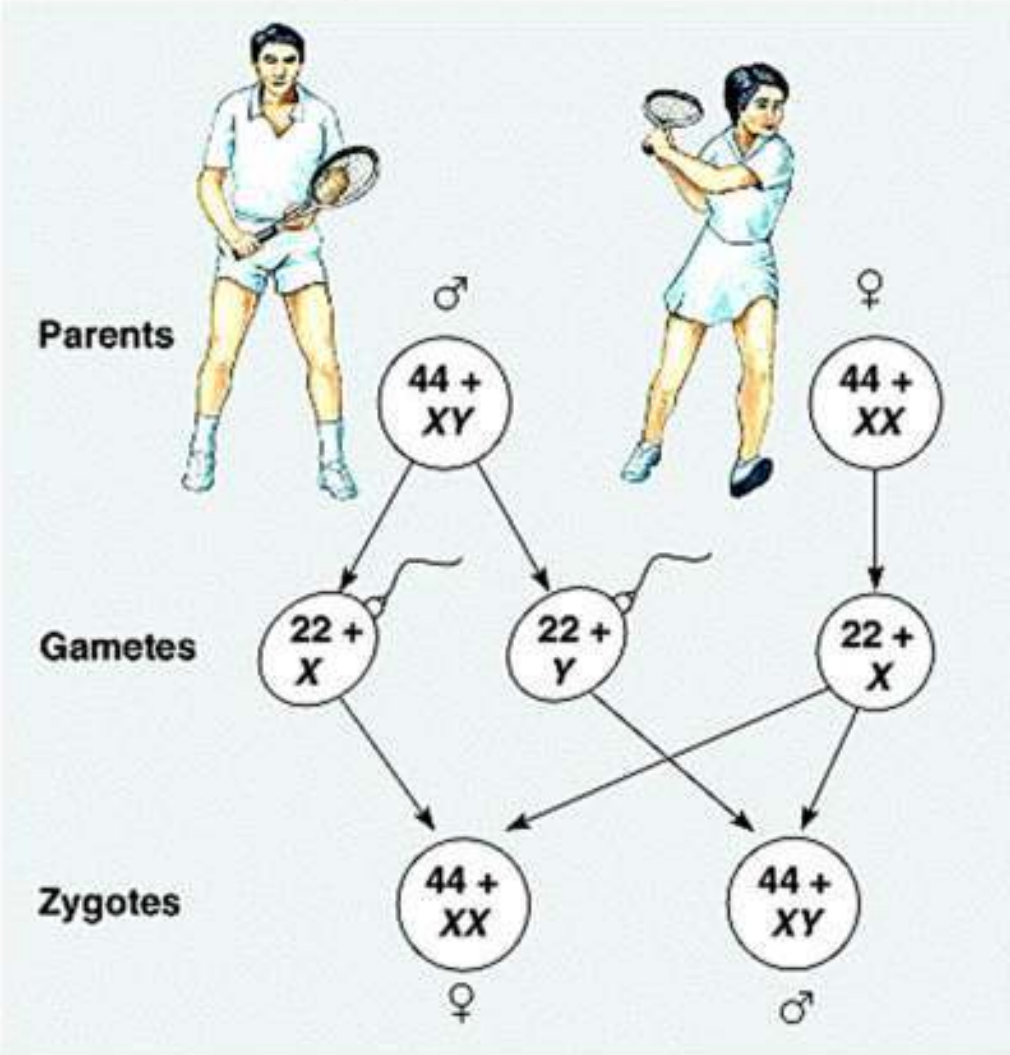
WHO AM I? BIOLOGICALLY SPEAKING

Bryan Ness

IT'S SO SIMPLE!

Figure 14.8a Some chromosomal systems of sex determination

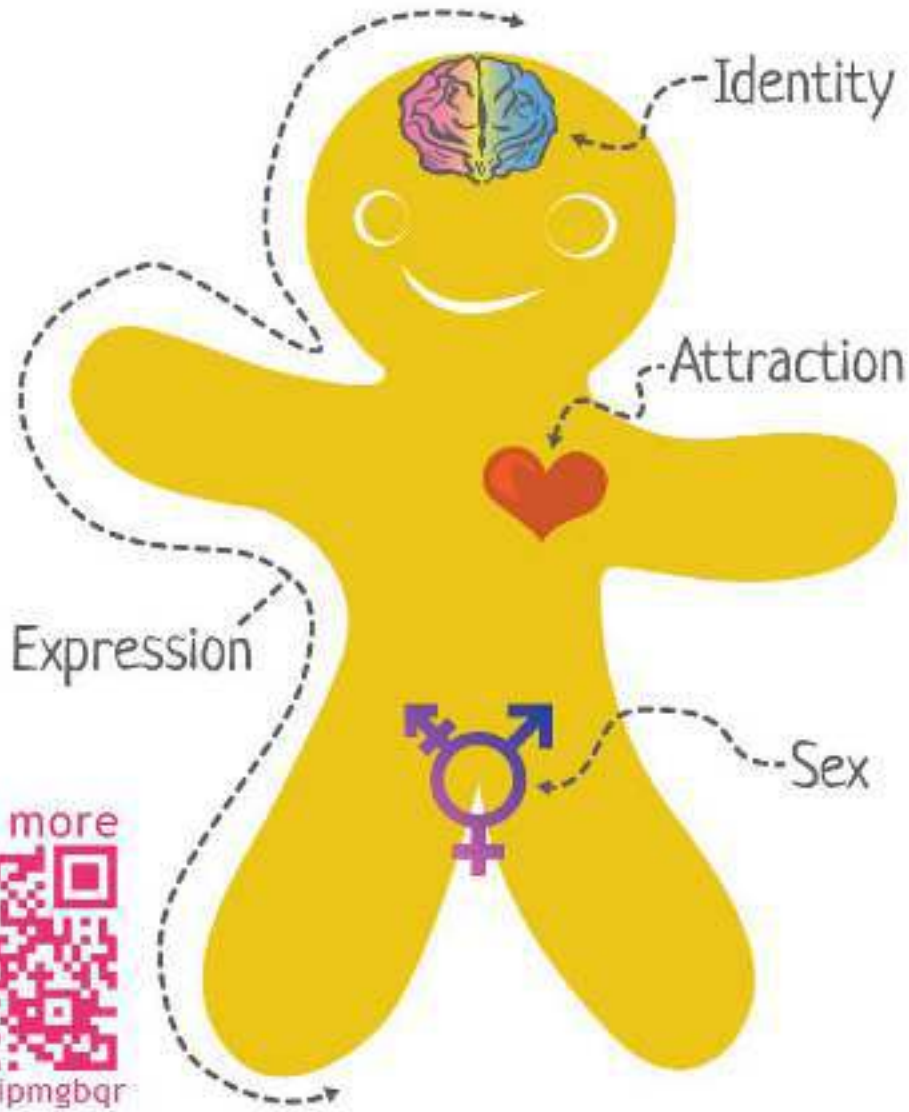


(a) The *X-Y* system

The Genderbread Person v2.0

by it's pronounced METROsexual

Gender is one of those things everyone thinks they understand, but most people don't. Like *Inception*.
Gender isn't binary. It's not either/or. In many cases it's both/and. A bit of this, a dash of that.
This tasty little guide is meant to be an appetizer for understanding. It's okay if you're hungry for more.



read more

bit.ly/ipmgbqr

Gender Identity

Nongendered { Woman-ness / Man-ness

5 (of infinite) possible plot and label combos: "woman" "man" "two-spirit" "genderqueer" "genderless"

Gender Expression

Agender { Masculine / Feminine

5 (of infinite) possible plot and label combos: "butch" "femme" "androgynous" "gender neutral" "hyper-masculine"

Biological Sex

Asex { Female-ness / Male-ness

5 (of infinite) possible plot and label combos: "male" "female" "intersex" "female self ID" "male self ID"

Attracted to

Nobody { (Men/Males/Masculinity) / (Women/Females/Femininity)

5 (of infinite) possible plot and label combos: "straight" "gay" "pansexual" "asexual" "bisexual"

Sex & Gender

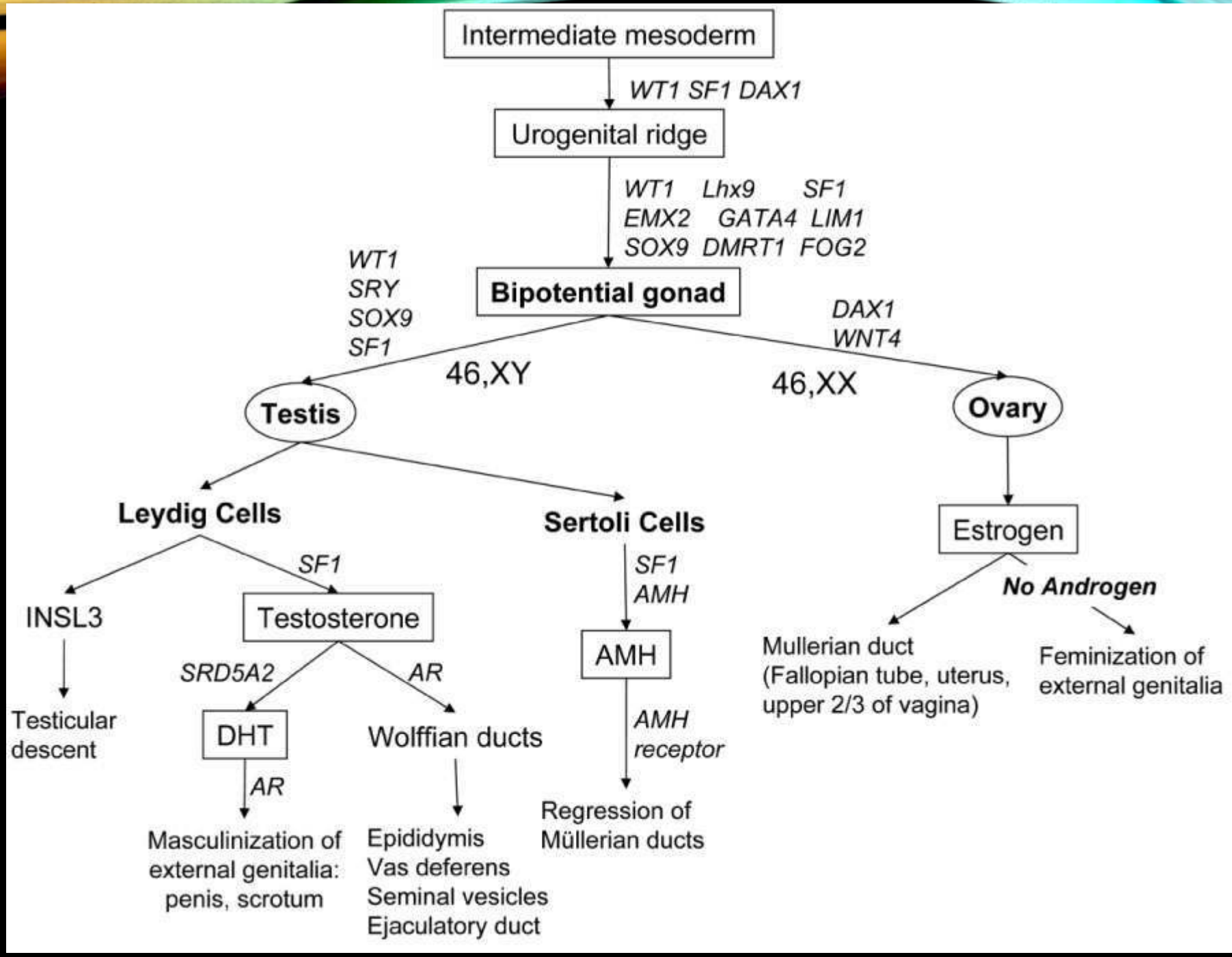
Chromosomal Sex

Phenotypic Sex

Gender Identity

Sexual Orientation

"NORMAL" SEXUAL DEVELOPMENT



DIFFERENCES OF SEXUAL DEVELOPMENT

Table 1. Disorders of sexual development (New DSD nomenclature) (3)

Sex Chromosome DSD	46,XY DSD		46,XX DSD		
	Disorders of Testicular Development	Disorders of Androgen Synthesis/Action	Disorders of Ovarian Development	Fetal Androgen Excess CAH	Non CAH
• 45,X Turner and Variants • 47,XXY Klinefelter and Variants • 45,X/46XY MGD • Chromosomal Ovotesticular DSD	•Complete Gonadal Dysgenesis • Partial Gonadal Dysgenesis • Gonadal Regression • Ovotesticular DSD	• Androgen Synthesis Defect • LH-Receptor Defect • Androgen Insentivity • 5α-Reductase Deficiency • Disorders AMH • Timing Defect • Endocrine Disrupters • Cloacal Extrophy	• Ovotesticular DSD • Testicular DSD (eg. SRY+, dup SOX9) • Gonadal Dysgenesis	• 21-OH Deficiency • 11-OH Deficiency	• Aromatase Deficiency • POR Gene Defect • Maternal • Luteoma • Iatrogenic

MGD: mixed gonadal dysgenesis, DSD: disorders of sexual development, AMH: anti-Müllerian hormone, CAH: congenital adrenal hyperplasia

CLINICAL ASSESSMENT OF INFANT SEX

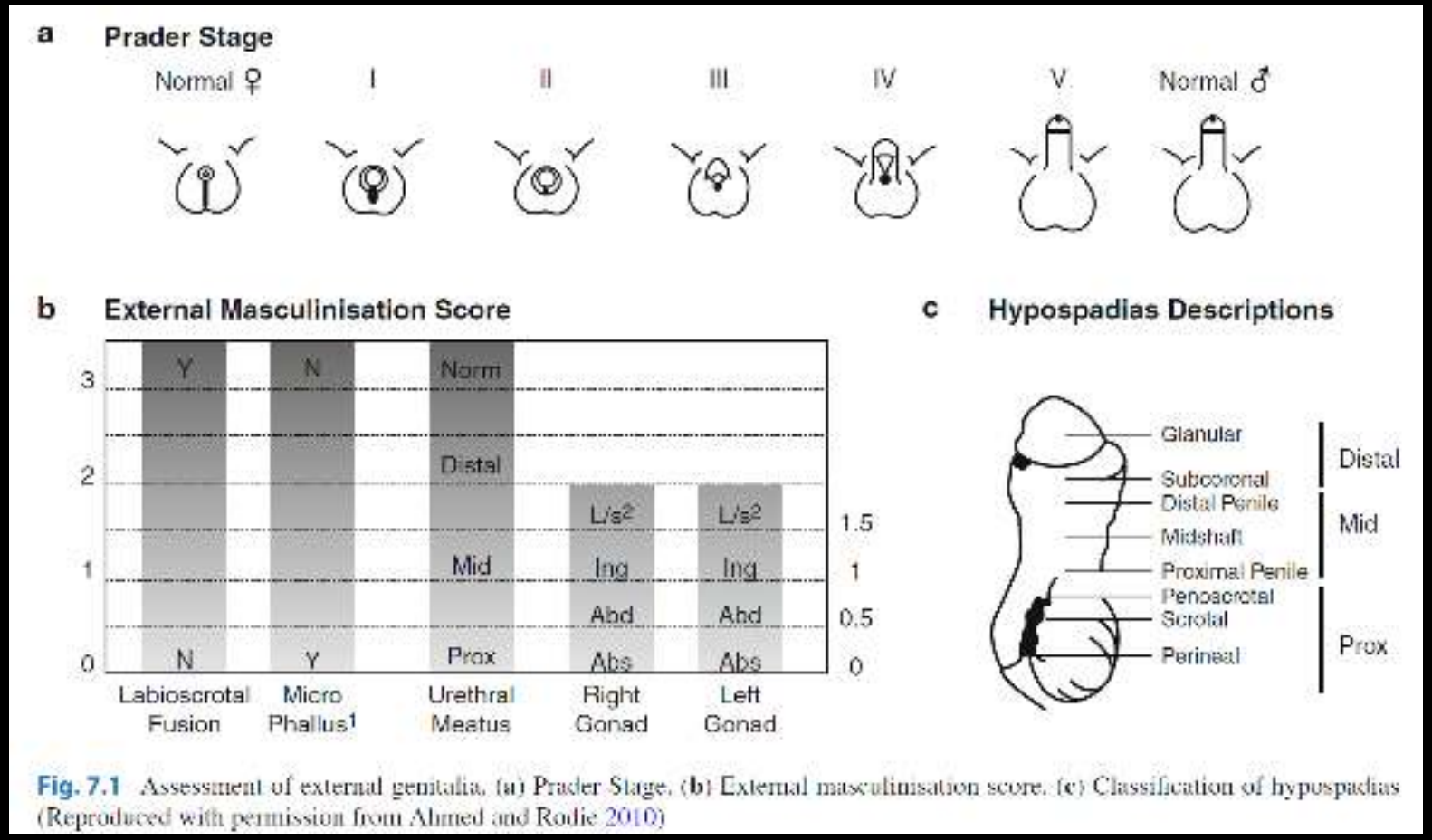


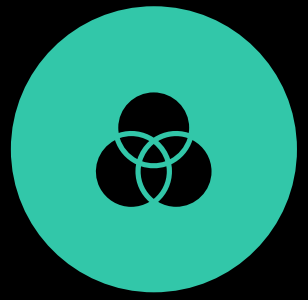
Fig. 7.1 Assessment of external genitalia. (**a**) Prader Stage. (**b**) External masculinisation score. (**c**) Classification of hypospadias (Reproduced with permission from Ahmed and Rodie 2010)

HOW MANY BABIES ARE BORN INTERSEX?

Lowest estimates are 0.018% of births

Realistic estimate is 1.7% of births

Largest estimates range to 10%



Differences among estimates are due to differences in the definition of intersex

SPECIFIC EXAMPLES OF INTERSEX

CAIS – Complete Androgen Insensitivity Syndrome

Turner's Syndrome, XO (45,X/46,XY Mosaicism)

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) I

Caused by a mutation in the Androgen receptor (AR) gene

The AR gene is on the X chromosome, thus it is a sex-linked trait.

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) II

A child with CAIS is chromosomally XY, thus they have the SRY gene.

Due to the SRY gene, testes develop and produce testosterone.

Because the androgen receptor does not function, testosterone cannot masculinize the fetus.

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) III

At birth, a child with CAIS appears like a typical female externally.

Internally there is no uterus or ovaries, but there are undescended testes.

Normal puberty does not occur.

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) IV

The undescended testes are sometimes diagnosed as a hernia.

Testes historically removed due to perceived cancer risk.

Medically, the gender choice for CAIS children has almost always been female.

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) V

Female hormones must be administered at puberty to produce female secondary sex characteristics.

Male gender is rarely chosen because secondary sex characteristics cannot be produced, since testosterone has no effect.

COMPLETE ANDROGEN INSENSITIVITY SYNDROME (CAIS) VI

So, someone with CAIS is **chromosomally male**, **physically intersex**, generally **gender female** and is most often sexually attracted to males.

So, if someone with CAIS marries by their own inclination they will marry a man. **Question:** Does this represent a same-sex marriage?

Most cases of Turner Syndrome are 45,X/46,XY mosaics.

A mosaic is a person composed of two chromosomally different types of cells.

People with this condition are usually born with a male appearance, but often are shorter than average, have dysgenic testes and are sterile as a result.

TURNER'S SYNDROME I

TURNER'S SYNDROME II

A much smaller number are born with female appearance with gonadal dysgenesis (poorly formed uterus, streak ovaries).

Gender dysphoria can occur in puberty.

Gender assignment at birth can be complicated, and historically genital surgeries were often done to make physical appearance match gender choice.

TURNER'S SYNDROME III

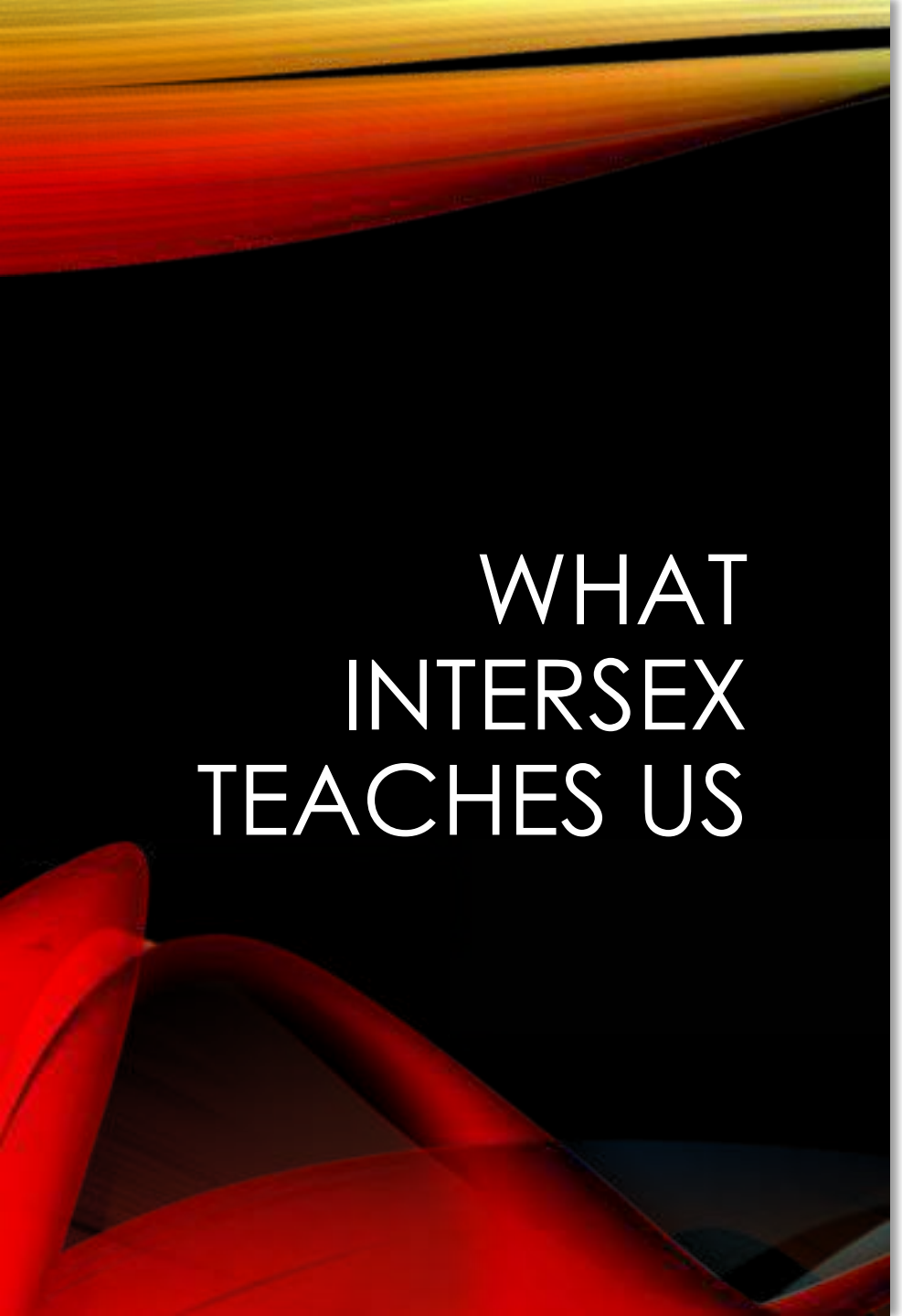
One factor prompting genital surgery was the perceived higher risk of cancer if dysgenic gonads were left in place.

Risks of cancer are less than once believed, so gender assignment is often delayed till puberty (or later).

TURNER'S SYNDROME IV

Regardless of chosen gender, someone with this condition is **chromosomally intersex**, **physically intersex** (although often resembling one sex more than the other) and **gender uncertain**.

So, if a gender female identified individual with this condition marries a man, is that a heterosexual marriage or is it a same-sex marriage?



WHAT INTERSEX TEACHES US

Intersex conditions are unequivocally genetically based

Acceptance of intersex individuals as normal opens the door to understanding gay and trans people

WHAT BIOLOGY SAYS ABOUT LGBTQIA+

Definitions:

- L – Lesbian
- G – Gay
- B – Bisexual
- T – Transgender
- Q – Queer
- I – Intersex
- A – Asexual

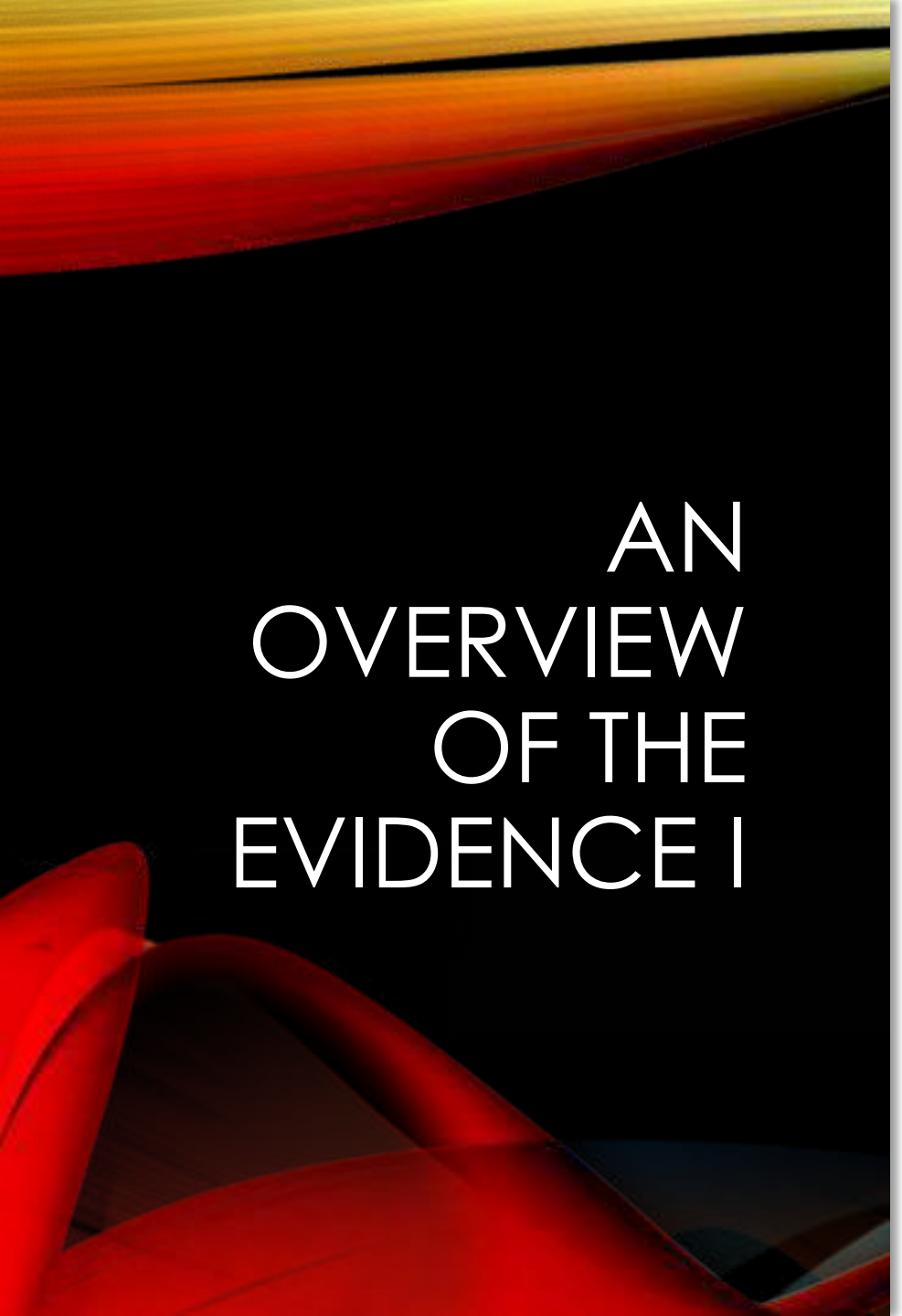
- Is there any evidence that biology accounts for these other sexuality/gender categories like it does for intersex?

- Short answer: Yes.

SLIGHTLY LONGER ANSWER

Ness's Developmental Aphorism: It would be surprising if there were not some people born who are sexually attracted to members of their own sex.

Ness's Corollary: It would also be surprising if there were not some people born whose gender is opposite to their chromosomal and/or physical sex.



AN OVERVIEW OF THE EVIDENCE I

Gender and sexual orientation are determined at different times during development, so it is expected that developmental variation can lead to decoupling.

Same-sex attraction has a heritability of 30-50%.

Concordance for same-sex attraction among male monozygotic twins averages 50%; among male siblings it is 25%.

AN OVERVIEW OF THE EVIDENCE II

For each boy a woman conceives, after her first, there is an additional 33% chance that each succeeding boy will be gay (background occurrence rate is ~7-8%).

The INAH-3 of the brains of gays, is, on average smaller than the same part of the brain in heterosexual males, and is about the same size as in heterosexual females.

AN OVERVIEW OF THE EVIDENCE III

The brains of transgender individuals usually resemble more the brains of their gender identity than the gender that matches their physical appearance. This includes normally sex-specific differences in the hypothalamic uncinate nucleus and INAH-3

Gay and transgender individuals can usually trace the roots of their sexual/gender orientation to early childhood.

Gay conversion therapy has been such a resounding failure that it is now even banned for minors entirely in several states. Failure of conversion therapy suggests than sexual orientation is usually fixed and cannot be changed.

IS SEXUAL AND GENDER ORIENTATION GENETIC?

Hardly any complex human trait is purely the result of genetics, so sexual and gender orientation are likely not caused solely by genetics.

The consensus among geneticists is that sexual and gender orientation are the result of a highly complex interaction between genetics, epigenetics and environment.

IS SEXUAL AND GENDER ORIENTATION GENETIC?

Epigenetic effects involve no change in the actual genes, just changes in how much and whether specific genes get expressed.

Environment includes effects external to the individual's own body, including intrauterine effects onward through post-birth.

WHICH OPTION SHOULD THE CHURCH CHOOSE IN RELATION TO LGBTQ+ INDIVIDUALS?

1. Discount the scientific evidence and continue to claim that same-sex attraction and gender is a choice that the Bible considers a sin.

2. Accept the scientific evidence, continue to consider same-sex sexual relations as a sin, and accept such individuals into church membership as long as they remain celibate.

3. Accept the scientific evidence and treat those with same-sex attraction exactly like everyone else, expecting them to refrain from premarital and extramarital sex and expecting them to marry, if they choose to, and remain monogamous.

"SIMPLE ARGUMENT" IN DEFENSE OF LGBTQ+ MARRIAGE & EQUALITY

1. **For an action or practice to be morally wrong, it must have some wrong-making feature. In other words, if an action is morally wrong, there must be something about the action that makes it wrong.**
2. **Wrong-making features include the following: the action or practice i) causes harm or ii) violates some competent person's autonomy or iii) is unfair or iv) violates someone's individual rights or v), etc.**
   - **This second premise can be extended. It should include an exhaustive list of features that make an action or practice morally wrong.**

"SIMPLE ARGUMENT" IN DEFENSE OF LGBTQ+ MARRIAGE & EQUALITY

3. **Same-sex sexual relations between two consenting adults do not have any of these features. In other words, i) it is not harmful, ii) it does not violate anyone's autonomy, iii) it is not unfair, iv) it does not violate anyone's individual rights, v), etc.**
   - **This, of course, is not to say that same-sex sexual relations can never be morally wrong. For example, if a man is married to a woman and has secret same-sex liaisons on the side, that would be morally wrong. But it is not the same-sex sexual behavior per se that makes such behavior morally wrong. What makes it wrong is that it involves betrayal and the violation of one's marriage vows. It is wrong because it is adultery, not because it is gay adultery.**

"SIMPLE ARGUMENT" IN DEFENSE OF LGBTQ+ MARRIAGE & EQUALITY

4. **Therefore, same-sex relations between mutually consenting adults are not morally wrong. This argument is obviously valid. To say that an argument is valid means that if the premises 1–3 are true, then the conclusion (4) must be true. The conclusion might still be false but only if at least one of the premises (1, 2, or 3) is false.**

- **Source: *The Moral Defense of Homosexuality: Why Every Argument against Gay Rights Fails* by Chris Meyers**

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