<u>NOTES: 12.1 - DNA</u> (History; Identifying the Substance of Genes)



What we've learned so far...

- Cells make proteins
- Genetic information is passed

on through chromosomes

- <u>Compacted DNA and proteins</u> = <u>chromosomes</u>
- Genetic information is stored in the <u>nucleus</u>
- Genetic information is essential; each cell must receive all info. (ensured by <u>MITOSIS</u>)



Identifying the Substance of Genes...

To truly understand genetics, biologists first had to discover the chemical nature of the gene. →How do genes control what you

look like?



12-1 DNA



Vocabulary:

- Transformation
- Bacteriophage

Key Concepts:

- What did scientists discover about the relationship between genes and DNA?
- What is the role of DNA in heredity?

DNA's "Experiment" History

- For thousands of years, humans have noticed that parents pass on traits to their offspring...
- What is the process and/or molecule that makes this possible...??



DNA's "Experiment" History

- Frederick Griffith: How do certain types of bacteria cause pneumonia?
 - The experiment that tested this question led to new knowledge.
 - Genetic information could be <u>transformed</u> (passed) from one bacterium to another.





TRANSFORMATION

- Heat killed pathogenic bacteria had passed their disease-causing ability to the harmless strain
- Griffith called this **TRANSFORMATION**
 - One strain of bacteria (harmless) had changed into the other (harmful, or disease-causing)
- Some <u>factor</u> was transferred from the heat killed cells to the live cells
 - This factor might contain a <u>GENE</u> with information that could change harmless bacteria into disease causing ones!

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Griffith's experiments



Avery & DNA

- Oswald Avery's group of scientists decided to repeat Griffith's experiment
 - ➔ to determine which MOLECULE in the heat killed bacteria was needed for transformation
- Made an extract (juice) from heat killed bacteria and added enzymes that destroy proteins, carbohydrates, & lipids

→Transformation still occurred!

- Repeated the experiment but added <u>enzymes that</u> <u>destroy DNA</u>
 - → Transformation DID NOT occur!!



Avery's Conclusion

 Avery's Conclusion: <u>DNA is the</u> <u>substance that stores and transmits</u> <u>genetic info</u>. from generation to generation

Hershey-Chase Experiment



- They studied viruses; specifically bacteriophages
 - Bacterio = bacteria
 - Phage = eater
- Viruses are made up of:
 - DNA + protein coat
- Research Question: Which part of the virus enters the infected bacteria cell?

- They grew viruses in the presence of radioactive markers ³²P and ³⁵S.
 - Sulfur is found in protein coat
 - Phosphorus is found in DNA







Hershey-Chase Conclusion:

- after viruses had infected the bacteria, bacteria were collected & tested for radioactive ³⁵S and ³²P
- nearly all of the radioactivity in the bacteria was from phosphorus!
- Genetic information of the bacteriophage that was passed into the infected bacteria was <u>DNA</u> (NOT protein!)



The Hershey-Chase Experiment

Hershey-Chase Conclusion:

- their experiment confirmed Avery's results
- this convinced many scientists that DNA was the genetic material found in genes...not just in viruses and bacteria, but in <u>all living cells</u>



- <u>Storing information</u>: the genes that make flowers purple must somehow carry that information; <u>blood type</u>, <u>eye color</u>; patterns of development
- <u>Copying information</u>: before a cell divides, it must make a <u>complete copy</u> of every one of its genes
- Transmitting information: genes are transmitted from one generation to the next

HOW does DNA...



- Store information?
- Copy information?
- Transmit information?

-first, we must understand the STRUCTURE of DNA!!...next time!