METHOD OF REPLICATION → There are mainly 3 possible method of replication of DNA. They are —

1. Conservative replication → In this method the two parental polynucleotide chain of DNA remain together and both they newly formed polynucleotide chains from the daughter molecule of DNA.

2. Semi-conservative replication → In this method the two strands of a DNA molecule separated from each other and maintain there integrate and both the strand synthesized from the pool of nucleotides with their complimentary strand. As a result the synthesized molecules carry one of the two strands of parent molecule. Such type of replication is found in plants, animals and bacteria.

3. Dispersive replication → In this replication the two helicle strands are broken along there length and produce small fragments. Each segment of broken strand replicate and then all become connected to form two new molecules. Okazaki (1968) have suggested that replication is a discontinuous process and takes place in short segments.

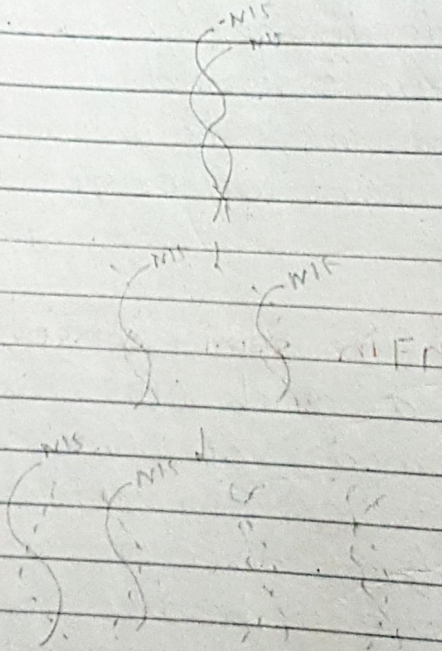
Replication in semi-conservative process

Watson and Crick (1953) were found that any model of DNA structure should be able to explain replication. They escaped from direction so that specific pairing have a possible copying mechanism for the genetic material. Delbruck (1963) suggested that the Watson and Crick model of DNA could theoritically replicate by three models, they are- Conservative, semi-conservative and dispersive as mention above.

The semi-conservative

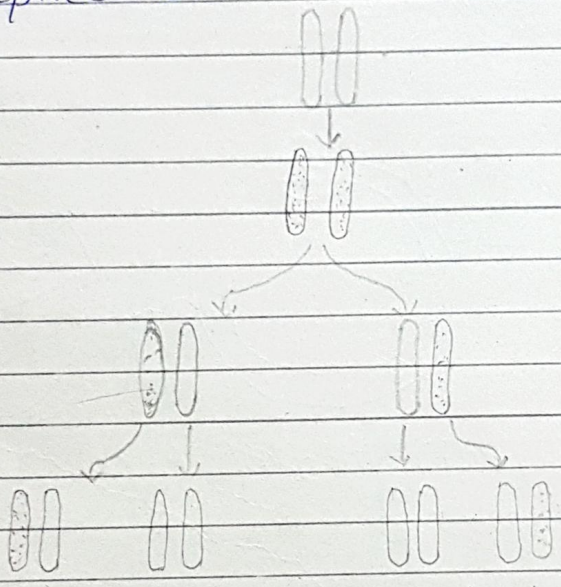
mode of replication has been experimentally supported by a number of workers.

The first experimental support was provided by Meselon and Stahl (19... in E. coli. The DNA of this micro organism was labeled N^{15} isotopes. It was then left for replication. In F_1 generation, one strand was found labelled with N^{15} isotopes. where as the second strand was free of the isotopes. In F_2 generation same result were obtained.



This was also proved by Taylor (1957) in Vicia faba. The chromosomes of this plant were labelled with H^3 isotopes. They were replicated and in F_1 generation only one chromatid was found labelled with H^3 isotopes. The second

chromatid was found labelled free from the isotopes. In F_2 generation two chromatids -osomes had one chromatid labelled with H^3 isotopes and one each chromatid was free from it. Similarly there were two chromosomes in which both the chromatids were free from H_3 isotopes It clearly proved that DNA replicates following semi-conservative mode of replication.



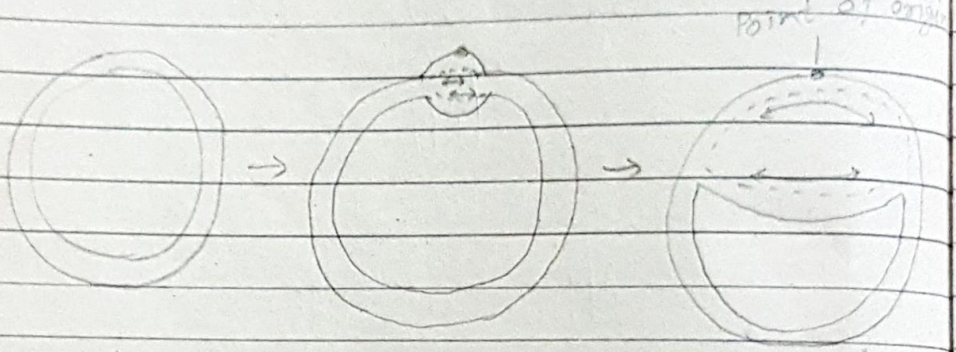
TAYLOR's Experiment illustrating semi-conservative segregation of chromatids.

Replication of Circular DNA → DNA of *E. coli* and bacteriophages are circular. They replicated through different mechanism.

Ⓐ **Replication of DNA of *E. coli*** → The DNA of *E. coli* has two strands. Its replication has been demonstrated by Cairns (1967). It is known as Cairns model.

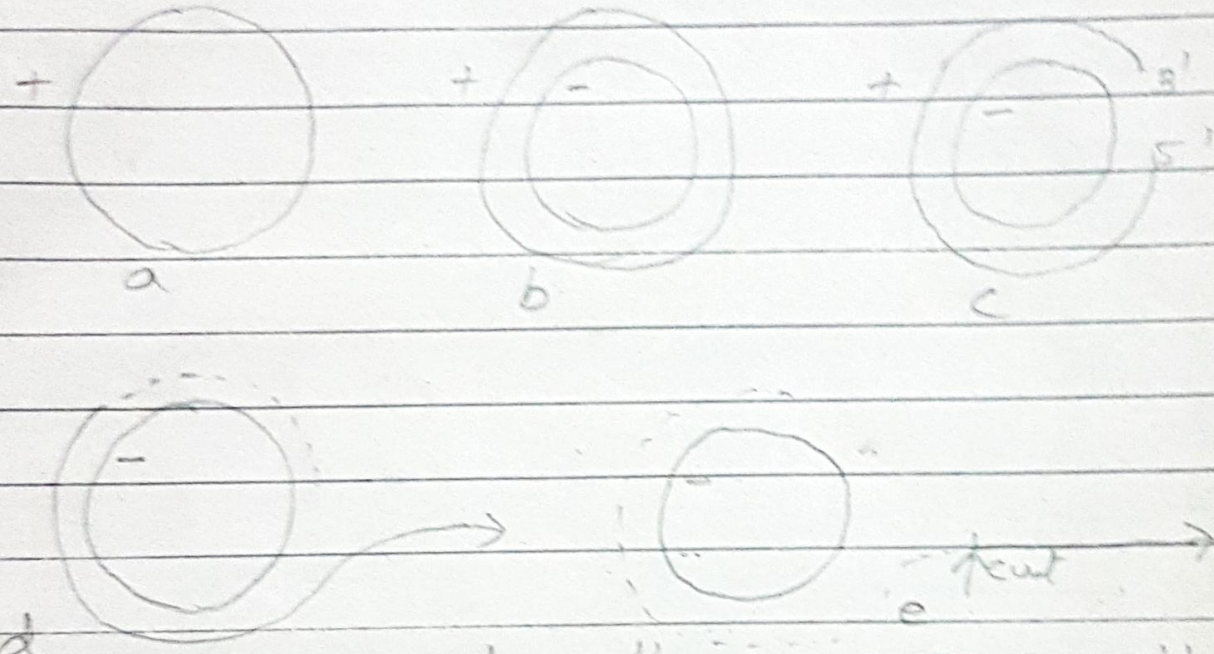
The replication begins

and proceeds in both direction. There is formation of a replicating bubble or Eye at the point of origin. Both strands of parental DNA replicates simultaneously by the movement of two replicating forks away from each other. The DNA appears like Greek later "Theta". After a brief period of replication the DNA are finally seperated to form the new DNA molecule.



Bidirectional replication of E. coli chromosome.

(b) Replication of DNA of viruses → The Lamdaphase and Phix 174 viruses have single stranded DNA which replicated through rolling circle method. It has been demonstrated below.



The rolling circle method of DNA replication

Okazaki Segments → Okazaki (1974) of Japan demonstrated that DNA replication occurs in short segments consisting of 1000 to 2000 nucleotides. These are called Okazaki segments. They unite with the help of Ligases to give rise the complete DNA molecule.