

Sex-determination

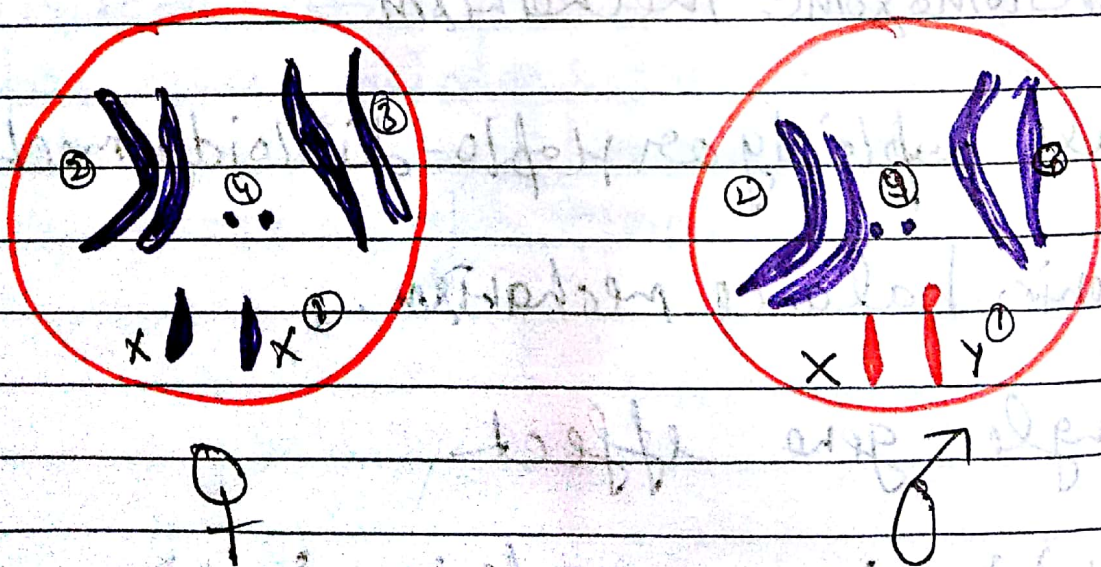
- Biologically, sex is an aggregate of those morphological, physiological and behavioural qualities that differentiate the organism producing eggs from those organism producing sperm.
- The organism producing eggs female, and those producing sperm male.
- The sex behaves as a mendelian character. Its inheritance follows law of segregation.
- The various mechanism of determination and differentiation of sex are as follows:
 - Chromosome mechanism
 - Male haploidy or Haplo-diploidy mechanism.
 - Genic balance mechanism.
 - Single gene effect.
 - Cytoplasmic sex determination.

Chromosome theory of sex determination.

→ In majority of diploid sexual animals are found a pair of sex chromosomes which are specialised for sex determination. These are represented by X and Y.

Sex chromosomes and autosome

→ The X-chromosomes was first observed by German biologist, Henking during the spermatogenesis in male bug and was described as X-body.



→ The theory of sex determination was

worped out by (1902-1905),

E.B. Wilson and Stevens

→ They named the X and Y chromosomes and other sex chromosomes or allosomes as autosomes of the cell.

① Sex - Chromosomes carry genes for sex. X-chromosome carries female determining genes and Y-chromosome has male determining genes.

→ The number of X and Y chromosomes determine the female or male sex of relation with the sex.

② Autosomes carry genes for the somatic characters. These do not have any relation with the sex.

① XX - XY type of sex determination.

eg-0 Female homogametic XX and male heterogametic XY →

→ In *Drosophila*, total number of chromosomes is 8.
 $XX + 6A$
 $\underbrace{\hspace{10em}}_{2 \text{ sex chromosomes}}$
 4 autosomes

Male - $6 + XY$
 female - $6 + XX$

sperm Male (XY) \times female (XX) Ova

		Ova	
		X	X
sperm	X	$6 + XX$	$6 + XX$
	Y	XY	XY

XX : female = 50%

XY : male = 50%

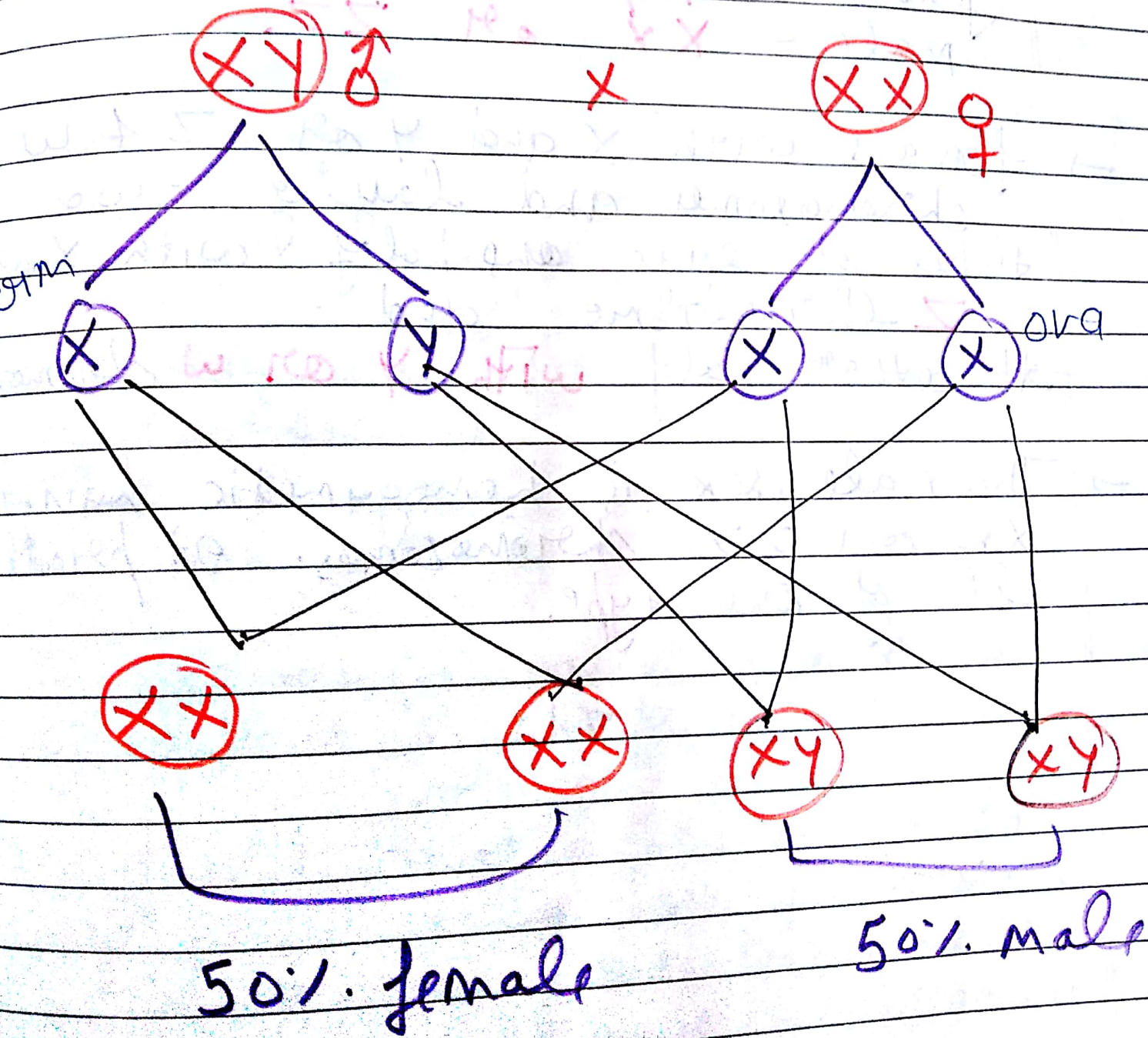
eg. (2) In man - In case of man total number of chromosome is 23 pairs or 46

In male = $44 + XY$

In female = $44 + XX$

The sperm produced by male are of two types $(22+X)$, $(22+Y)$

whereas the ova all have $22+X$ chromosomes



2) female heterogametic and male homogametic.

- In fowl, other birds and some fishes, certain moths and butterflies the
female - XY or ZW
male - XX or ZZ

→ female with X and Y or Z & W chromosomes and laying two types of eggs, one half with X or Z chromosome and the other half with Y or W chromosome.

→ The male sex is homogametic having XX or ZZ chromosomes. It produces all of one type.