

Name: \_\_\_\_\_ Period: \_\_\_\_\_ Date: \_\_\_\_\_



**Penguin Bay Biology**

- Biology Class, Simplified -

## 12.1 Student Notes

### Vectors

#### Genetic Engineering

\_\_\_\_\_ is the process of manipulating \_\_\_\_\_  
\_\_\_\_\_ to develop technologies. Genetic engineering uses biotechnology to  
directly \_\_\_\_\_.

\_\_\_\_\_, which are made up of \_\_\_\_\_, are the \_\_\_\_\_. Genes from one type of  
organism can be \_\_\_\_\_ and \_\_\_\_\_ when  
put into another kind of organism.

- **Example:** \_\_\_\_\_ are routinely transferred  
into \_\_\_\_\_ in order to synthesize products for medical and  
commercial use.

#### Vectors

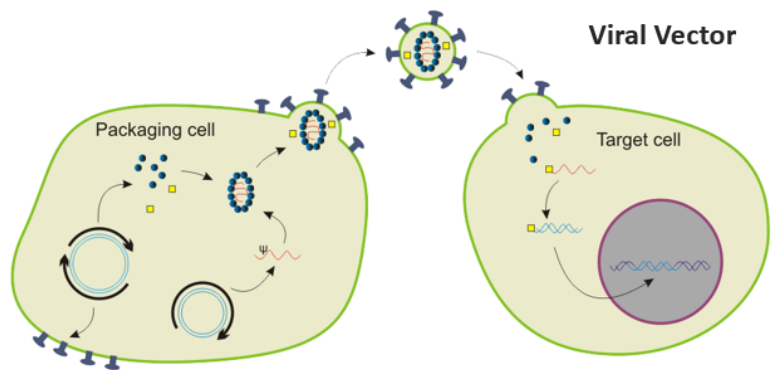
\_\_\_\_\_ are used  
by genetic engineers to

\_\_\_\_\_ into a

\_\_\_\_\_. The most common molecular vectors are \_\_\_\_\_ and  
\_\_\_\_\_.

Genetically engineered vectors contain \_\_\_\_\_ DNA or RNA.

\_\_\_\_\_ engineered from \_\_\_\_\_  
\_\_\_\_\_ are known as \_\_\_\_\_ DNA (\_\_\_\_\_).



#### Plasmids

\_\_\_\_\_ are double stranded \_\_\_\_\_  
capable of \_\_\_\_\_  
within \_\_\_\_\_ cells.

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\_\_\_\_\_ of foreign plasmids are \_\_\_\_\_ each time infected bacteria \_\_\_\_\_.

\_\_\_\_\_ are used to determine if a \_\_\_\_\_ has been successfully \_\_\_\_\_ into a cell.

- Example: Scientists make the insulin ( \_\_\_\_\_ ) used by Type 1 Diabetics by engineering a \_\_\_\_\_ and inserting it into a \_\_\_\_\_. The plasmid is put into a \_\_\_\_\_ and allowed to ferment before the insulin is harvested and purified for medical use.

## Viruses

A \_\_\_\_\_ is composed of a \_\_\_\_\_ of genetic material ( \_\_\_\_\_ ) and an outer protein coat ( \_\_\_\_\_ ).

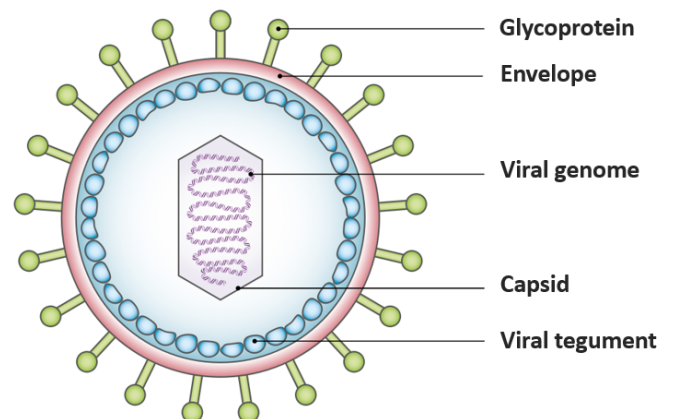
Viruses that infect \_\_\_\_\_

\_\_\_\_\_ have an outer

\_\_\_\_\_ that is mostly derived from \_\_\_\_\_.

The \_\_\_\_\_ along the \_\_\_\_\_ identify and bind to \_\_\_\_\_ on host membranes.

- Example: \_\_\_\_\_ have promising applications in the future of \_\_\_\_\_. Genetic disorders caused by \_\_\_\_\_ in DNA, such as cystic fibrosis and hemophilia A, might one day be treated by viral vectors delivering \_\_\_\_\_ of these \_\_\_\_\_ to the patient's cells.



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### ***Are Viruses Alive?***

Since viruses are incapable of \_\_\_\_\_, they are generally regarded as \_\_\_\_\_.

However, viruses do contain \_\_\_\_\_. Most viruses contain \_\_\_\_\_ in their nucleic acid core, while some contain \_\_\_\_\_.

In order to \_\_\_\_\_, a virus must \_\_\_\_\_ into a \_\_\_\_\_.

### ***Viral Reproduction***

Once a virus has invaded a host cell, its

\_\_\_\_\_ (capsid) is stripped off by cell

\_\_\_\_\_ releasing viral \_\_\_\_\_ into the cell.

Viruses rely on the host cell's natural

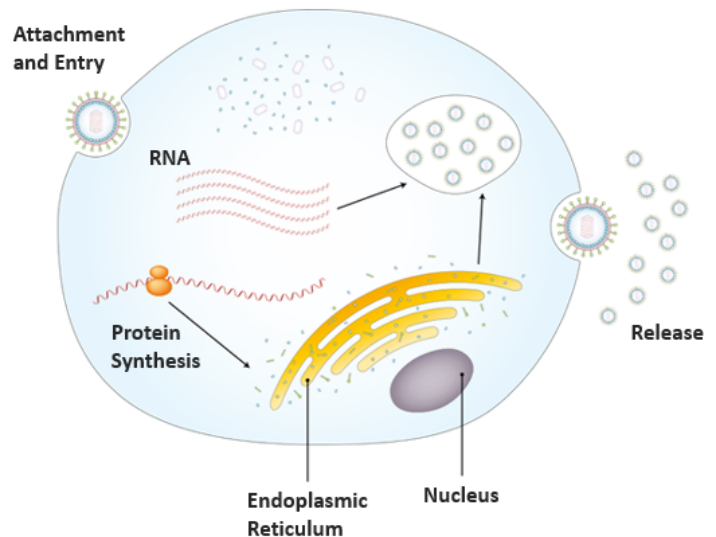
\_\_\_\_\_ machinery to \_\_\_\_\_ from its exposed genetic material.

Viral mRNA \_\_\_\_\_ the cell to produce the \_\_\_\_\_ necessary for complete viral \_\_\_\_\_.

\_\_\_\_\_ produced by the cell are assembled into complete virus particles known as \_\_\_\_\_.

Once mature, virions within an \_\_\_\_\_ either remain \_\_\_\_\_ or are \_\_\_\_\_ from the cell.

Virions are typically released from animal cells by means of \_\_\_\_\_ or "\_\_\_\_\_".



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### *Bacteriophages*

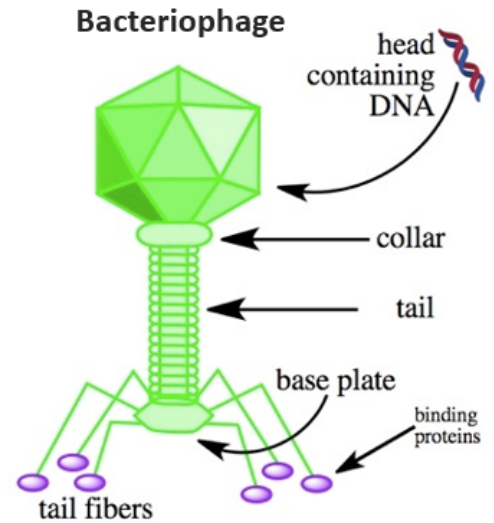
\_\_\_\_\_ are viruses that infect \_\_\_\_\_.

Using its \_\_\_\_\_

\_\_\_\_\_ a bacteriophage \_\_\_\_\_ itself to a bacterium and \_\_\_\_\_ its \_\_\_\_\_ into the host cell.

Once mature \_\_\_\_\_ have been assembled, they either remain \_\_\_\_\_ or are \_\_\_\_\_ from the cell.

Virions are typically released from bacteria cells by means of \_\_\_\_\_, a \_\_\_\_\_ in the bacteria cell's membrane due to a compromise in \_\_\_\_\_.



### *Retroviruses*

A \_\_\_\_\_ is a type of virus that uses \_\_\_\_\_ as its genetic material.

After \_\_\_\_\_ a host cell, retroviruses use an \_\_\_\_\_ called \_\_\_\_\_ to make a \_\_\_\_\_ ( \_\_\_\_\_ ) of its \_\_\_\_\_.

Because reverse transcription lacks the \_\_\_\_\_ of typical \_\_\_\_\_, retroviruses are highly prone to \_\_\_\_\_. These mutations make retroviruses highly \_\_\_\_\_ to treatment and vaccination.

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### HIV Retrovirus

#### *HIV Retrovirus*

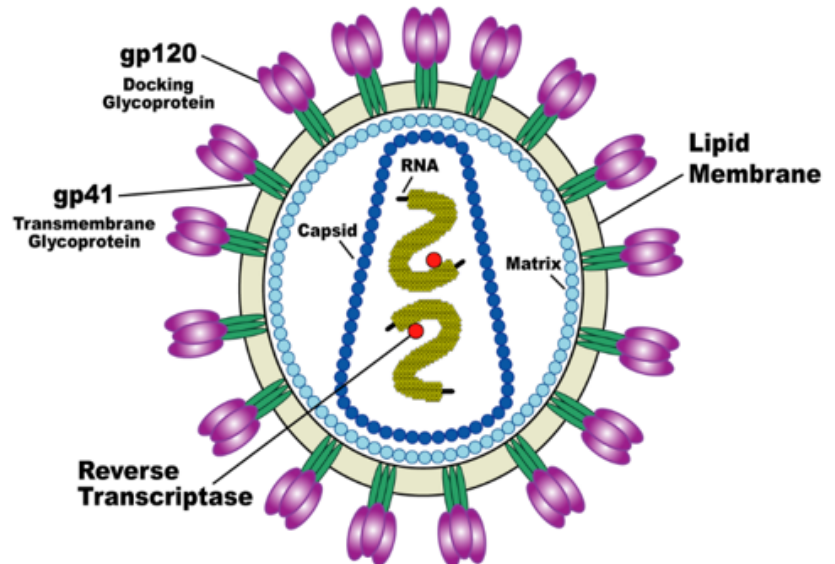
\_\_\_\_\_ is a  
\_\_\_\_\_  
that attacks cells in the human  
\_\_\_\_\_  
\_\_\_\_\_.

HIV's high \_\_\_\_\_  
rate and fast \_\_\_\_\_  
\_\_\_\_\_ result in high  
\_\_\_\_\_.

This means that many

\_\_\_\_\_ of HIV can be generated in a \_\_\_\_\_ infected  
individual in just \_\_\_\_\_.

Over time, an \_\_\_\_\_ individual infected by the HIV virus will develop  
\_\_\_\_\_, a progressive \_\_\_\_\_ of the immune system.



#### *Lentiviruses*

\_\_\_\_\_, such as HIV, are a type of \_\_\_\_\_  
characterized by a long span of time ( \_\_\_\_\_ )  
between \_\_\_\_\_ to the virus and the first \_\_\_\_\_  
\_\_\_\_\_.

Lentiviruses are an efficient method of \_\_\_\_\_ because they  
can \_\_\_\_\_ a large amount of \_\_\_\_\_ into host cell \_\_\_\_\_.

- Example: Genes required for \_\_\_\_\_ must always be  
\_\_\_\_\_ from lentiviruses before use in \_\_\_\_\_  
\_\_\_\_\_ in order to prevent potential \_\_\_\_\_  
\_\_\_\_\_.