

## Review 15

- Hereditary Factors:**
- Where are they? IN NUCLEUS OF CELL
  - What are they? PROTEIN OR NUCLEIC ACID?
  - How do they work?
  - How do they get passed on?

### WHAT IS THE COMPOSITION OF THE HEREDITARY FACTORS?

the material of the hereditary factors must be

- exactly reproducible
- reliably stable
- capable of carrying complex information

can't be small molecules or ions

### Protein or Nucleic Acid?

\* Proteins favored because:

- ☞ known to be very important to cells; not much known about nucleic acids or their structure
- ☞ complexity argument (example of four amino acids versus four nucleic acids—160,000 different combinations versus 256 combinations) favored proteins over nucleic acids

\* How does one decide whether proteins or nucleic acids are the hereditary material?

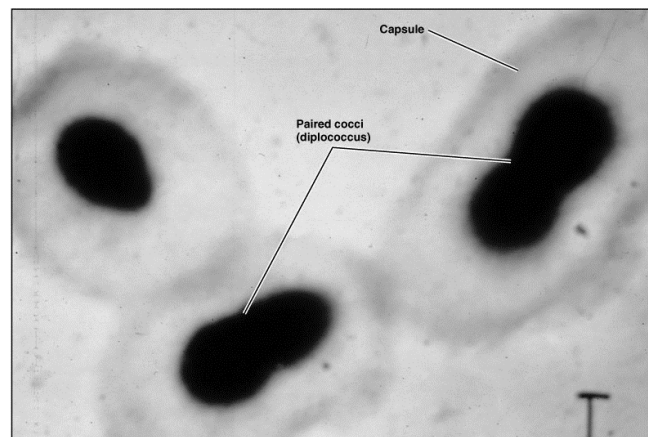
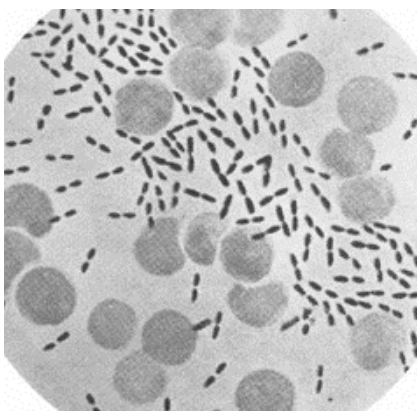
\* Accumulating evidence in favor of nucleic acids:

1) 1928 F.W. Griffith--experiments with Streptococcus, BACTERIUM that causes a particularly virulent form of pneumonia

- ▮ found presence of a "transforming factor" which transforms non-virulent bacteria into virulent bacteria

2) 1943 O.T. Avery

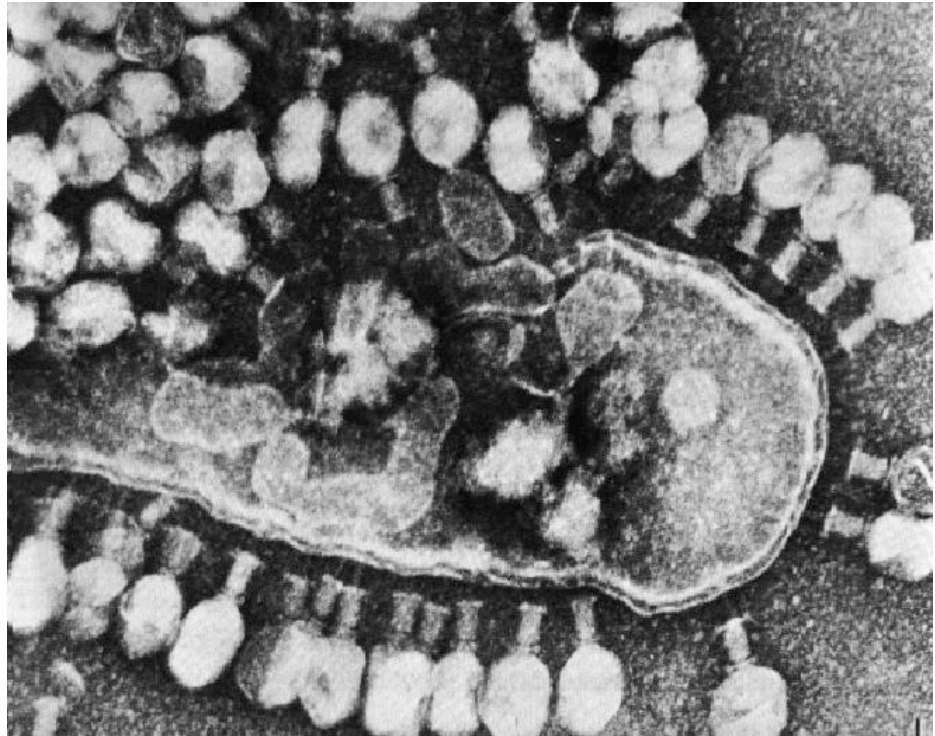
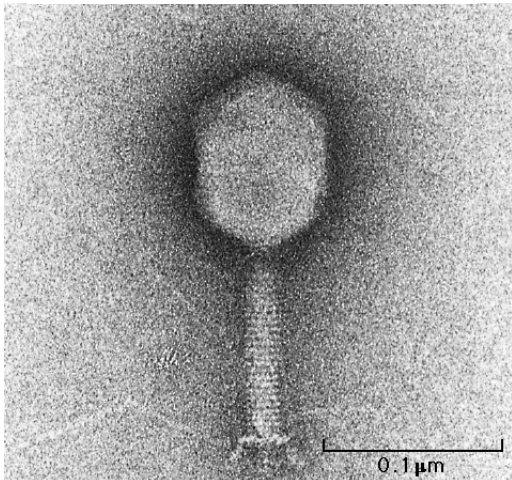
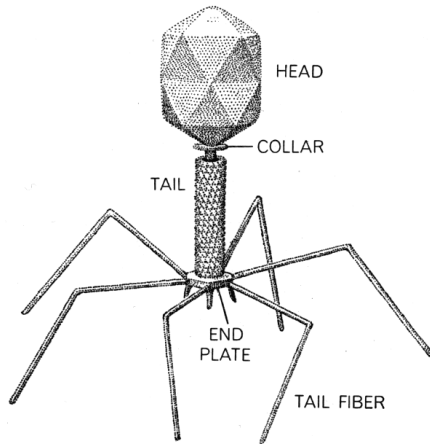
- ▮ identified transforming factor as DNA



## Review 15, con't

### 3) 1952 Hershey and Chase--experiments with radioactively labeled BACTERIOPHAGE (bacterial virus)

▣▣▣ showed that it was DNA that entered the bacterial cells, not protein



### 4) 1953 Watson and Crick identify the double helical structure of the DNA molecule

▣▣▣ it's the DNA that carries the hereditary information!

#### Nucleic Acids

DNA and RNA--know them & differences between them!

Nucleotides and nucleotide triphosphates (e.g. ATP)

Structure of nucleic acids

alternating –sugar–phosphate–sugar–phosphate– backbone  
bases sticking “free” off the sugars