

2. New classification of intersex

In 2006, based on the advice of 50 international experts, who convened in Chicago (*the Chicago Consensus*), the *Lawson Wilkins Pediatric Endocrine Society* and the *European Society for Pediatric Endocrinology* issued a consensus statement on the **new classification of intersex**. This had become necessary because (1) Substantial advances in **molecular genetic** and **endocrine** causes of abnormal sex had taken place (2) terms like *intersex*, *hermaphrodite*, or *pseudohermaphrodite* were thought to be derogatory, and there was heightened awareness of ethical issues related to such terms. (3) Earlier terminologies were perceived to be controversial gender-based diagnostic labels only. Following new terms were suggested in place of old terms (**Table 7**).

Table 7: Proposed new intersex related terms

Old term	New term
Intersex	Disorder of sex development (DSD)
Male pseudohermaphrodite; undermasculinization and undervirilization of an XY male	46, XY DSD
Female pseudohermaphrodite; masculinization and overvirilization of an XX female	46, XX DSD
True hermaphrodite	Ovotesticular DSD
XX male or XX sex reversal	46, XX testicular DSD
XY sex reversal	46, XY complete gonadal dysgenesis

3. Concealed sex

Concealed sex is hiding one's sex by wearing dress of the opposite sex. Salient features: (1) Criminals often do it to avoid being caught by the police. This can be detected by physical examination. (2) *Concealed sex is different from transvestism (eonism)*, in which also the person wears clothes of the opposite sex. But in the latter, there is a psychological compulsion instead of a motivation to avoid detection (see also chapter 25). (3) **Colonel Sir Victor Barker's** case is one of the most amazing cases of concealed sex. Barker (1895 – 1960) was born a **female** (Valerie Lilius Barker), **who acted like a man between 1923 and 1929**. She married twice to males and once to a female (posing as a male)! During the period she posed as male, she played for a cricket club, moved about in the streets in Khaki shorts with a shirt open at the neck and dropped in at pubs for drinks. She was sentenced to nine months imprisonment for making a false statement in the marriage register.

4. Determination of sex

Determination of sex [in living and dead in medico legal practice] can be done by (1) Examination of external genitalia (2) sex chromatin (3) DNA based methods (4) skeleton

a. Examination of external genitalia

Useful in cases of concealed sex. In other cases, may be unreliable and confusing. Please see intersex above.

b. Sex chromatin

A normal person has 46 chromosomes (males 46, XY; females 46, XX). *Sex chromatin is the condensed chromatin of the inactivated X chromosome in females (Barr body)*. While **sex chromosomes** refer to both X and Y chromosomes, **sex chromatin** refers *only to inactivated X chromosome*. [A] **Sex chromatin** is: (i) characteristic of females [found in about 30% to 40% of female cells] (ii) **shape** - planoconvex in shape (iii) **size** - about 1 μ , in diameter (iv) **location** - Lies against the

inner surface of the nuclear membrane (v) **Stage seen in** - present *only during interphase*; disappears during mitosis (vi) **Tissues seen in** - Visible in all nucleated cells (not seen in RBC), but easily seen in (a) buccal smears [most preferred, because of its simplicity, for routine use as a diagnostic aid or when conducting mass surveys for research purposes] (b) saliva, (c) skin (d) hair follicles (e) dental pulp and (f) bone marrow. **Karyotyping** (study of chromosomal constitution of cell nuclei for sex determination) of fetus is done from (g) amniocytes (h) lymphocytes and (i) fibroblasts (vii) **Stain** - (a) **X chromosome** - demonstrated by **Feulgen reaction** using acriflavine Schiff reagent [X chromosome seen as **bright yellow spot**].

Memory Aid - 3

XY FAST - chromosome looks bright yellow in fluorescent
Feulgen reaction using acriflavine Schiff reagent

Memory Aid - 4

Feulgen reaction is +ve in females

(b) **Y chromosome** - demonstrated by **quinacrine dihydrochloride** [Y chromosome seen as **bright fluorescent body** - commonly referred to as an **f-body**] (viii) **discovered in** - 1948 by Barr and Bertram [hence the name Barr body] (ix) **Putrefied bodies** - Sex chromatin may be demonstrated in **putrefied bodies**, but not if putrefaction has reached up to cellular level. Uterus and prostate resist putrefaction for a long time; in advanced putrefaction, sex can be determined by identifying uterus and prostate.

Memory Aid - 5

MCQ - Male chromosome colors with quinacrine

(x) **Lyon hypothesis** - *Mary Lyon in 1960 proposed that sex chromatin was an inactivated X chromosome, and named it the Barr body*. In cells with multiple X chromosomes, all but one are inactivated during embryogenesis. The genes on the inactivated X chromosome are not translated. **Lyonization** (X-inactivation) is a process by which one of the two copies of the X chromosome present in females is inactivated. (xi) **Number of Barr bodies** - In individuals with > one X chromosome, the number of Barr bodies is **always one less** than the total number of X chromosomes (**Fig 3.8**). (a) If there is no Barr body (**chromatin-negative**), the genotype may be XY or XO; (b) if one Barr body (**chromatin-positive**), XX or XXY; (c) if two Barr bodies (**chromatin-positive plus**), XXX or XXXY; (d) if one **small Barr body (chromatin-positive minus)**, X^s, i.e. One normal X chromosome paired with one having a *partial deletion* and (e) if there are two types of cells in the individual - one type showing no Barr body and another type two, it is a case of **tissue mosaicism** (two different cell lines). (xii) It has been estimated that about **2 or 3 persons per 1,000** suffer from an **abnormality of sexual development**; *the incidence may be even higher at birth*. Testing for sex chromatin provides a simple and indispensable aid in the diagnosis of such patients. [B] **Davidson's bodies:** (i) **Location** - Barr bodies seen on the nucleus of **neutrophils**. Appears like a drumstick (**Fig 3.9**).

Table 8: Various cellular level tests for male and female features, and their positivity

S.No	Test	Male%	Female%
1.	Barr body [sex chromatin]	0-4%	30-40%
2.	Davidson's body	0%	3%
3.	Feulgen reaction	0-2%	50-70%
4.	Quinacrine Dihydrochloride	45-80%	0%