



"MESELSON AND STAHL  
EXPERIMENT"

BY:

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# INTRODUCTION

- **Matthew Meselson** and **Franklin Stahl** in 1958 performed the most beautiful experiment in Biology which supported the hypothesis proposed by Watson and Crick that DNA replication was semiconservative.



## WHAT IS DNA REPLICATION ??

- DNA replication is a mean to produce new molecules that have the same base sequence.
- Occurs during interphase of the cell cycle ,especially in "S" phase.



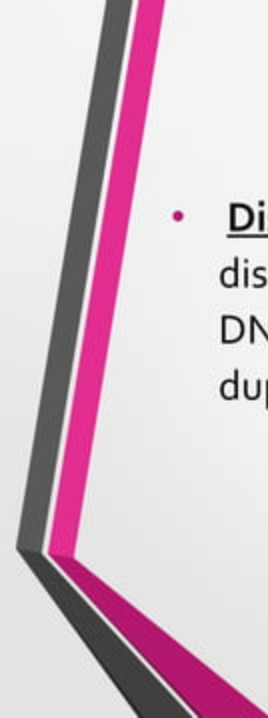


## MODES OF DNA REPLICATIONS

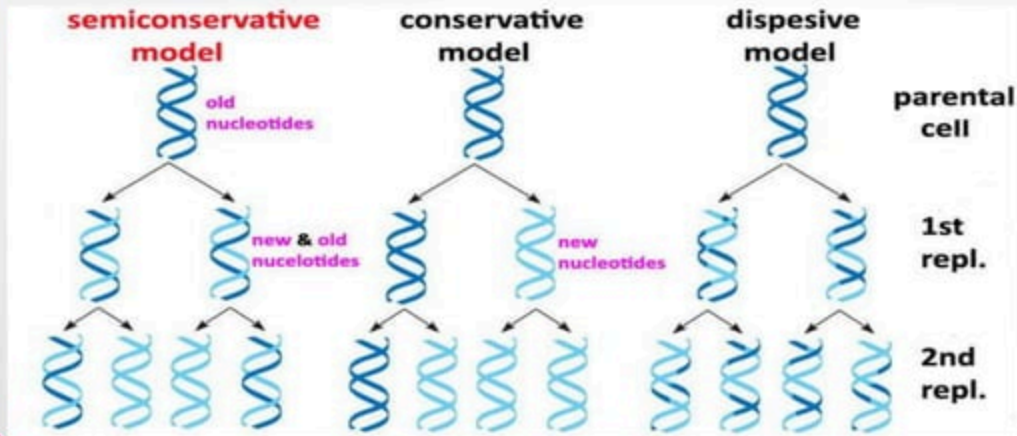
- Semiconservative.
- Conservative.
- Dispersive.

## MODES OF DNA REPLICATION

- **Semiconservative**: Daughter duplex made of one parental and one newly synthesized strand.
- **Conservative**: Original strands stay together after serving as templates for two new strands that also stay together; one contains only "old" DNA, the other only "new" DNA.

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- **Dispersive**: Integrity of both parental strands disrupted; new duplex strands made of old & new DNA; neither the parental strands nor the parental duplex is preserved.

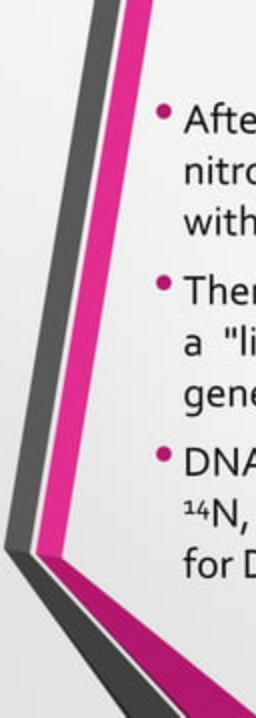
# TYPES OF DNA REPLICATION



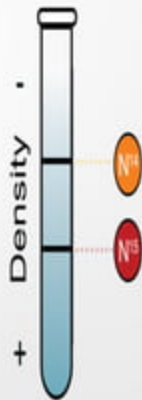
## MESELSON-STAHN EXPERIMENT

- Meselson and Stahl conducted their famous experiments on DNA replication using *E. coli* bacteria as a model system.
- They began by growing *E. coli* in medium, or nutrient broth, containing a "heavy" isotope of nitrogen,  $^{15}\text{N}$ .
- Bacteria took up the nitrogen and used it to synthesize new biological molecules, including DNA.

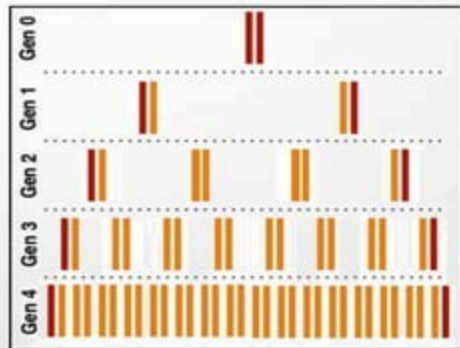
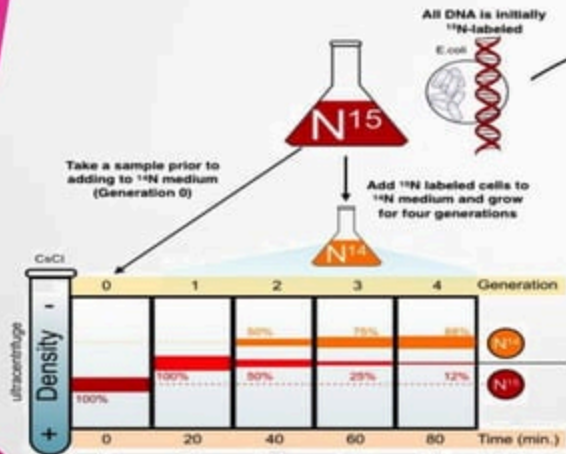


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- After many generations growing in the  $^{15}\text{N}$  medium, the nitrogenous bases of the bacteria's DNA were all labeled with heavy  $^{15}\text{N}$ .
  - Then, the bacteria were switched to medium containing a "light"  $^{14}\text{N}$  isotope and allowed to grow for several generations.
  - DNA made after the switch would have to be made up of  $^{14}\text{N}$ , as this would have been the only nitrogen available for DNA synthesis.

- They collect small samples in each generation and then extract and purify the DNA and measured the density of the DNA using density gradient centrifugation.
- Cesium chloride, forms a density gradient from the top to the bottom of the spinning tube.



# RESULTS OF THE EXPERIMENT



## CONCLUSION

- Meselson and Stahl demonstrated that DNA replicated semi-conservatively, meaning that each strand in a DNA molecule serves as a template for synthesis of a new, complementary strand.



THANK YOU