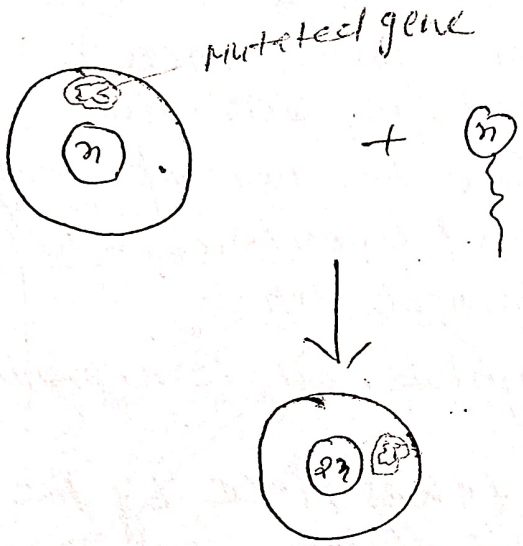
Cytoplasmic Inheritance (or Plasmagenes)

MSc-6 sem

→ Maternal inheritance follows non mendelian inheritence
→ Result of reciprocal cross would be different
→ Absence of linkage with chromosomal gene
→ Maternal inheritance



Critaria for extra nuclear inheritance

→ Difference in the result of reciprocal crosses (one parent usually maternal) exerts a grater influence than the other parent on a particular trait.

→ Maternal influence female gametes influences the trait by contributing the cytoplasm with cytoplasmic genes to the zygote.

→ Lack of mandelian segregation of the cytoplasmic ge i.e. non-mendelian.

→ Linkage absent with nuclear genes

→ Transmission of traits without transmission of nuclea gene in certain cases make it as infection like

Transmission.

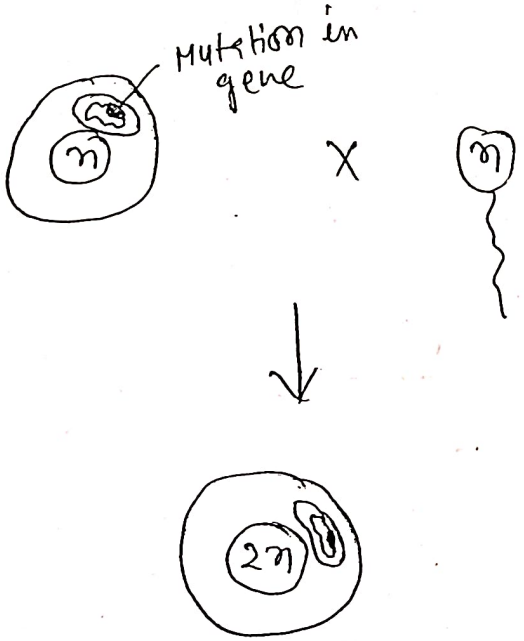
1. Mitochondrial Inheritance

→ e.g. LHON (Laber's Hereditary optic Neuropathy) ~~mutatio~~ occurs in complex I & complex III.

→ e.g. MERRF (Myoclonic epilepsy and Ragged Red fibre disease) - mutation in t-RNA

→ e.g. Patite in yeast - A mutant yeast colonies called patite which form a small colonies, defective in their ability to utilize oxygen in the metabolism of carbohydrate because of lack of cytochrome oxidase due to mitochondrial mutation. It also prevent the patite from producing enough no. of spores.

→ e.g. sterility in culex mosquito due to mutation in mitochondrial gene.



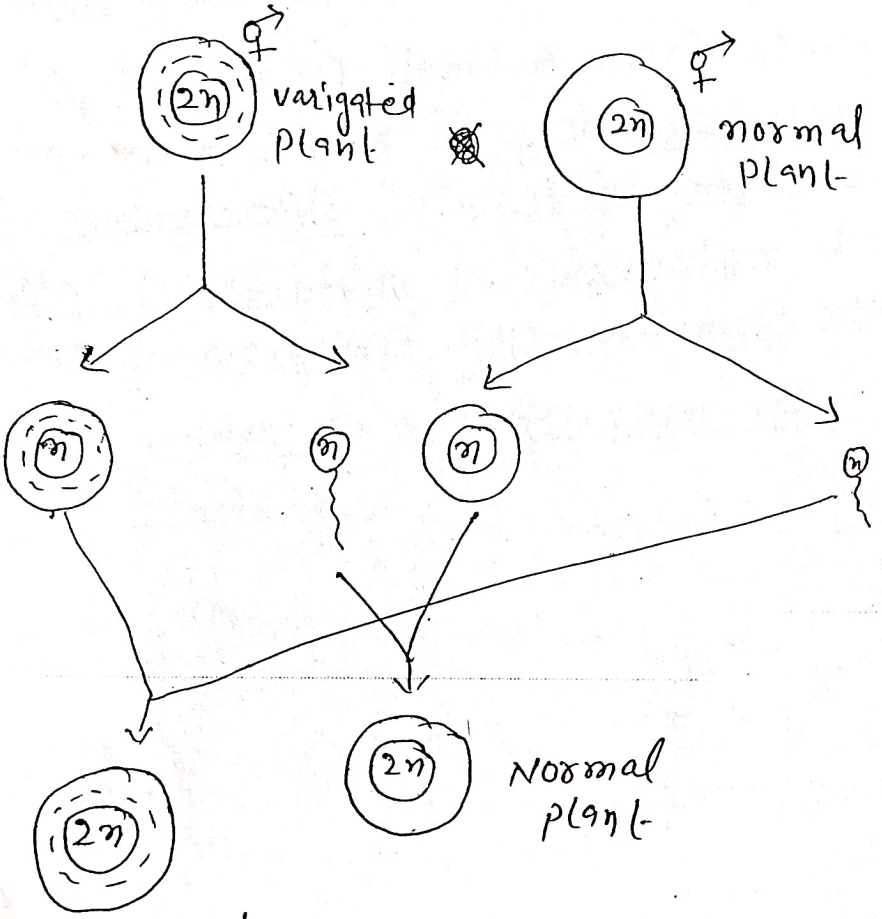
2. Chloroplast Inheritance

e.g variegation in leaf colouration in Mirabilis jalapa

Green leaf

variegated leaf

♂ – variegated plant (cross fertilization)



→ In Mirabilis jalapa the variegation in leaves or other vegetative part due to chloroplast inheritance through cytoplasm to the ovum. This variegation effect is transmitted through the maternal line the generation after generation because the pollen of the plant has little amount of cytoplasm which influence of variegation is negligible.