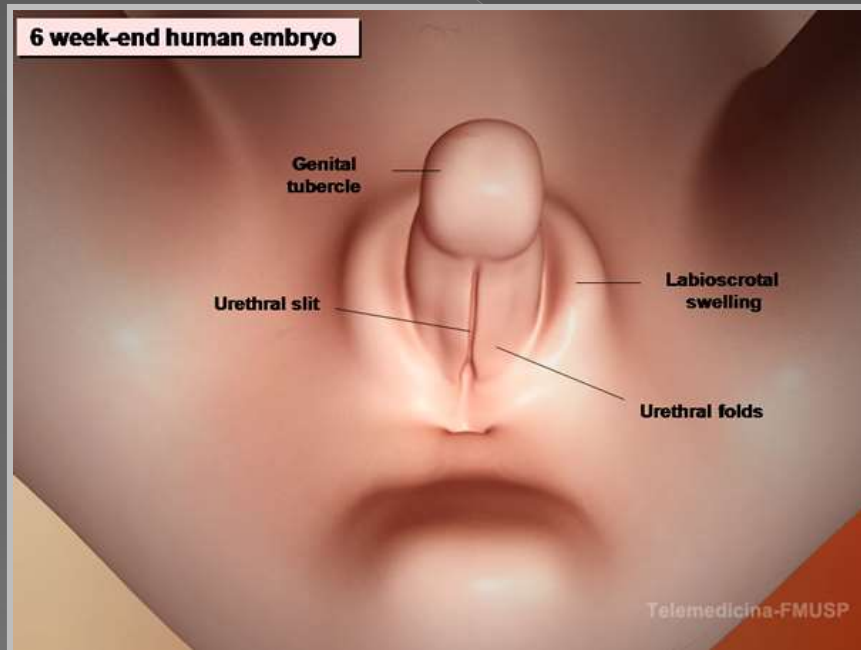
- Sertoli cells: Antimüllerian hormone (AMH)
- Leydig cells: Testosterone

Development of Male and Female Internal Genitalia



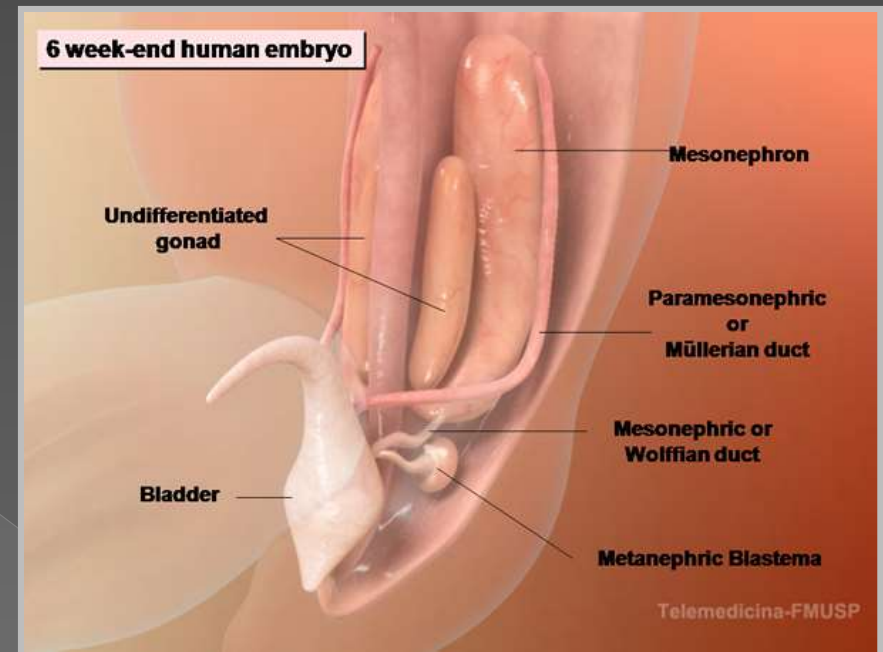
Bipotential Structures

Seen in all fetuses at 6-8 weeks of development



External Undifferentiated Structures

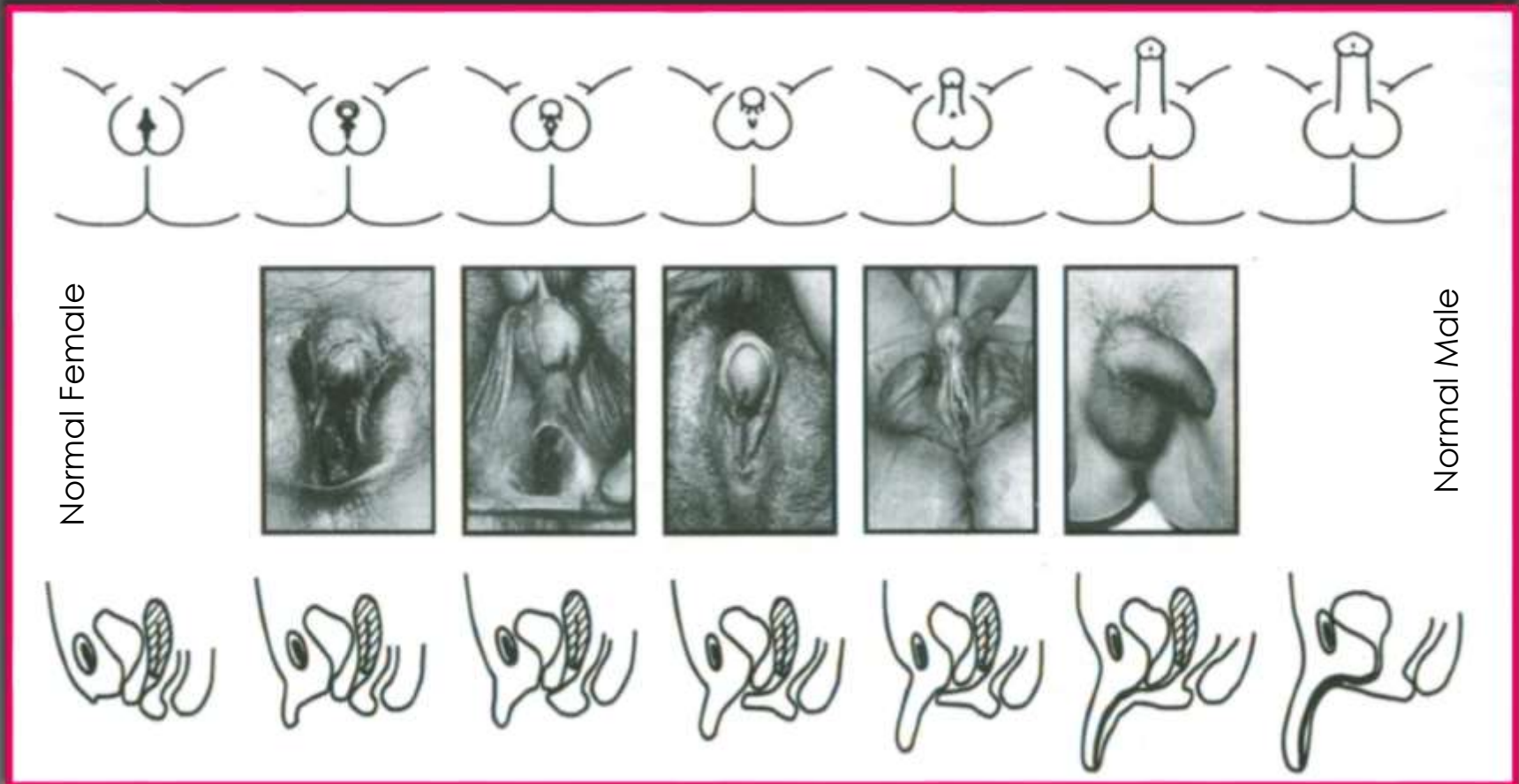
- **Genital tubercle:** Clitoris or Penis
- **Labioscrotal swellings:** Labia of the vagina or the Scrotum



Internal Undifferentiated Structures

- **Mullerian Duct:** Female fallopian tubes, uterus, and upper part of the vagina
- **Wolffian Duct:** Male vas deferens, prostate, and epididymis
- **Bipotential Gonad:** Ovaries or Testes

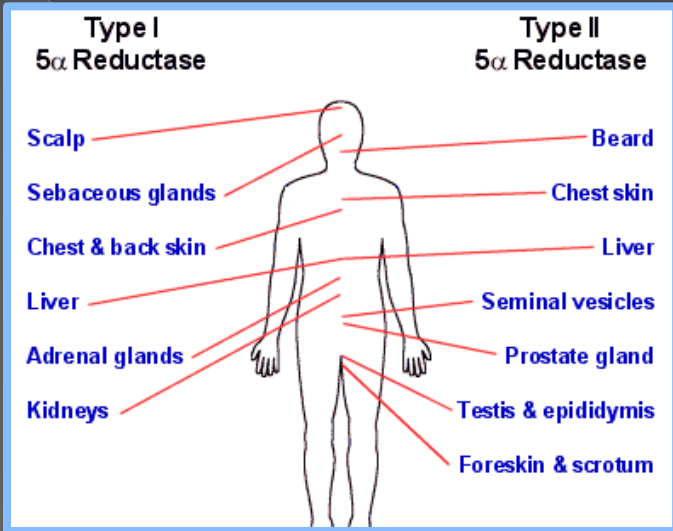
Continuum of Ambiguous External Genitalia



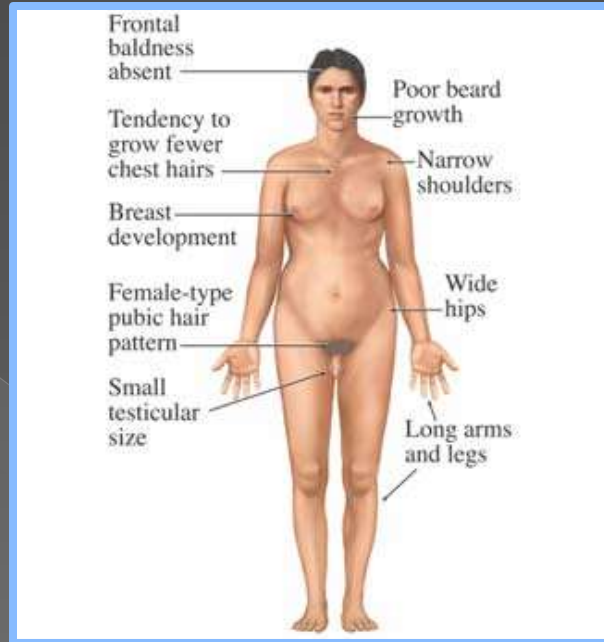
Females: Varying degrees of clitoral enlargement, fusion of labial scrotal folds, common urogenital sinus

Males: progressive penile enlargement, while the testes and prostate remain small even following puberty

Various Syndromes



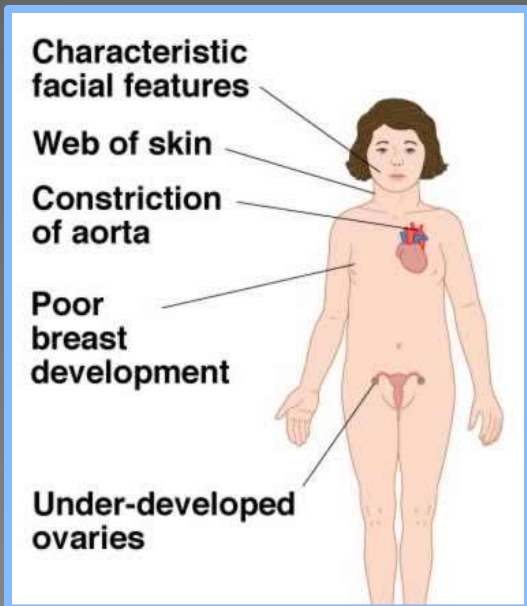
○ 5-α-Reductase Deficiency



○ Klinefelter's Syndrome



○ Androgen Insensitivity

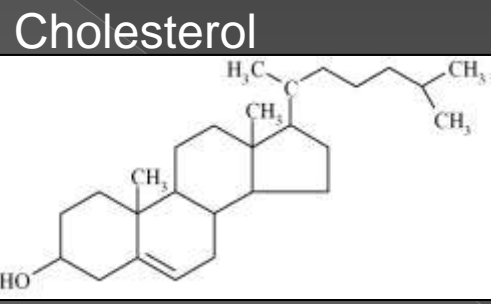


○ Turner Syndrome

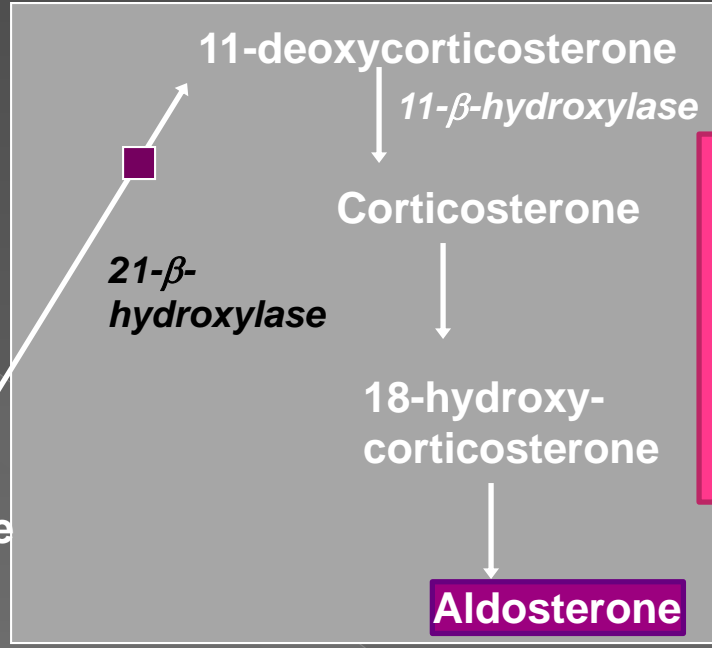
○ Congenital Adrenal Hyperplasia



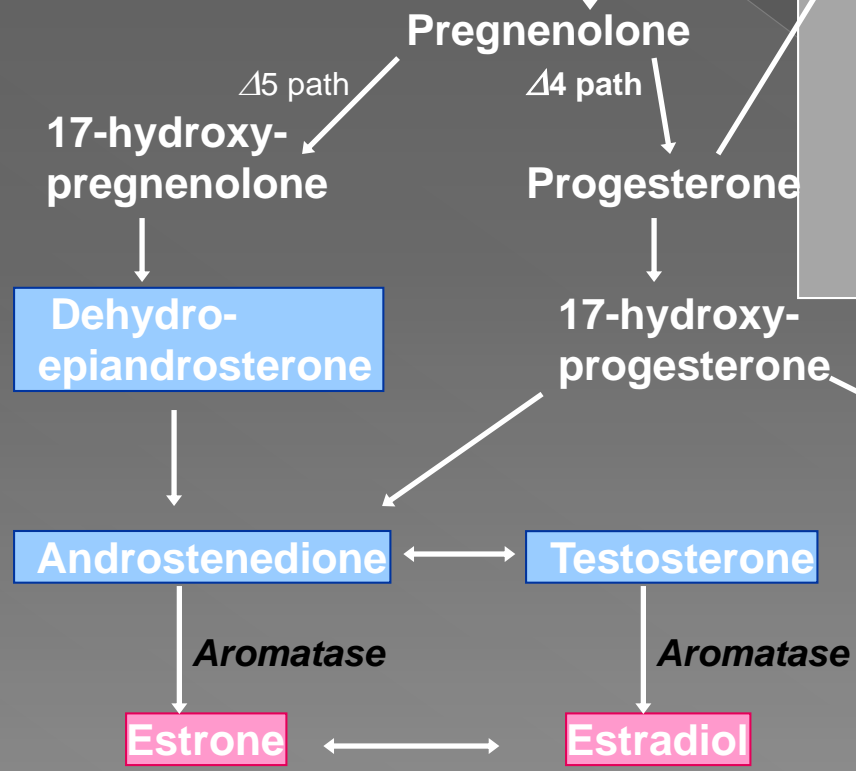
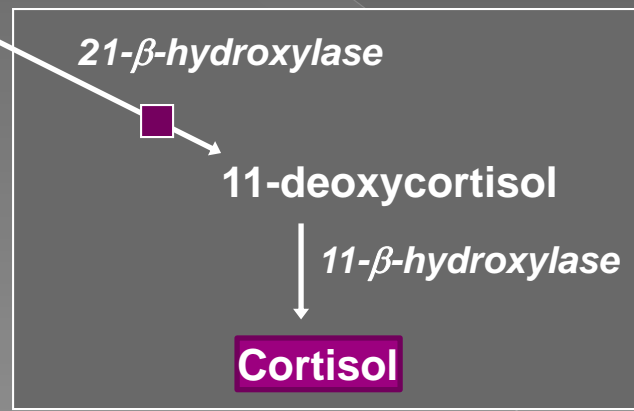
Steroid Hormone Biosynthesis



Stimulated by hormones that induce StAR protein, e.g. ACTH, LH, FSH, hCG

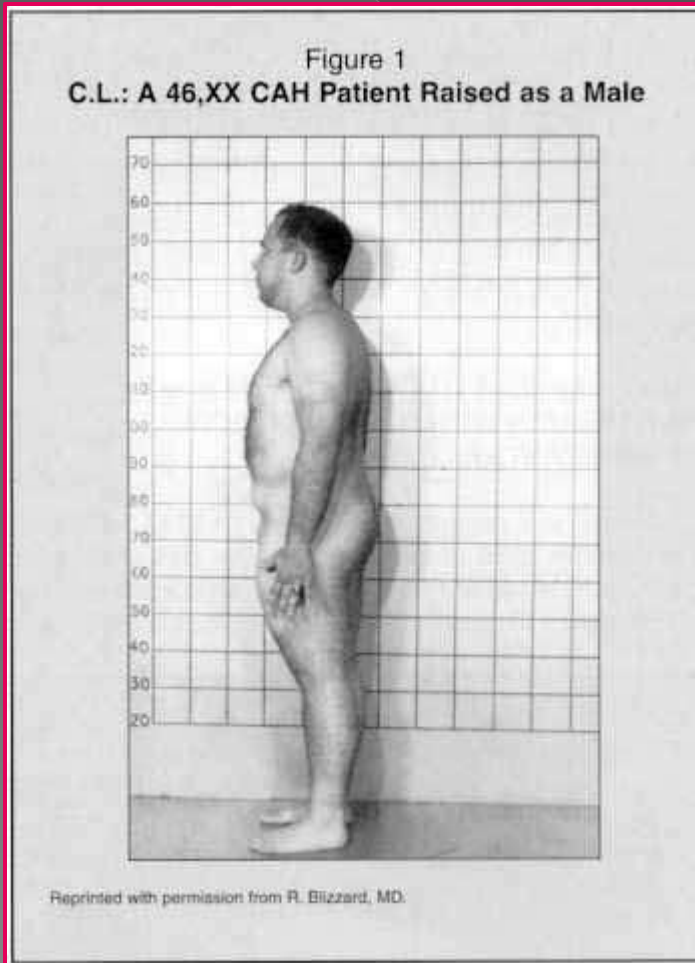


Square ■ :
Block in pathway as seen in Congenital Adrenal Hyperplasia (CAH)



Congenital Adrenal Hyperplasia

* 21- β -Hydroxylase Deficiency

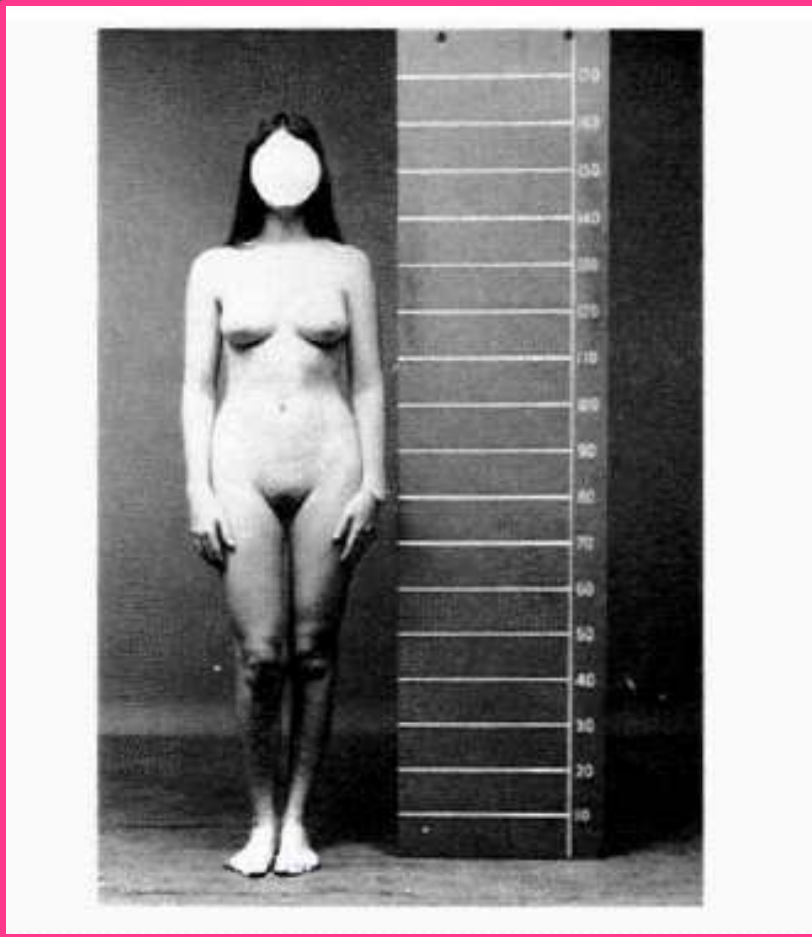


Male phenotype, XX

- Increased Androgens
- Decreased aldosterone and cortisol
- Virilization of female external structures
- Normal genitalia in males
- Advanced bone age
- Early epiphyseal bone shaft fusion
 - Tall height as a child and short height as an adult

Androgen Insensitivity Syndrome

* Androgen receptor mutation



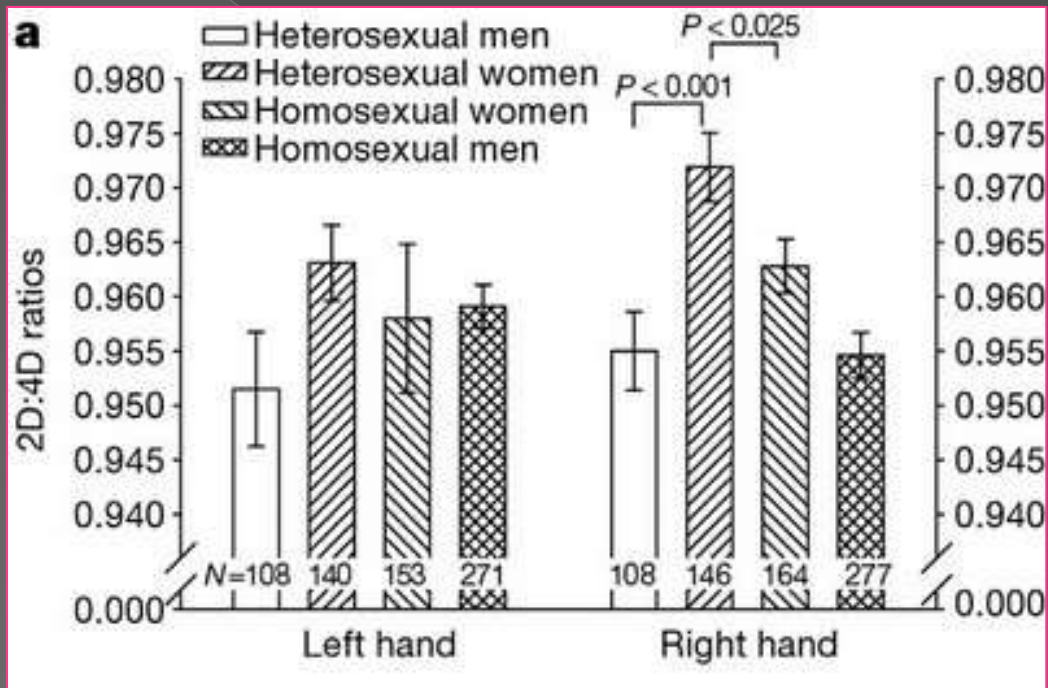
Female phenotype, XY

- ◉ Stimulation from testosterone and dihydrotestosterone (DHT) does not occur
- ◉ Spectrum of disorders
 - > CAIS, PAIS, MAIS
- ◉ Tissue response to estrogen remains, allowing certain signs of feminization to occur
- ◉ Antimüllerian hormone is present, resulting in regression of the Müllerian duct.
- ◉ Because of androgen resistance, the male Wolffian duct does not form.

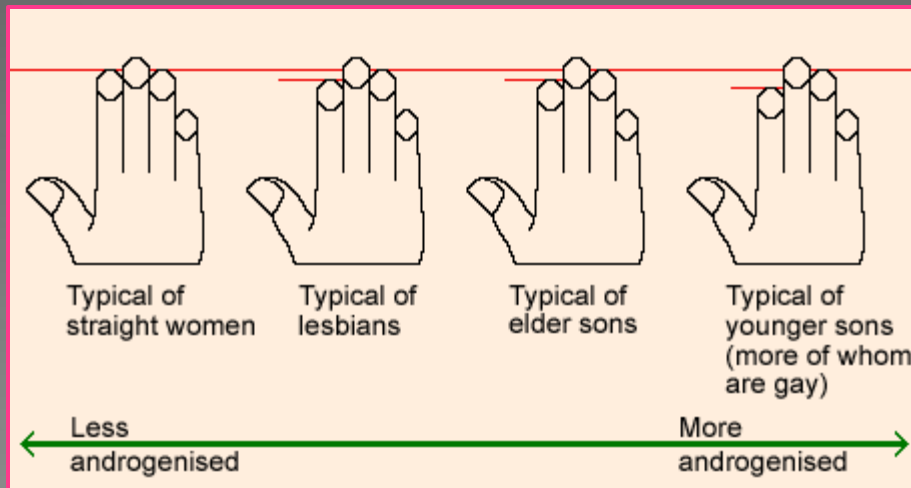
Spectrum of Structures with Androgen Insensitivity Syndrome

<u>Type</u>	<u>External Genitalia</u>	<u>Findings</u>
CAIS	Female ("testicular feminization")	<ul style="list-style-type: none"> • Absent or rudimentary Wolffian duct derivatives • Absence or presence of epididymides and/or vas deferens • Inguinal or labial testes; short blind-ending vagina • Scant or absent pubic and/or axillary hair
PAIS	Predominantly female ("incomplete AIS")	<ul style="list-style-type: none"> • Inguinal or labial testes • Clitoromegaly and labial fusion • Distinct urethral and vaginal openings or a urogenital sinus
	Ambiguous	<ul style="list-style-type: none"> • Microphallus (<1 cm) with clitoris-like underdeveloped glans; labia majora-like bifid scrotum • Descended or undescended testes • Perineoscrotal hypospadias or urogenital sinus
	Predominantly male	<ul style="list-style-type: none"> • Simple (glandular or penile) or severe (perineal) "isolated" hypospadias with a normal-sized penis and descended testes or severe hypospadias with micropenis, bifid scrotum, and either descended or undescended testes
MAIS	Male ("undervirilized male syndrome")	<ul style="list-style-type: none"> • Impaired spermatogenesis and/or impaired pubertal virilization

Sexual Orientation



- Testosterone exposure during fetal development may influence sexual orientation
- Fingerlength is an anatomical marker of such exposure
- John Manning



Treatment Options

Surgery?

- Irreversible genital surgery. A parental decision?
- Surgery should be performed in order to minimize gender dysphoria, family discomfort and peer ostracization
- Hard to speculate on surgery success
 - > Better technology = better nerve preservation
 - > Others argue that these tissues are harmed, resulting in sexual anxiety and sexual discomfort
- Different procedures:
 - > Clitoral surgery, repair of the common urogenital sinus, vaginoplasty
 - Emphasis should be based on functionality rather than cosmetic appearance
 - > Procedures can have variable results and sexual stimulation is never a guarantee.
- **Love and acceptance is the best cure**

Conclusion

- There is a fluid continuum of sexual orientation due to biological causation
- The range of intersex possibilities that exists invalidates the idea of a fixed biological sex category.
- Human variation does not fit neatly into clearly demarcated definitions; therefore, constrained and polarized categories are inaccurate and should reflect more fluid boundaries for sexuality, gender, and sexual orientation.



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