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## Virus Transmission

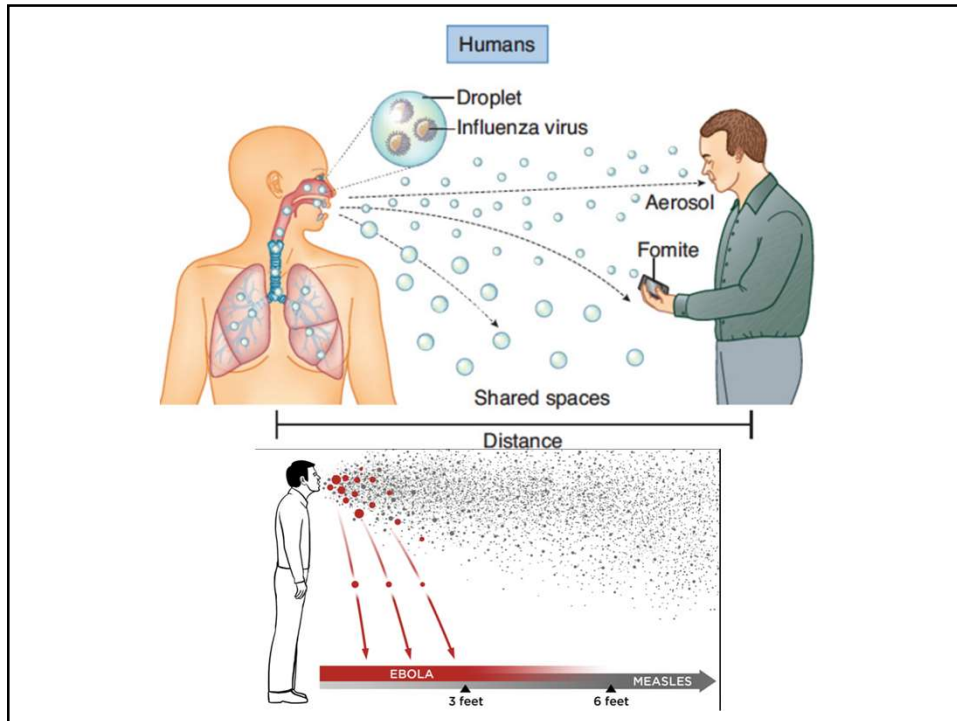
### Fomites

Objects that are capable of transmitting infection, such as skin cells, clothing, hair, and bedding material.

WORD OF THE DAY CONTRIBUTED BY DANA MACKENZIE

MANDY PATINKIN MATT DAMON LAURENCE FISHBURNE JUDE LAW SWYNETH PALTROW KATY WINKSLET  
**NOTHING SPREADS LIKE FEAR**  
**CONTAGION**  
SEPTEMBER 9

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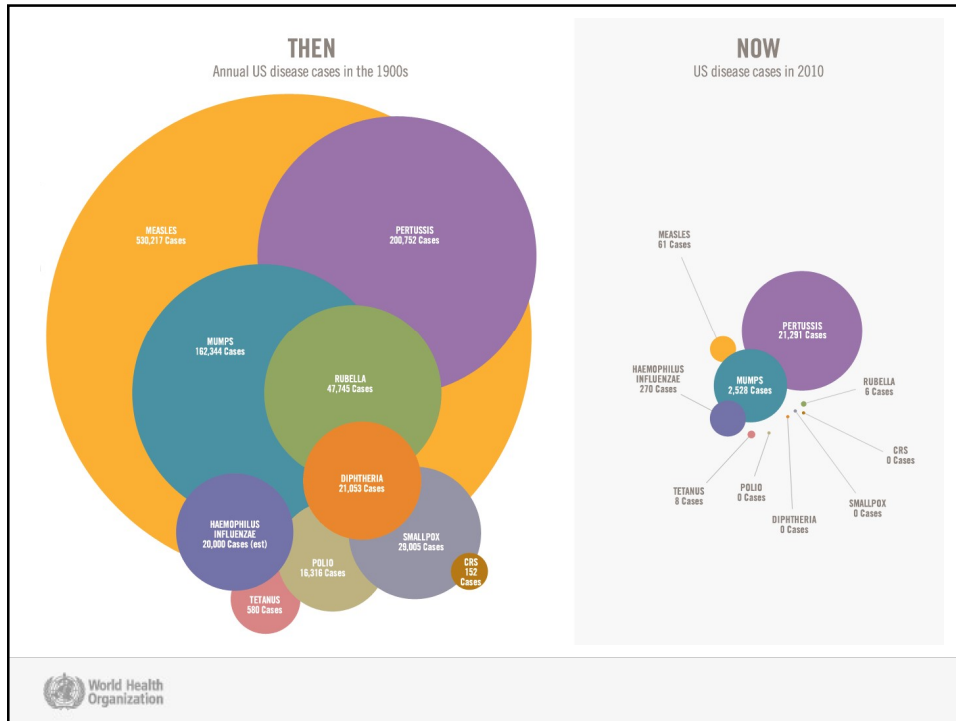
3

### What is a vaccine?

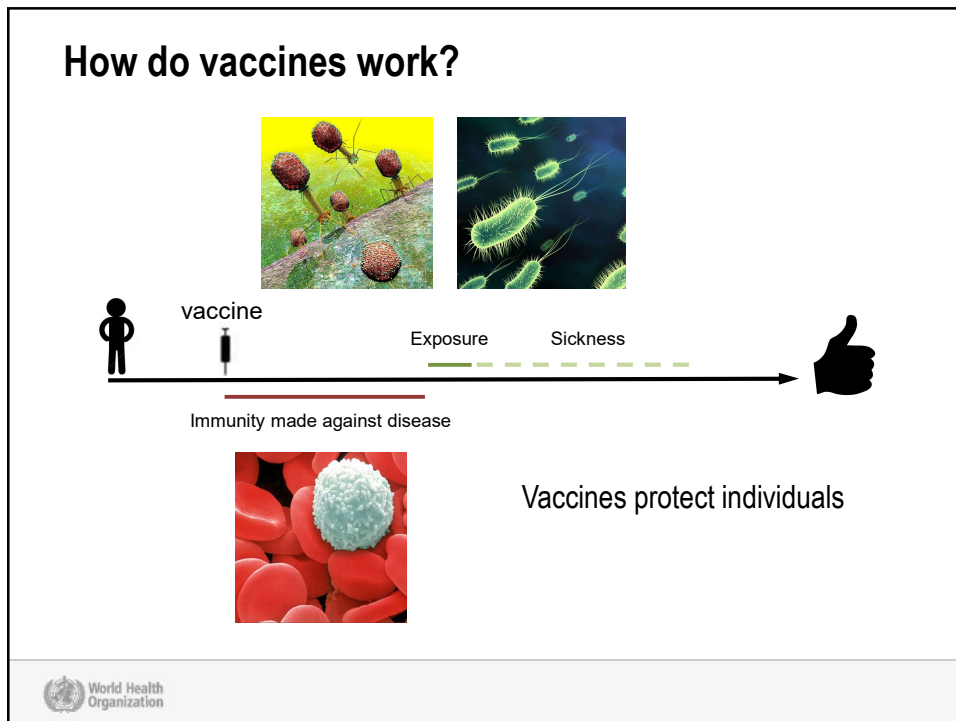
A substance that stimulates immunity against an infectious agent  
(what does this mean?)

World Health Organization

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## How do vaccines work?




Activity: Disease spread

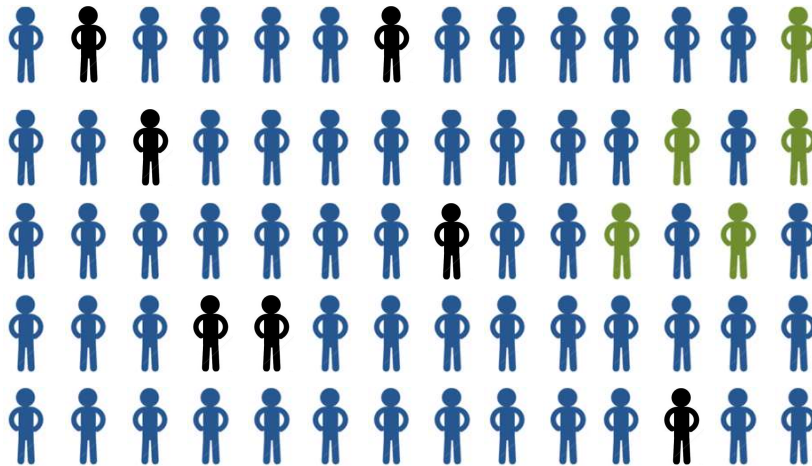


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## How do vaccines work?

Vaccines protect populations from disease spread

-  unvaccinated
-  vaccinated
-  diseased



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# Vaccine Components

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## Ingredients for any vaccine

**Part of the  
Infectious  
Agent**  
(aka Antigen)

Target for immune  
system

+


**Adjuvant**

Stimulates the immune  
system

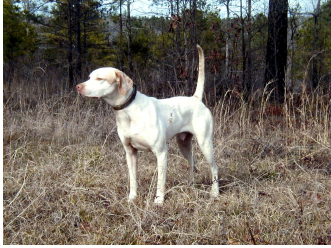
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### Ingredients for any vaccine

Antigen




Target for




+

Adjuvant

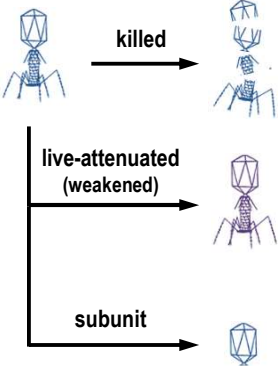


Stimulates





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#### TYPES OF ANTIGENS



#### TYPES OF ADJUVANTS

Aluminum salts 

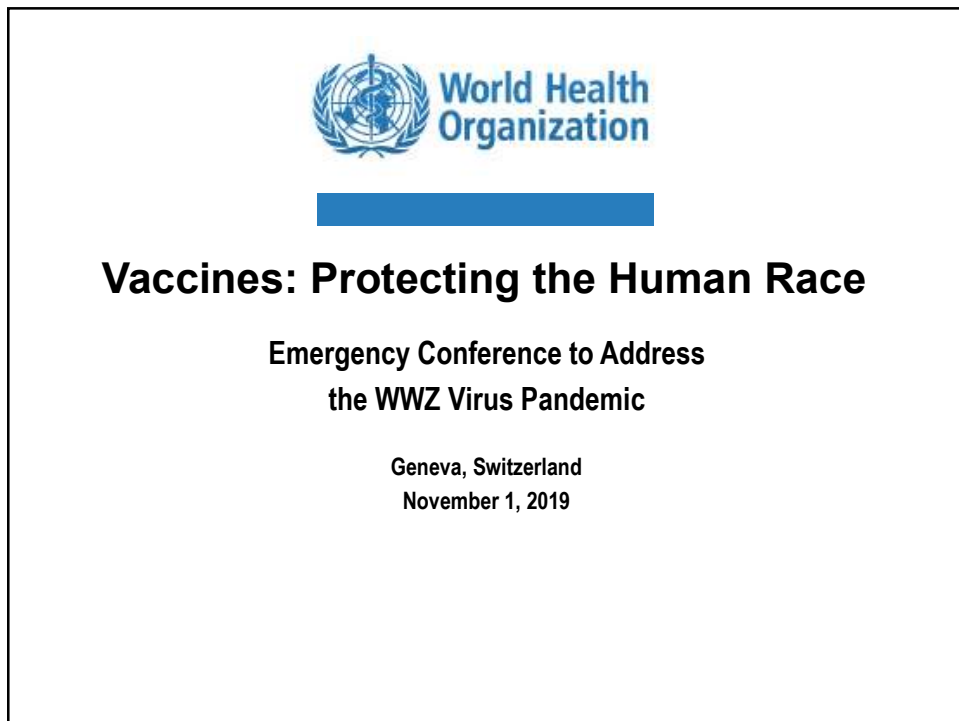
Mineral oil 



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**One of your tasks for today:**

Pretend you are a scientist specializing in infectious diseases.  
You and your colleagues are attending a conference in Europe  
to discuss a current international emergency.

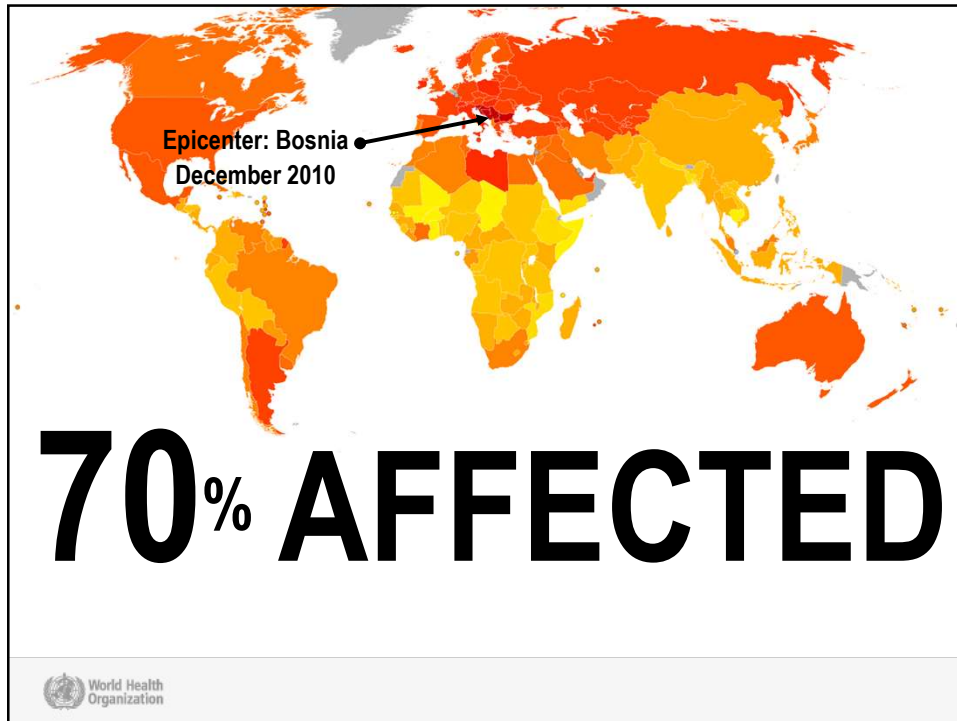
**Jovian** from uOttawa  
Graduate Student

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**WWZ Pandemic**

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## WWZ Virus

Rhabdovirus family, closely related to rabies

World Health Organization

The complex block contains the title 'WWZ Virus' and a descriptive sentence 'Rhabdovirus family, closely related to rabies'. To the right, there are two electron micrographs showing the characteristic bullet-shaped morphology of WWZ virus particles. The top image shows a dense field of these particles, while the bottom image is a higher magnification view of individual particles. The World Health Organization logo is located at the bottom left of the slide frame.

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## Affected Individuals

Sick – Incoherent – Violent/Savage

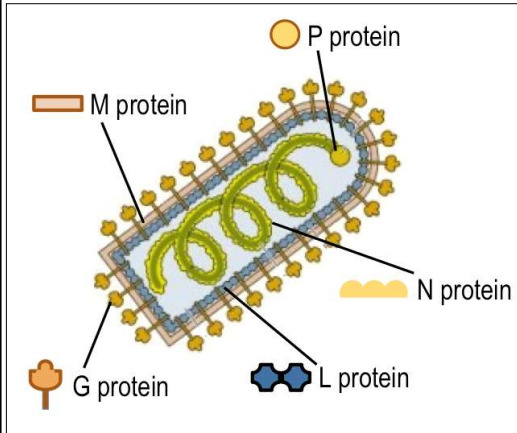


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**Vaccine Needed**

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## Design a WWZ vaccine



**\$10 million prize** for vaccine candidate with most potential

**10 month** vaccine development period

### Development Package:

- 1 vaccine design document
- 1 round-trip flight for collaborative purposes
- 1 manuscript to publish or withhold

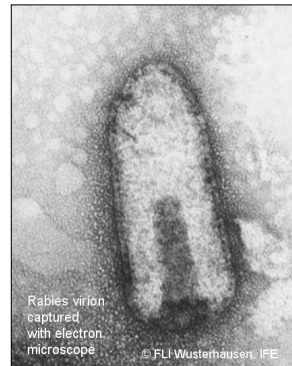
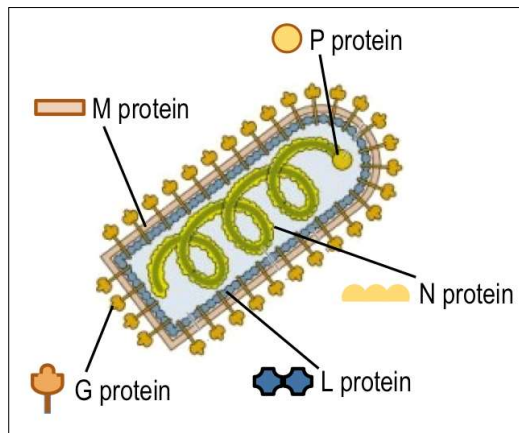


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Jun Jul Aug Sept Oct Nov Dec Jan Feb Mar



# End



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ARTICLES nature immunology

Immunity generated against L protein ineffective in protecting against WWZ virus in primate studies

**ARTICLE** doi:10.1038/nature13586

**WWZ vaccine developed with N and P viral proteins insufficient in generating potent anti-viral immunity**

The NEW ENGLAND JOURNAL of MEDICINE

**ORIGINAL ARTICLE**

Aluminum salts cause rapid mutation in live-attenuated WWZ viral vaccine, unsafe

**SUPPLEMENT ARTICLE**

Mineral oil has adverse effects when used as an adjuvant with many viral vaccines

**Worth mentioning:**

- Rationale that lead your group to develop your vaccine candidate
- Include previous research/data that guided your development
- Take group questions/comments
- If given more time, what would you do differently?

World Health Organization

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**Additional facts to consider about...**

**Killed vaccines**

**Live-attenuated vaccines**

**Subunit vaccines**

World Health Organization

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# Verdict

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## Summary

Evaluated current uses of vaccines

Discussed how vaccines work with our immune systems

Examined the components of vaccines

Designed a WWZ vaccine candidate

Collaborated with colleagues to determine best candidate  
(**Bonus:** Simulated an aspect of life in Academia)

Saved the human race???????



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