Dr. Rajesh Verma, Assistant professor and Head, U.G. Department of zoology, D.K. College, Dumraon (Buxar). Notes for B.Sc part 3rd, paper VI, Unit = 2(B).

Question :- Write notes on extra Nuclear genetic Material ?

Answer :-

Extranuclear inheritance :-

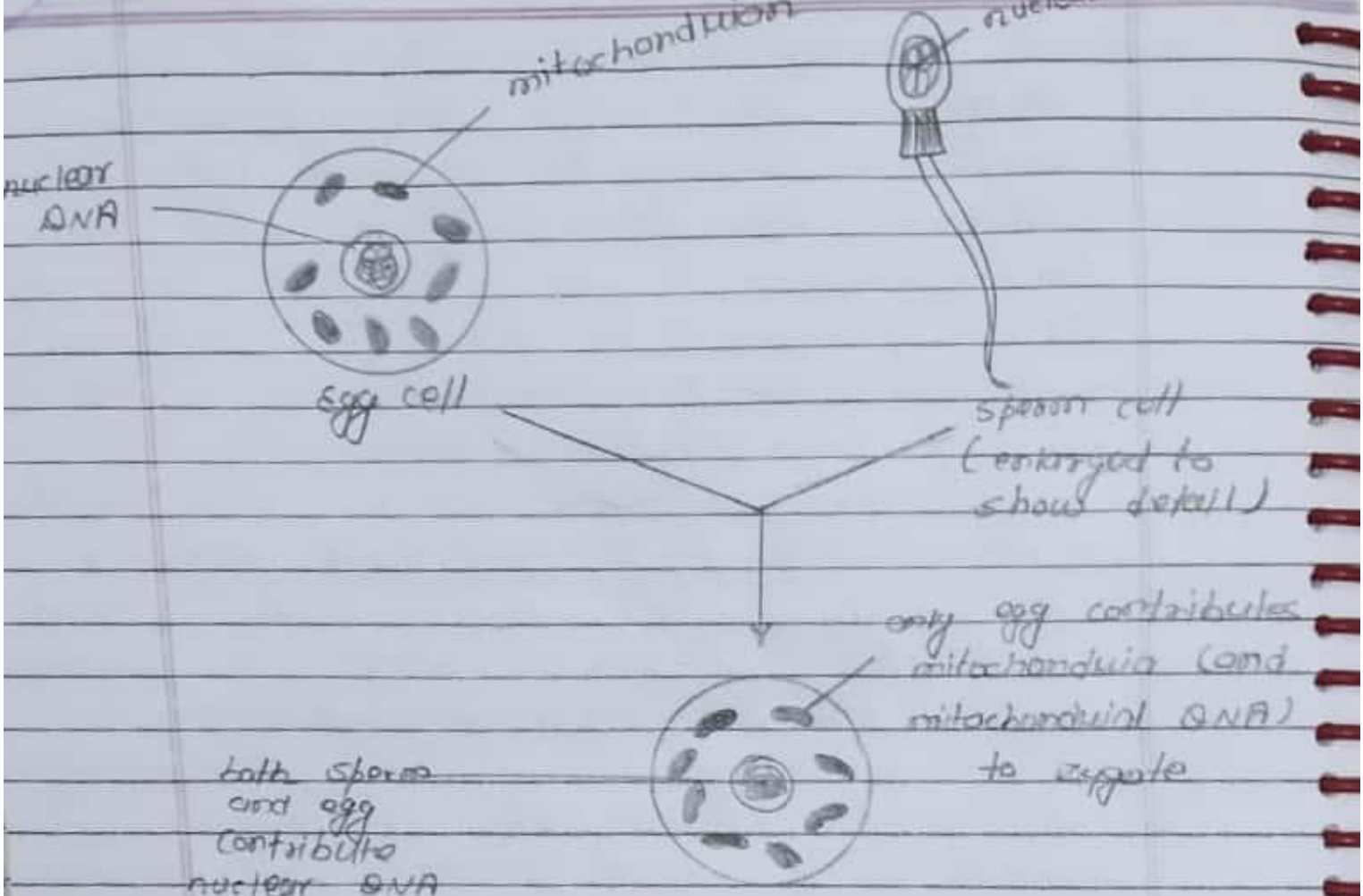
Extranuclear inheritance or cytoplasmic inheritance is the transmission of genes that occur outside the nucleus. It is found in most eukaryotes and is commonly known to occur in cytoplasmic organelles such as mitochondria and chloroplasts or from cellular parasites like viruses or bacteria.

Organelles :-

Mitochondria are organelles which function to transform energy as a results of cellular respiration. Chloroplasts are organelles which function to produce sugar via photosynthesis in plants and algae. The genes located in mitochondria and chloroplast

are very important for proper cellular function. The mitochondrial DNA and other organelles which function to produce sugars via photosynthesis in plants and algae. The genes located in mitochondria and chloroplasts are very important for proper cellular function. The mitochondrial DNA and other extra-nuclear types of DNA replicate independently of the DNA located in the nucleus, which is typically arranged in chromosomes that only replicate one time preceding cellular division. The extranuclear genomes of mitochondria and chloroplasts however replicate independently of cell division. They replicate in response to a cell's increasing energy needs which adjust during that cell's lifespan. Since they replicate independently, genomic recombination of these genomes is rarely found in offspring, contrary to nuclear genomes in which recombination is common.

Mitochondrial diseases are inherited from the mother not from the father.



Mitochondrial inheritance and chloroplast DNA

Parasites :-

Extranuclear transmission of viral genomes and symbiotic bacteria is also possible. An example of viral genome the bloodstream or breastmilk. This is of particular concern with mothers carrying HIV or Hepatitis C viruses. reproductive

Types :-

There are several types of mitosis. This is of particular concern with mother types of extranuclear inheritance exist.

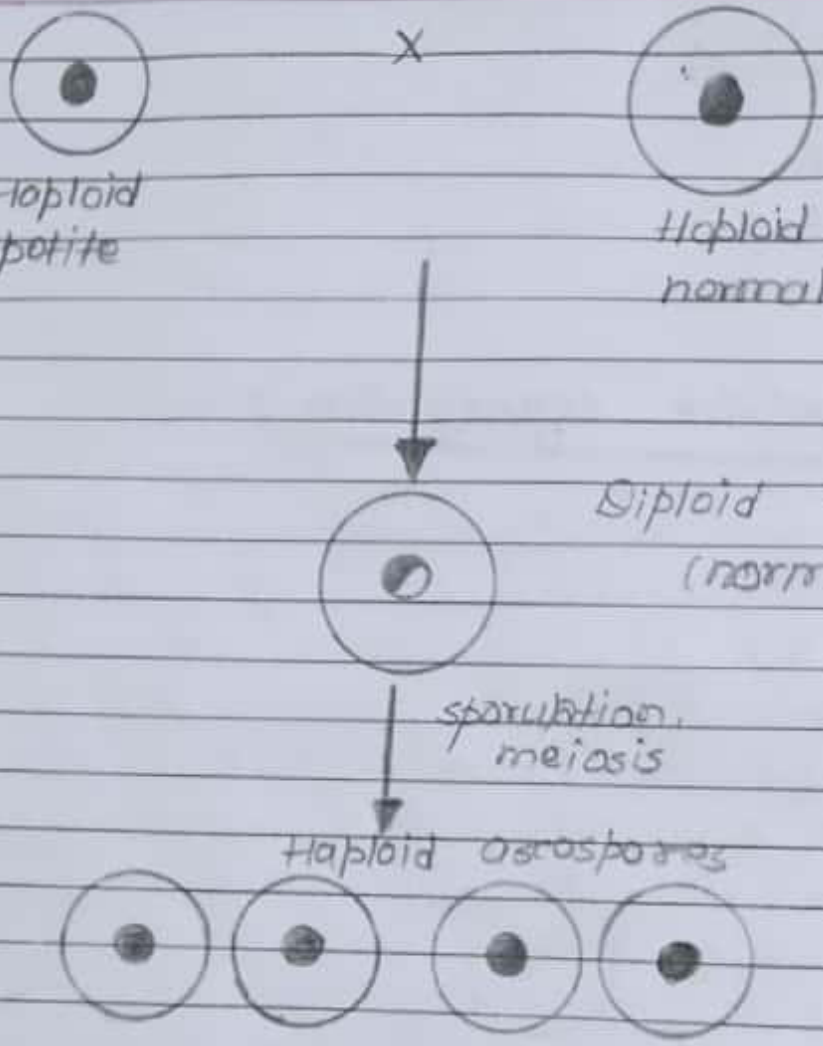
- **Vegetative segregation :-**

Vegetative segregation results from random distribution and partitioning of organelles. It occurs with chloroplast and mitochondria during mitotic cell divisions and results in daughter cells that contain a random sample of the parent cell's organelles. An example of vegetative segregation is with mitochondria of asexually reproducing yeast cells.

- **Uniparental Inheritance :-**

extranuclear genes where only one parent contributes organelles via the offspring. A example of uniparental gene transmission is the maternal inheritance of human mitochondrial gene. The mother's mitochondria are passed to the offspring at fertilization via the egg. The father's investigators have been found.

Page no.: 105



All normal

Mitochondrial inheritance in yeast

Very many cases which require further investigation have been reported of paternal mitochondrial genes are not transmitted to the offspring via the sperm. Very many cases which require further investigation have been reported of paternal mitochondrial genes are not transmitted to the offspring via the sperm.