Intersex Conditions[xxiv]

Grade 12

Curriculum Connections
This lesson fits well with the curriculum in Biology 12 (and may be adapted for Science 9).

Context
The goal of this lesson is to provide students with an understanding of gender diversity from a genetic and hormonal perspective.

Preparation

- Photocopy the handout from pages 57-58
- Know the size of the school population and town population

Lesson
1. Prepare the class by describing the lesson content and setting expectations for mature and sensitive behaviour.
2. Handout the information sheet on Intersex Conditions.
3. Read through with the class, answering any questions they may have.

Extension
If time permits, show students the documentary "Intersex" from the Discovery channel (currently available on YouTube).

Discussion questions
1. Considering the ratios given for some of these conditions, how many people in your school might have intersex conditions? How many people in your city might have intersex conditions?
2. Many people believe there are two clear-cut categories for gender: male and female Others believe it's a fluid line between two end points. Still others believe there are many gender categories. What do you think?

Assessment
With a partner, answer the following questions:

A: How has your understanding of intersex conditions changed as a result of this lesson?
B: Has your attitude about people with intersex conditions changed?
C: Work to develop a scientific definition of male and of female, bearing in mind what you have learned about the many gender variations that exist in humans.

"I always felt excluded because nobody understood what being trans meant. My teacher was talking about transsexual or transgender people in social science class and then he told us that it was the same thing as hermaphrodite [sic]...If you're gonna give the class information, then at least give them the right information." [xxv]

Information Sheet: Intersex Conditions

Q: What does intersex mean?
A: Someone who has an intersex condition has sexual or reproductive anatomy that someone has decided does not fit the standard definitions of male or female.

Q: Are intersex and hermaphrodite the same thing?
A: Hermaphrodite is an older term generally intended to refer to the idea of someone who has full male and full female sexual organs- a biological impossibility. The term hermaphrodite is now considered to be out of date and offensive to intersex people.

Q: Are people diagnosed as having intersex conditions at birth?
A: Sometimes, but other times people don't know they have intersex conditions until later in life. Their condition can be discovered at puberty, in adulthood when fertility difficulties are examined, or during an autopsy after someone dies in old age. Sometimes people live their whole lives never knowing they have an intersex condition.

Q: How many people count as having intersex conditions?
A: That's hard to answer, since there's a lot of grey area in what counts as an intersex condition. For instance, how small does a penis have to be before it meets the criteria of an intersex condition? This is a social decision and may change from culture to culture. However, the rate of people whose bodies differ from the standard male or female is 1 in 100 births, while the number of people receiving surgery to 'normalize' genital appearance is 1 or 2 in 1000 births. The number of people born without a XX or XY chromosome pairing is 1 in 1666 births.

Types of Intersex Conditions (Not a complete list)

Androgen insensitivity syndrome (1 in 13 000): This is an inherited genetic condition, where a child will have an XY karyotype but the body's cells are not able to respond to androgen. This results in a baby with genitals of a normal female appearance. There are also undescended or partially descended testes, but no uterus, cervix, fallopian tubes, or upper part of the vagina. At puberty, the testes begin producing testosterone, and because testosterone is chemically very similar to estrogen, this results in breast development. Women with AIS will not menstruate or be fertile, and they may choose surgery to lengthen the vagina so that vaginal intercourse is possible.

Partial androgen insensitivity syndrome (1 in 130 000): This occurs when the body's cells respond only partially to androgen, often resulting in ambiguous genitalia where the baby is considered to have either a large clitoris or a small penis (two ways of describing the same structure). In the past, corrective surgery was often performed to normalize the genital appearance, but more commonly now, the recommendation is to offer but not impose the surgery when the person is older and can decide for him or herself.

Klinefelter syndrome (1 or 2 in 1000): Men with Klinefelter syndrome inherit an X chromosome from their mother, a Y chromosome from their father, and an extra X chromosome from either parent, resulting in an XXY karyotype. Infants usually appear to have normal male genitals, though the testes may be small and firm. At puberty, boys

with Klinefelter might not develop much body hair and they may develop breasts. Testosterone injections can help men with Klinefelter syndrome virilize more strongly.

Congenital adrenal hyperplasia (1 in 15 000): This condition impacts people with either XX or XY karyotypes, but it only results in an intersex condition for people with an XX karyotype. Adrenal hyperplasia happens when the adrenal glands have an incorrect genetic 'recipe' for making the hormone cortisone. While trying to make the cortisone, the adrenal glands also make virilising hormones, causing the XX embryo to have a large clitoris to the extent that it may look like a penis, or labia that may look like a scrotum. After birth, the CAH hormones can have a masculinising effect, causing body hair, a deep voice, or prominent muscles. These effects can be counteracted by administering cortisone. In XY births, the genitals will have a normal male appearance, but untreated CAH can cause boys to enter puberty early causing social and behavioural challenges as well as causing them to stop growing earlier, resulting in short stature.

Vaginal agenesis/ MKRS (1 in 5000): This condition impacts girls with an XX karyotype, and it occurs when the foetal development of sex organs does not complete, resulting in an absent or incomplete vagina. Ovaries are present but the uterus is absent, misshapen, or small. Genitals will have a normal appearance, so vaginal agenesis is not usually diagnosed until the late teens when menstruation has not started. Secondary sex characteristics (breasts, pubic hair, etc) usually develop normally.

Ovotestes (1 in 83 000): Formerly known as "true hermaphroditism", ovotestes is a condition where gonads contain both ovarian and testicular tissue and can be present in the ovaries and/or testes. Some people at birth will look typically female, some typically male, and some will have ambiguous genitalia.

5 alpha reductase deficiency (no estimate): This condition affects only people with an XY karyotype. It results from an autosomal anomaly (on a chromosome other than the X and/or Y chromosome) and requires the altered gene from both the mother and the father. 5- alpha reductase is an enzyme that converts weaker testosterone into the more potent hormone, DHT. The lack of this enzyme means the foetus will develop as a girl with internal testes. Although the baby at birth will be identified as female, at puberty the testosterone production is generally sufficient to produce masculinisation. Sometimes, the child will migrate into a male role.

Gonadal dysgenesis (1 in 150 000): This condition can affect people of either XX or XY karyotypes, and it occurs when there is an absence of both Mullerian inhibiting factor and testosterone. The lack of testosterone results in the regression of the Wolffian ducts, prohibiting the development of male internal reproductive organs, while the lack of Mullerian inhibiting factor results in the creation of oviducts and uterus. The result is a baby who appears to have a normal female appearance and reproductive system, though who may have an XY karyotype. Secondary sex characteristics will not develop.

Hypospadias (1 in 770): This relatively common condition occurs when the urethral meatus (pee hole) is located along the underside, rather than at the tip, of the penis. In some cases, the urethra may be open mid-shaft out to the glands or may even be entirely absent, with urine exiting behind the penis.