

### **3: HISTORY OF VIROLOGY**

This timeline presents some of the major events in the history of virology.

Don't  
put glue  
inside  
this box.

# Timeline of Virology

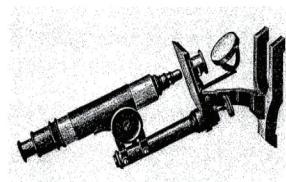
"Variolation" was done for several centuries before Jenner's famous vaccination experiment. It was practiced in Asia and Africa. Scabs or pus were collected from someone who had a light case of smallpox, and these were dried and then blown in the nose (or scratched into the skin) of people who had not yet caught it.



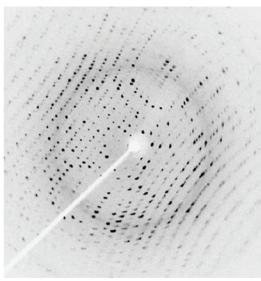
Lady M. in Turkish costume

Lady Montagu, the wife of the British ambassador to the Ottomans brought this technology to England in 1717. The practice soon spread to Europe and became very popular.

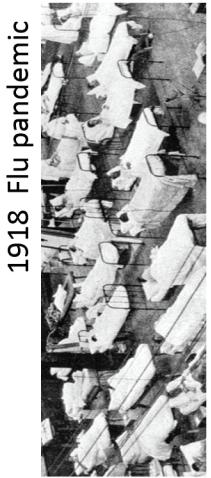
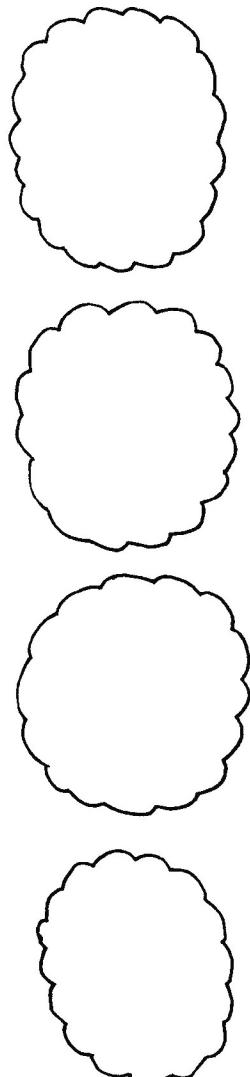
The microscope was being developed all during the 1700s and 1800s. This allowed the discovery of bacteria.



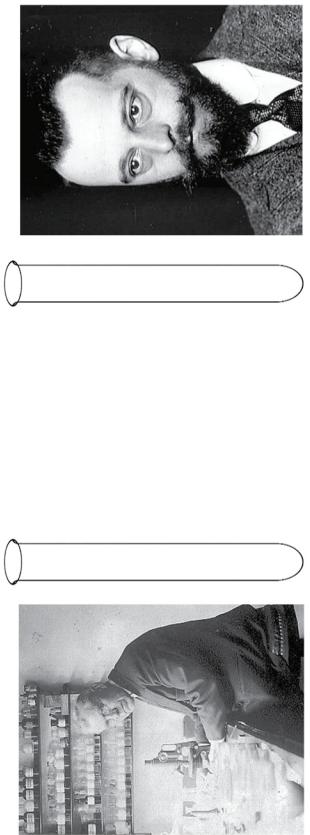
Smallpox was called "variola." If it didn't kill you, if left you scarred for life. Variolation spared many people.



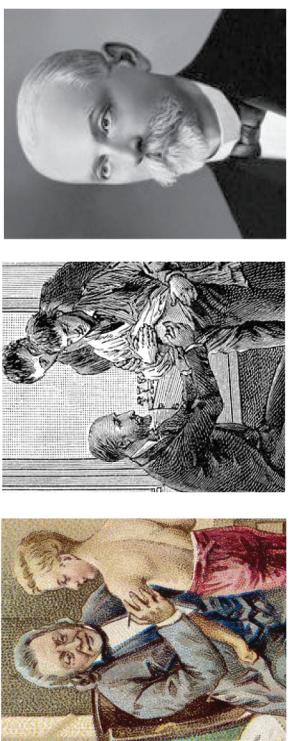
X-ray diffraction patterns allow scientists to figure out structure of crystals.



1918 Flu pandemic



Coins the word "bacteriophage" and begins using phages to treat bacterial diseases of animal and humans. Took this tech to other countries.



Works with what later turns out to be TMV, and coins the word "virus" for this newly discovered infectious agent.

1892  
1884  
1885  
1891  
1898  
1906  
1913  
1914  
1917 - 1919

Observes that even after straining with the Chamberland filter, the water from his plants still contain an infectious agent.

gives a rabies vaccine to a boy who was bitten by a rabid dog. Pasteur had already vaccinated sheep against anthrax bacteria.



This device allowed scientists to strain out anything larger than 100 nm. (.1 micron) They knew that bacteria were much larger than that, so anything that got through the filter could not be a bacteria.



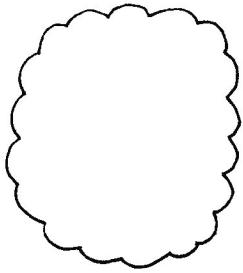
Ross Harrison discovers how to grow animal tissues in lymph solution.

This is the first time scientists can work with tissues "in vitro." (vitro = glass)

1933: Influenza grown in eggs.



First micrograph of TMV using an electron microscope.

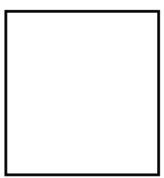
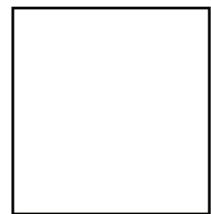


## GLOBAL IMMUNIZATION EFFORTS



discovers "reverse transcriptase" along with Howard Temin.

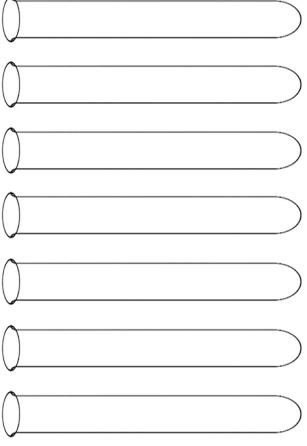
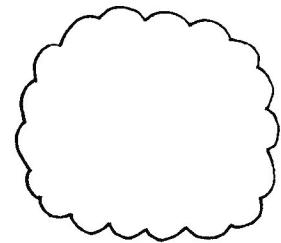
In 1971 he develops the **Baltimore classification** system, which is based on viral genome.



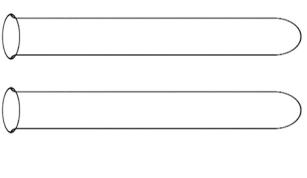
Wendell Stanley crystallizes TMV and uses X-ray diffraction to show that it is a rod made of protein.



Scientists figure out that insects can carry viral diseases from plant to plant, acting as "vectors."



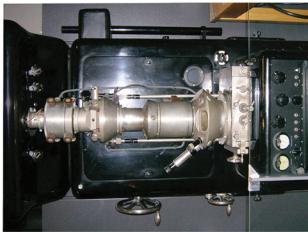
develops a vaccine for the dreaded polio virus.  
(After that, he builds the Salk Institute for virology in San Diego.)



**Hemagglutination test**  
discovered. (Some viruses will stick to red blood cells and make them clump.)



Invented by Ernst Ruska and Max Knoll.

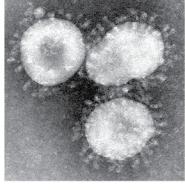


Chemists discover the chemicals that DNA is made of:

- 1) ribose sugar
- 2) phosphate
- 3) nucleic acids

They have no clue as to what it looks like and don't even know it is in the nucleus. They do guess that it might have something to do with heredity.

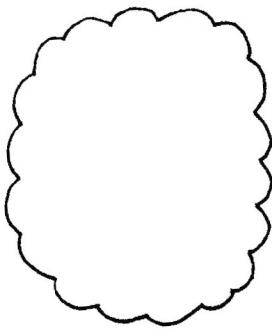
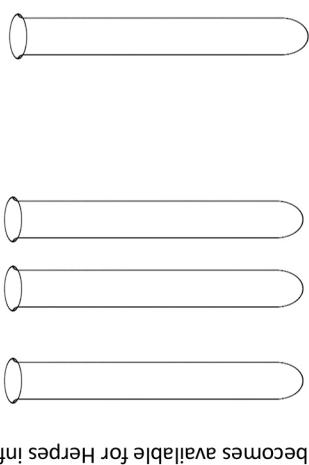
2002 SARS coronavirus  
in Asia



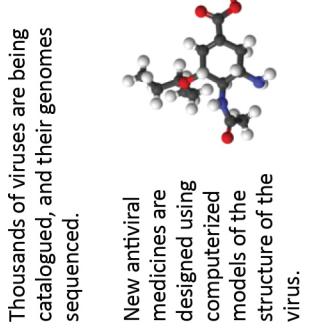
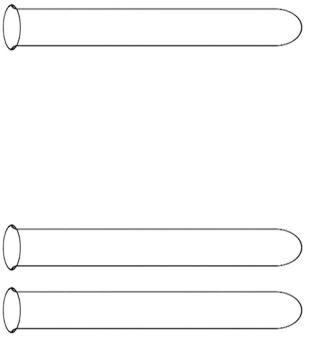
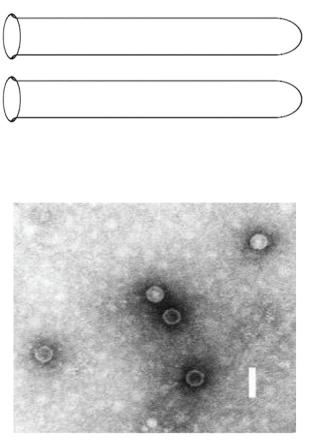
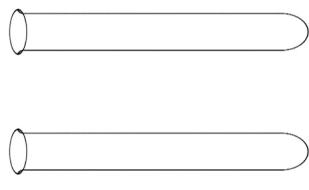
2014 MERS coronavirus  
in Middle East



becomes available to treat influenza infections



becomes available for Herpes infections



Thousands of viruses are being catalogued, and their genomes sequenced.

New antiviral medicines are designed using computerized models of the structure of the virus.

2019 Covid-19 global pandemic



is created in a lab.  
Then a phage was made.  
You can't do this with bacteria because they are living things.  
Viruses are not alive.

Complete structure of adenovirus revealed.

1971 1972 1976 1977 1983 1985 1992 1997 2002 2008 2010 2013 2019



Invented by Kary Mullins  
**Polymerase Chain Reaction**  
*Thermus aquaticus*  
Discovery of "Taq polymerase"  
inside bacteria that live at extreme temperatures in places like geysers and thermal vents.



2017: Nobel prize goes to inventors of Cryogenic Electron Microscopy (Cryo-EM), where samples are quickly frozen before being viewed. The detailed images this produces are stunning, and extremely helpful to virology researchers.

