Lecture : 5

زانکۆی سەلاحەدین - هەولێر
Salahaddin University-Erbil

PRACTICAL
ANIMAL

GENETICS

Subject : BARR BODY

X INACTIVATION

Department: Animal Resources

Stage : 2

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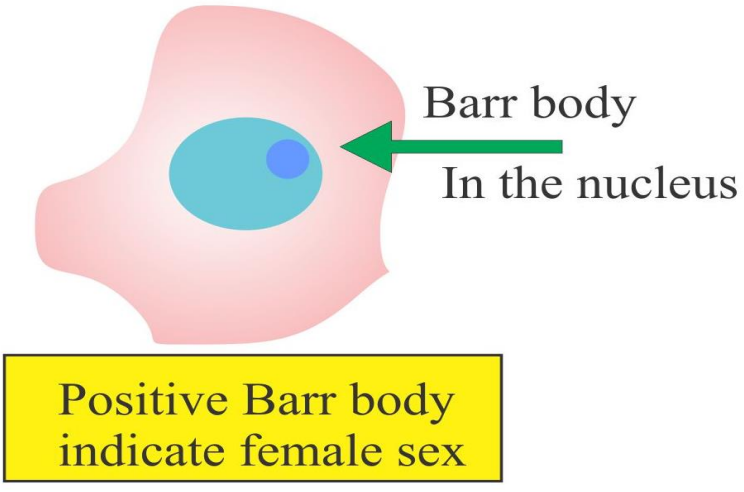
Introduction

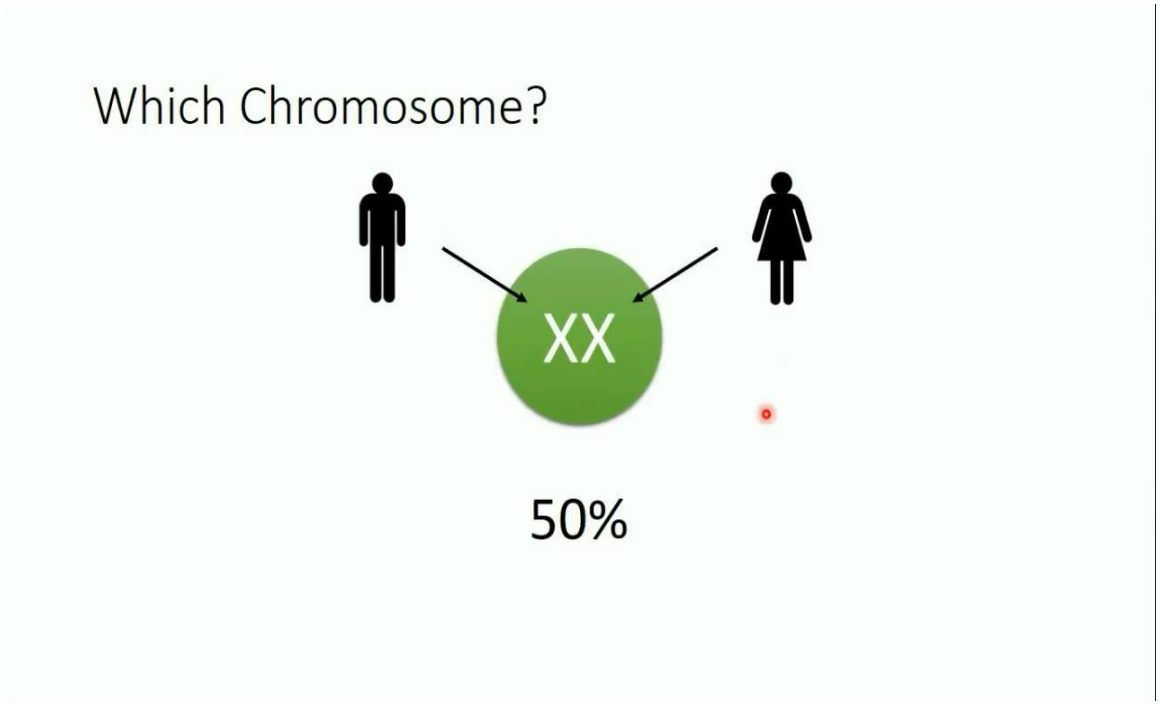
In most mammals, the female has two X- chromosomes and male has only one X-chromosome. These means that all X-chromosome genes in female are present in double dose, where as in male X-chromosome gene are present in single dose. This difference in dosage can affect the gene expression and they need to genetic imbalance in one of the two sexes. In most mammals, this is corrected by inactivation or hetrochomatination of one of the female X-chromosomes in a process called lyonization, becoming the Barr body, so that the transcription of these genes is not possible. The number of Barr bodies is always one less than the total number of X chromosomes.

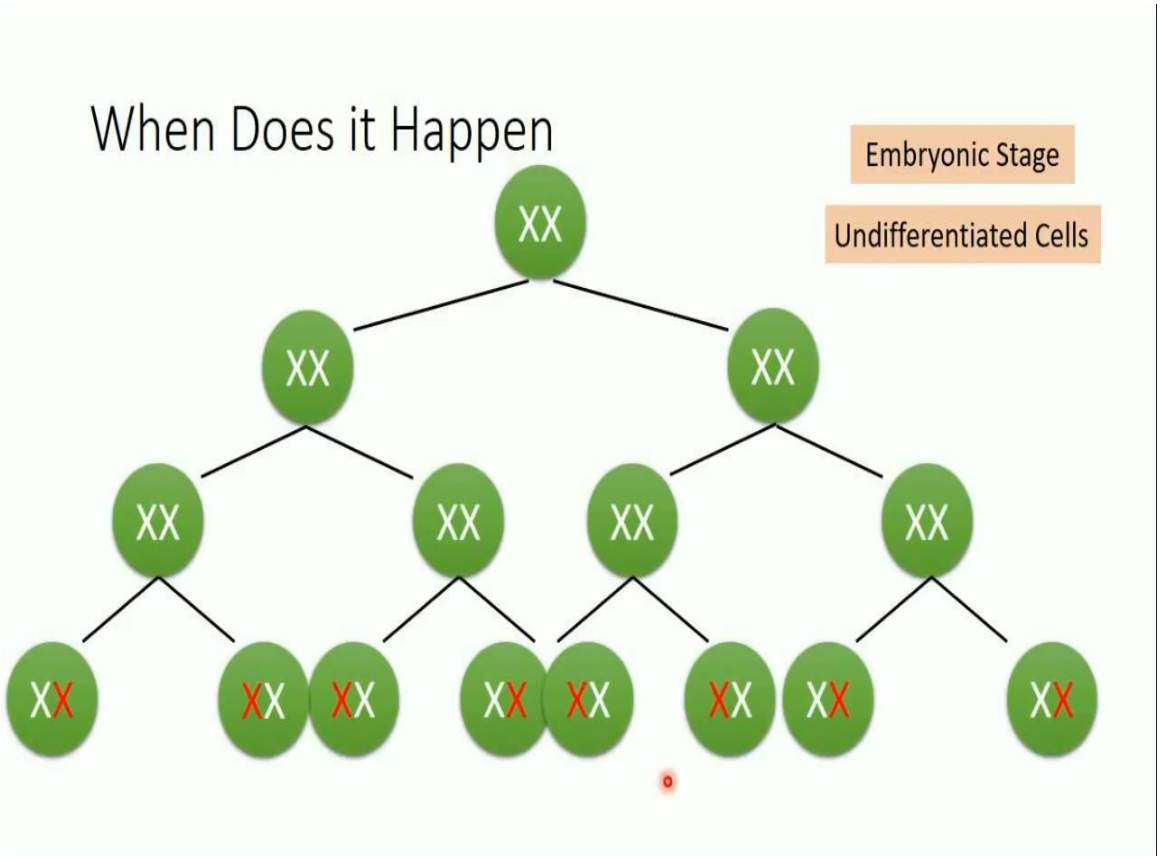
In short, the amount of X chromosome genes expressed has to be equal in both males and females.

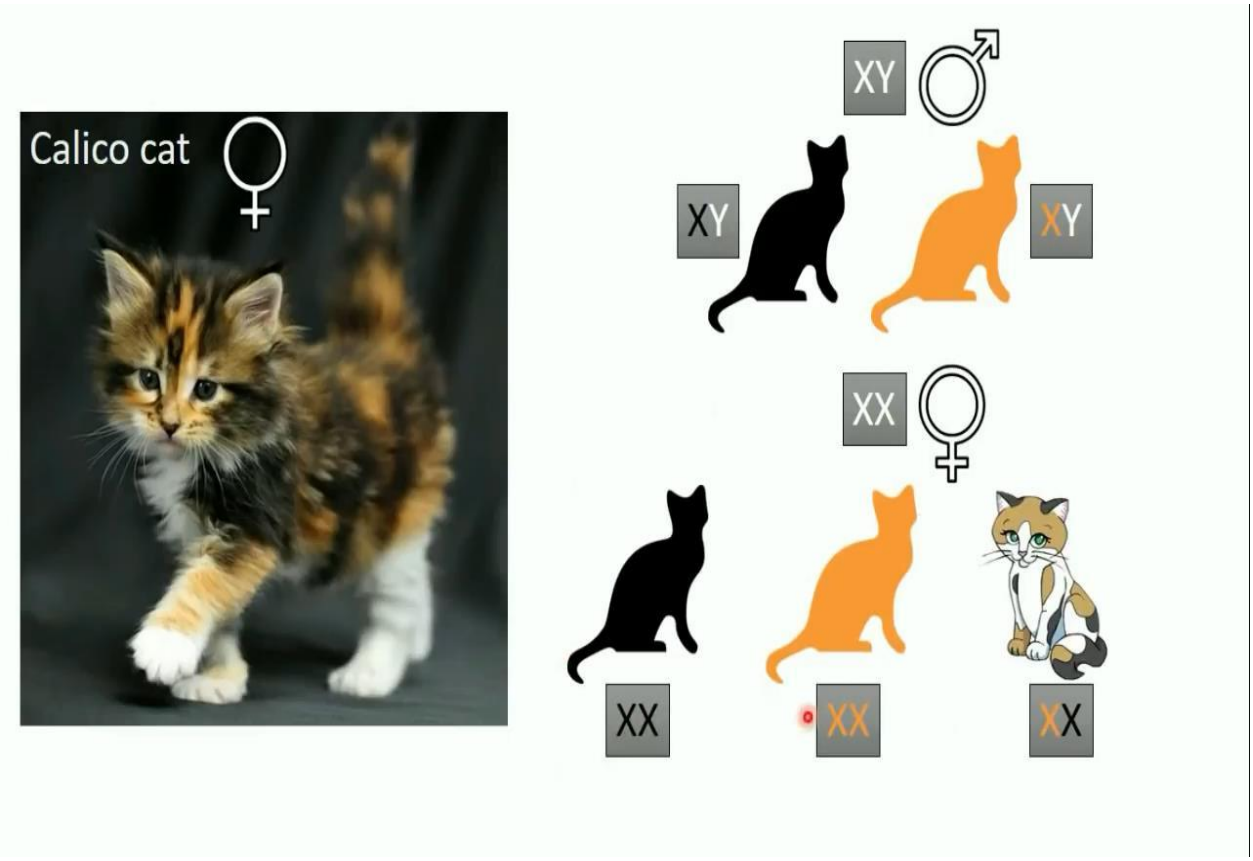
What is X Inactivation/ Barr Body?

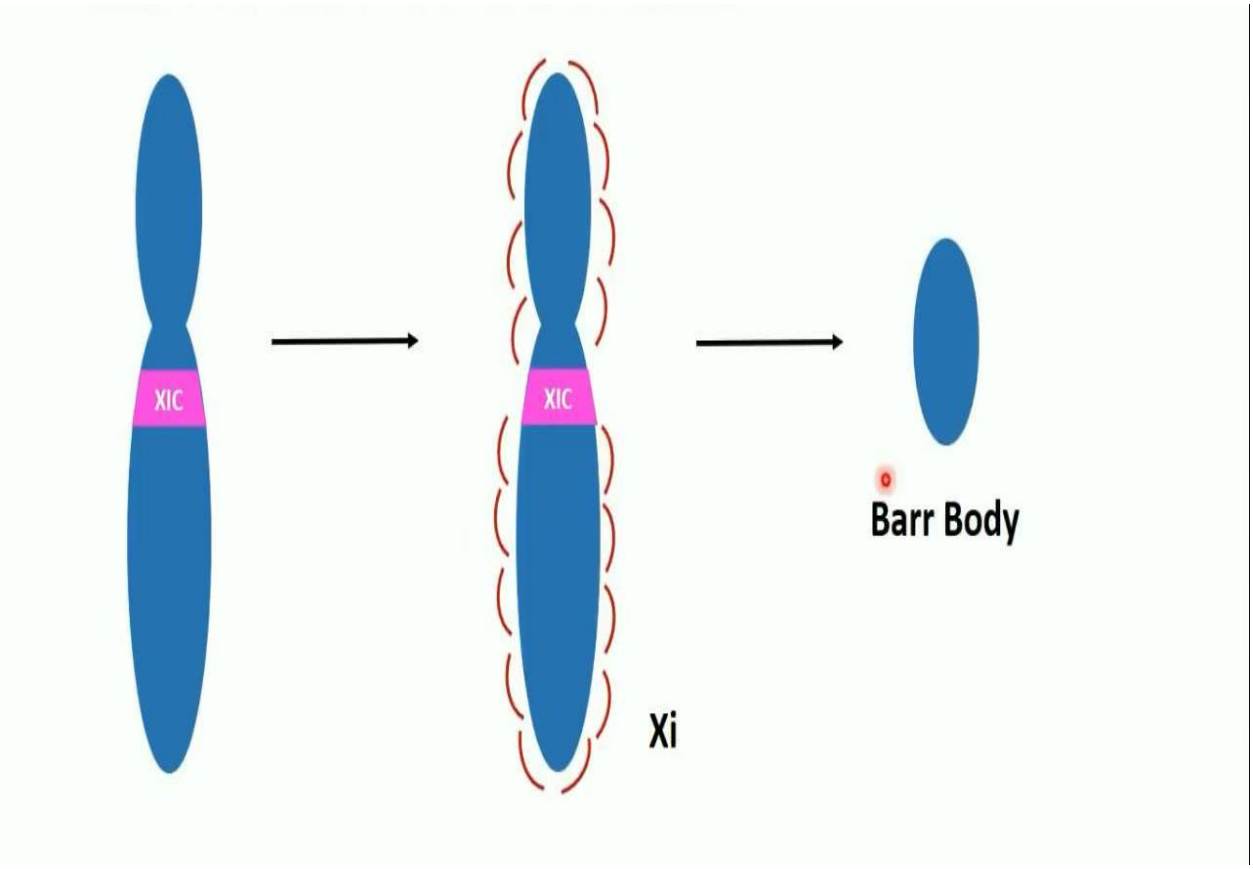
Sometimes called the **sex chromatin**, a darkly staining chromatin body present in the nucleus of most mammalian somatic female cells is called Barr body. It was discovered by M.L. Barr 1949. The barr body attached to the inner surface of the nuclear membrane. It contains a large amount of heterochromatin and lesser amount of euchromatin. Hence it contains large amount of RNA and lesser amount of DNA. It is inactivated X- chromosome.




Which Chromosome?
XX
50%


When Does it Happen
Embryonic Stage
Undifferentiated Cells
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX
XX


Calico cat
XY
XY
XY
XX
XX
XX
XX


XIC
XIC
Barr Body
Xi

Human being have 46 chromosome; in male 44 autosomes and two sex chromosomes(X and Y), where as in female 44 autosome and two sex chromosomes (X and X) these means the human female have the projection to produce twice as much X-chromosome product compare to human male, but these function does not happen. In female one of the two X-chromosomes become inactive and generally remains attached to nuclear membrane in interphase cell stage

Condition	Sex	Chromosomes	Number of Barr Bodies
Normal	Female	XX	1
Normal	Male	XY	None
Trisomy X	Female	XXX	2
Turner's Syndrome	Female	X	None
Klinefelter's Syndrome	Male	XXY	1
Down Syndrome	Male	XY	None
Down Syndrome	Female	XX	1

Procedure:

- Take a clean slide glass
- Place a drop of water in the center of the slide
- Gently scrap the inside of your cheek.
- Spread cells in the drop of water and mix well gently.
- Place cover slip on top of specimen
- Add one drop of methylene blue along one side of the cover slip.
- Along the opposite edge of the cover slip gently tough with a piece of paper towel.
- Observe barr boy by microscope under lens.

Observation:

In the female epithelial cell of the buccal mucos, small round, darkly stained which attracted to the nuclear membrane will be observed.