

# AU Science Club

Update on Antivirus Vaccinations

Marc Bernhardt

October 19, 2021

Increase Your Positivity

$$f(x) = |x|$$



Hackensack  
Meridian *Health*

## SCIENCE KEEPS CHANGING

- Peptic ulcers are NOT caused by diet.
- *Helicobacter pylori*

October 2, 2021

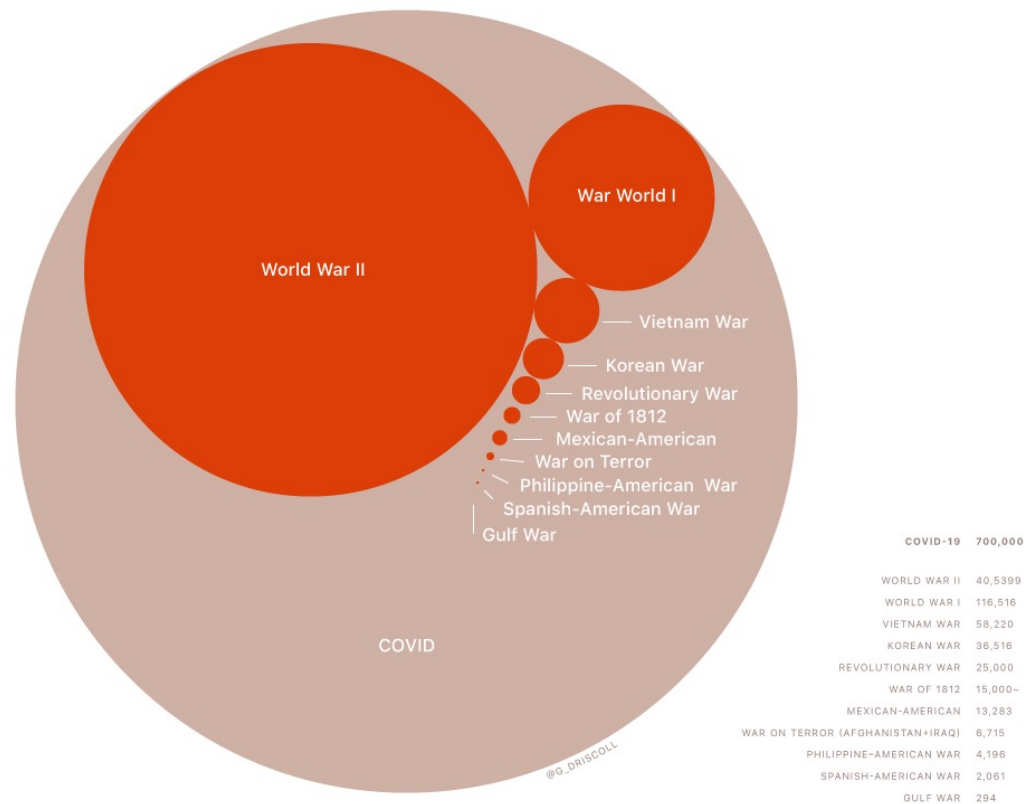
***NEW YORK POST***

**US COVID-19 death toll eclipses 700,000**

# More Americans have died from COVID than every foreign conflict in US history

(OCTOBER 1, 2021)

[https://en.wikipedia.org/wiki/United\\_States\\_military\\_casualties\\_of\\_war](https://en.wikipedia.org/wiki/United_States_military_casualties_of_war)



October 2, 2021



**Governor Phil Murphy** ✓

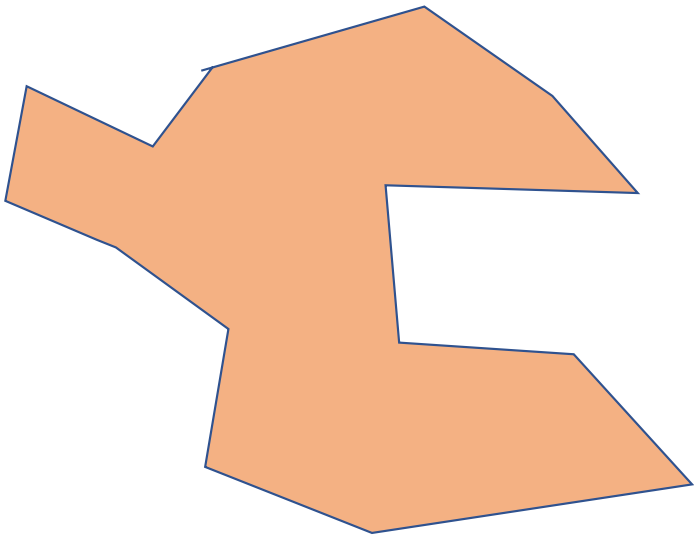
@GovMurphy

NEW JERSEY #COVID19 UPDATE: ➡ 1,717 new positive PCR tests ➡ 1,006,664 total positive PCR tests ➡ 458 new positive antigen tests ➡ 151,514 total positive antigen tests ➡ 23 new confirmed deaths ➡ 24,679 total confirmed deaths ➡ 2,787 probable deaths covid19.nj.gov pic.twitter.com/rIPJpW4oHr

Twitter • 1:11 PM

# SAR (Structure Activity Relationship)

Cell Receptor

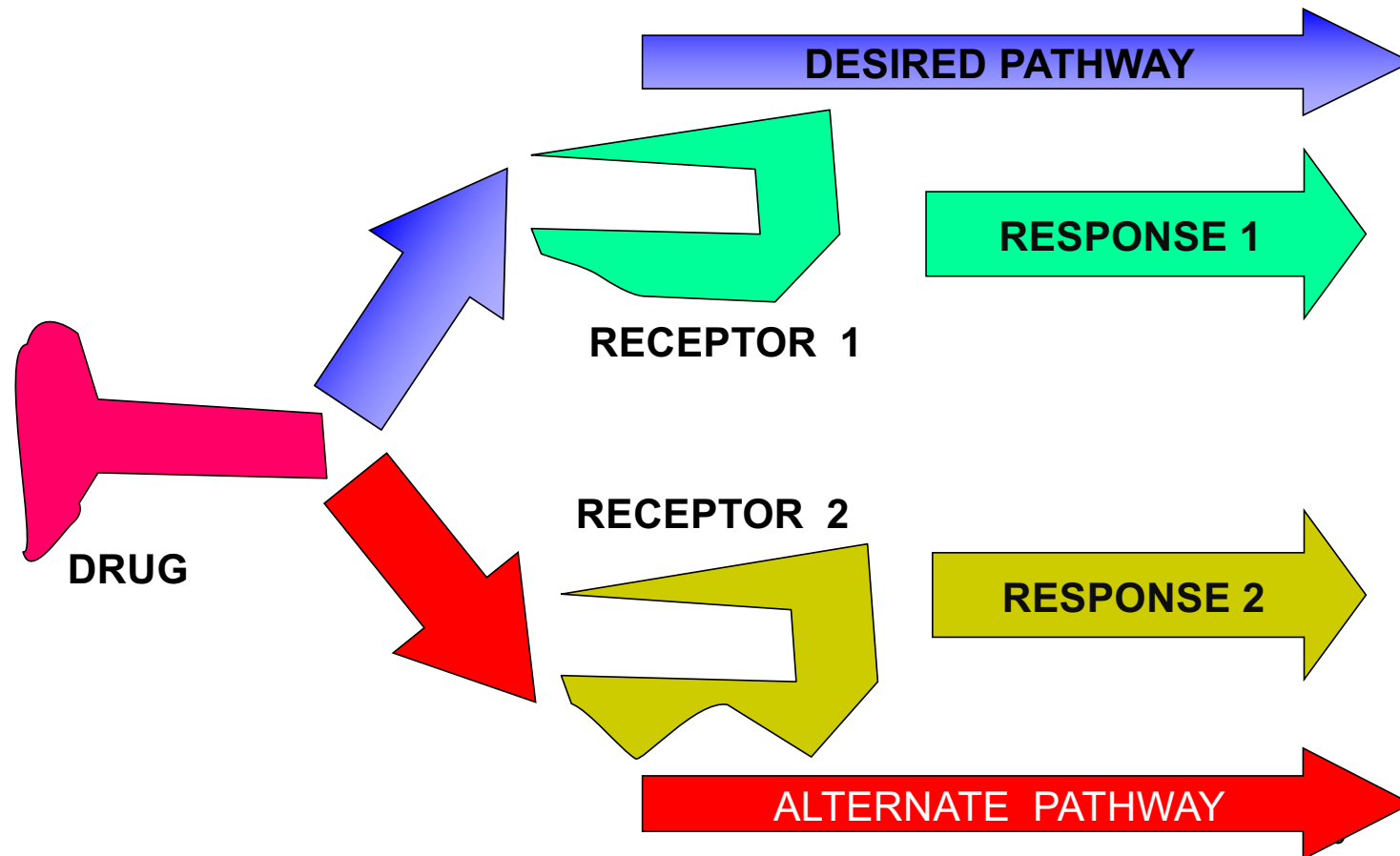


Drug

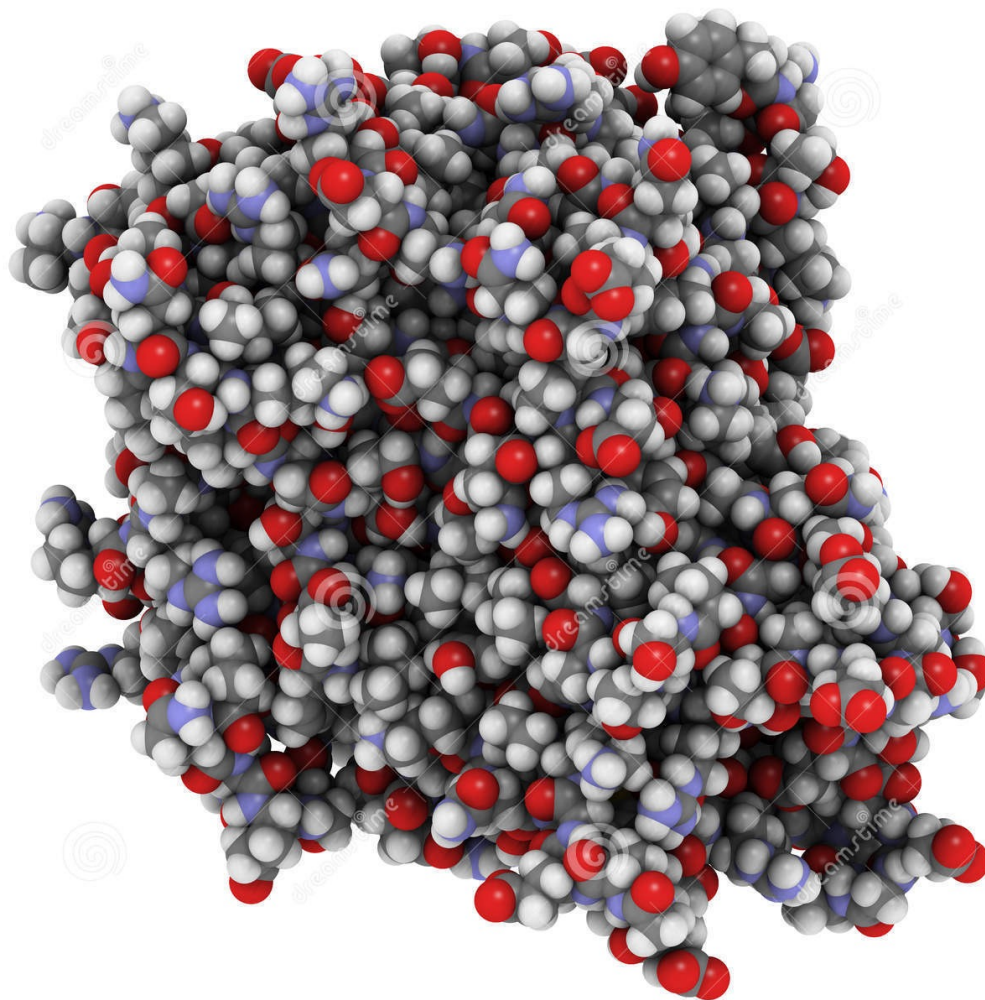




# RECEPTOR SITES SIDE EFFECTS



TNF



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# MODERN DRUG DESIGN



# Adalimumab

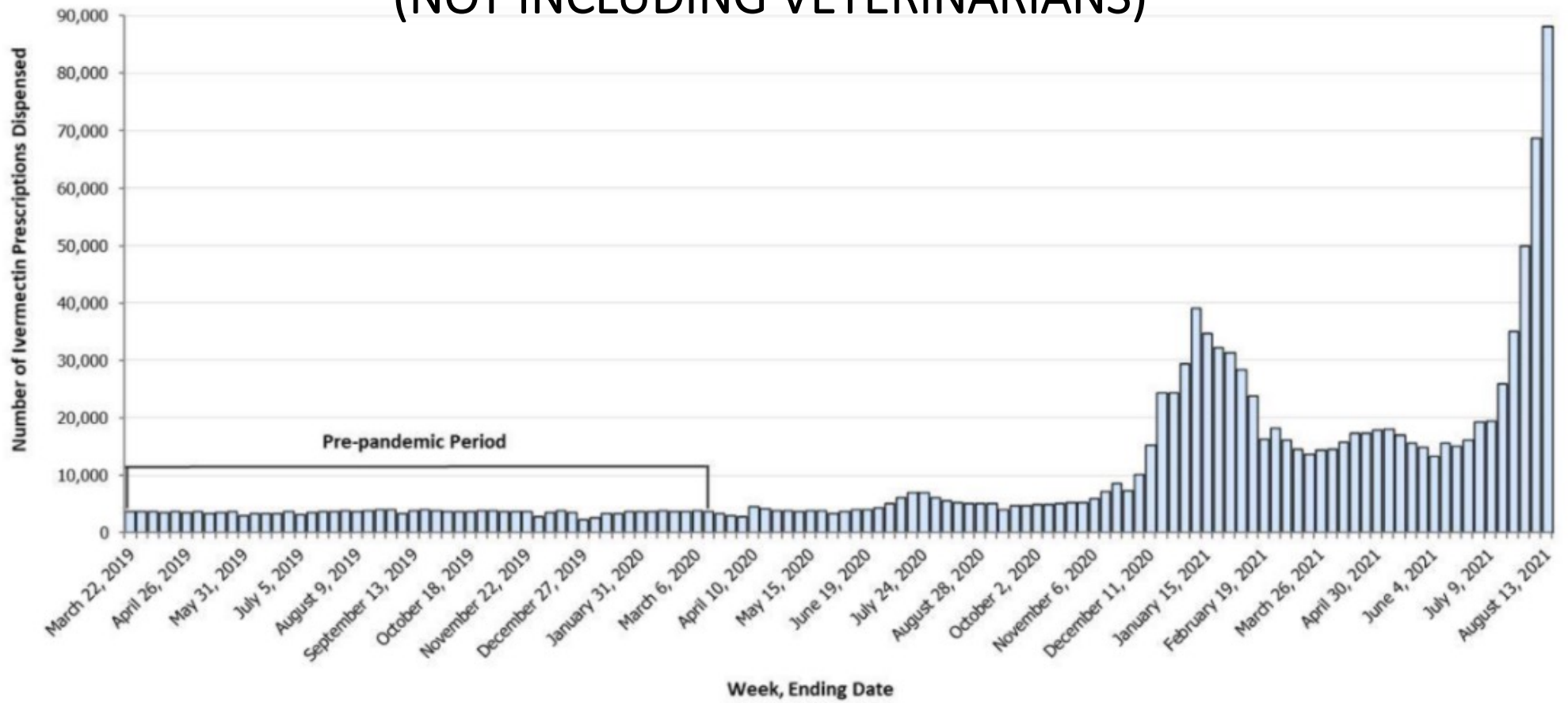
- Adalimumab is a tumor necrosis factor blocker. Adalimumab is a recombinant human IgG1 monoclonal antibody created using phage display technology resulting in an antibody with human derived heavy and light chain variable regions and human IgG1:k constant regions. Adalimumab is produced by recombinant DNA technology in a mammalian cell (Chinese Hamster Ovary (CHO)) expression system and is purified by a process that includes specific viral inactivation and removal steps. It consists of 1330 amino acids and has a molecular weight of approximately 148 kilodaltons. Adalimumab binds specifically to TNF-alpha and blocks its interaction with the p55 and p75 cell surface TNF receptors. Adalimumab also lyses surface TNF expressing cells in vitro in the presence of complement. Adalimumab does not bind or inactivate lymphotoxin (TNF-beta). TNF is a naturally occurring cytokine that is involved in normal inflammatory and immune responses. Elevated concentrations of TNF are found in the synovial fluid of patients with RA, JIA, PsA, and AS and play an important role in both the pathologic inflammation and the joint destruction that are hallmarks of these diseases. Increased concentrations of TNF are also found in psoriasis plaques. In Ps, treatment with HUMIRA may reduce the epidermal thickness and infiltration of inflammatory cells. The relationship between these pharmacodynamic activities and the mechanism(s) by which HUMIRA exerts its clinical effects is unknown.

# Ivermectin

- STROMECTOL\* (Ivermectin) is a semisynthetic, anthelmintic agent for oral administration. Ivermectin is derived from the avermectins, a class of highly active broad-spectrum, anti-parasitic agents isolated from the fermentation products of *Streptomyces avermitilis*.
- Compounds of the class bind selectively and with high affinity to glutamate-gated chloride ion channels which occur in invertebrate nerve and muscle cells. This leads to an increase in the permeability of the cell membrane to chloride ions with hyperpolarization of the nerve or muscle cell, resulting in paralysis and death of the parasite.

[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2009/050742s026lbl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2009/050742s026lbl.pdf)

# IVERMECTIN PRESCRIPTIONS PER WEEK (NOT INCLUDING VETERINARIANS)

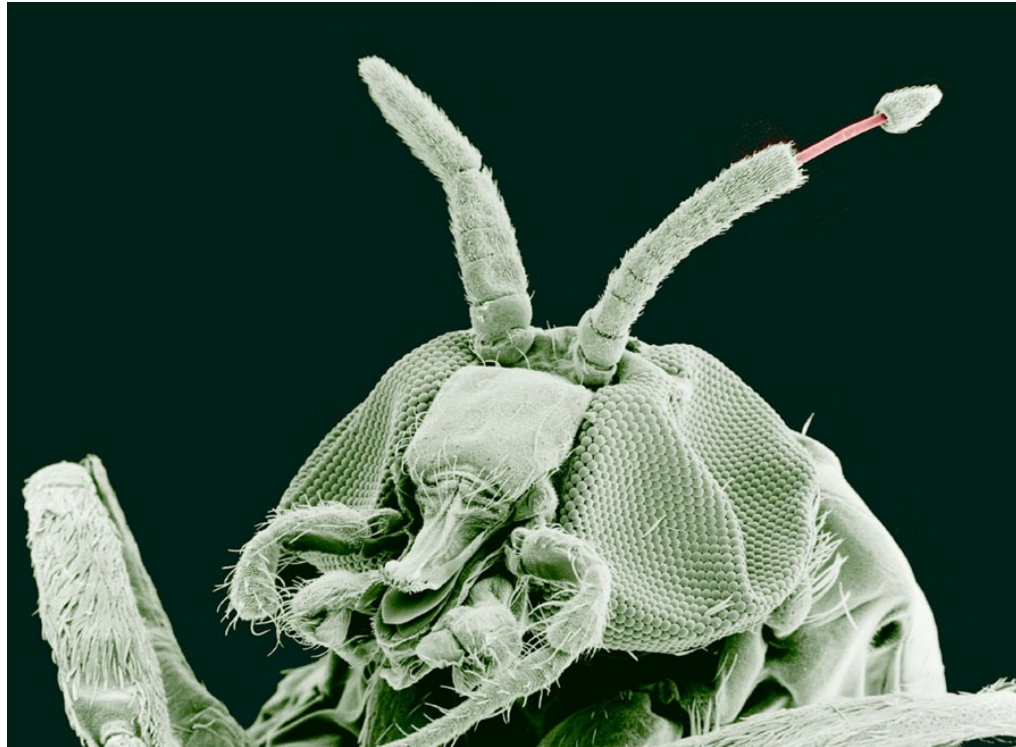


# Ivermectin

- Ivermectin is active against various life-cycle stages of many but not all nematodes. It is active against the tissue microfilariae of *Onchocerca volvulus* but not against the adult form.
- Its activity against *Strongyloides stercoralis* is limited to the intestinal stages.

[https://www.accessdata.fda.gov/drugsatfda\\_docs/label/2009/050742s026lbl.pdf](https://www.accessdata.fda.gov/drugsatfda_docs/label/2009/050742s026lbl.pdf)

# Ivermectin



Adult Black Fly (*Simulium yahense*) with (*Onchocerca volvulus*)  
emerging from the insect's antenna. 100X

Photo: US Dept of Agriculture



# Ivermectin: The Preprint Danger of Fake Science

“Efficacy and Safety of Ivermectin for Treatment and Prophylaxis of COVID-19 Pandemic” by Ahmed G. Elgazzar, Benha University, 16 Dec. 2020

- “Plagiarism” “Clearly repeated data points”
- “Data alterations” “Poor clinical practices”
- “Impossible statistical values”
- None of the 14 authors could provide any of the original data.

Goodman, J., Schraer, R. (2021, October 7). Ivermectin: How false science created a Covid “miracle” drug. BBC News.

## Ivermectin

- Onchocerciasis = River Blindness caused by parasitic worm *Onchocerca volvulus*. Transmitted by bites of the blackfly genus *Simulium*.
- STROMECTOL is indicated for the treatment of intestinal (i.e., nondisseminated) strongyloidiasis due to the nematode parasite *Strongyloides stercoralis*.
- STROMECTOL is indicated for the treatment of onchocerciasis due to the nematode parasite *Onchocerca volvulus*.
- This indication is based on randomized, double-blind, placebo-controlled and comparative studies conducted in 1427 patients in onchocerciasis-endemic areas of West Africa.

Photo:

# Ivermectin

- Ivermectin has been shown to be teratogenic in mice, rats, and rabbits when given in repeated doses of 0.2, 8.1, and 4.5 times the maximum recommended human dose, respectively (on a mg/m<sup>2</sup>/day basis).
- Teratogenicity was characterized in the three species tested by cleft palate; clubbed forepaws were additionally observed in rabbits.
- STROMECTOL is excreted in human milk in low concentrations.

Photo:

# Ivermectin

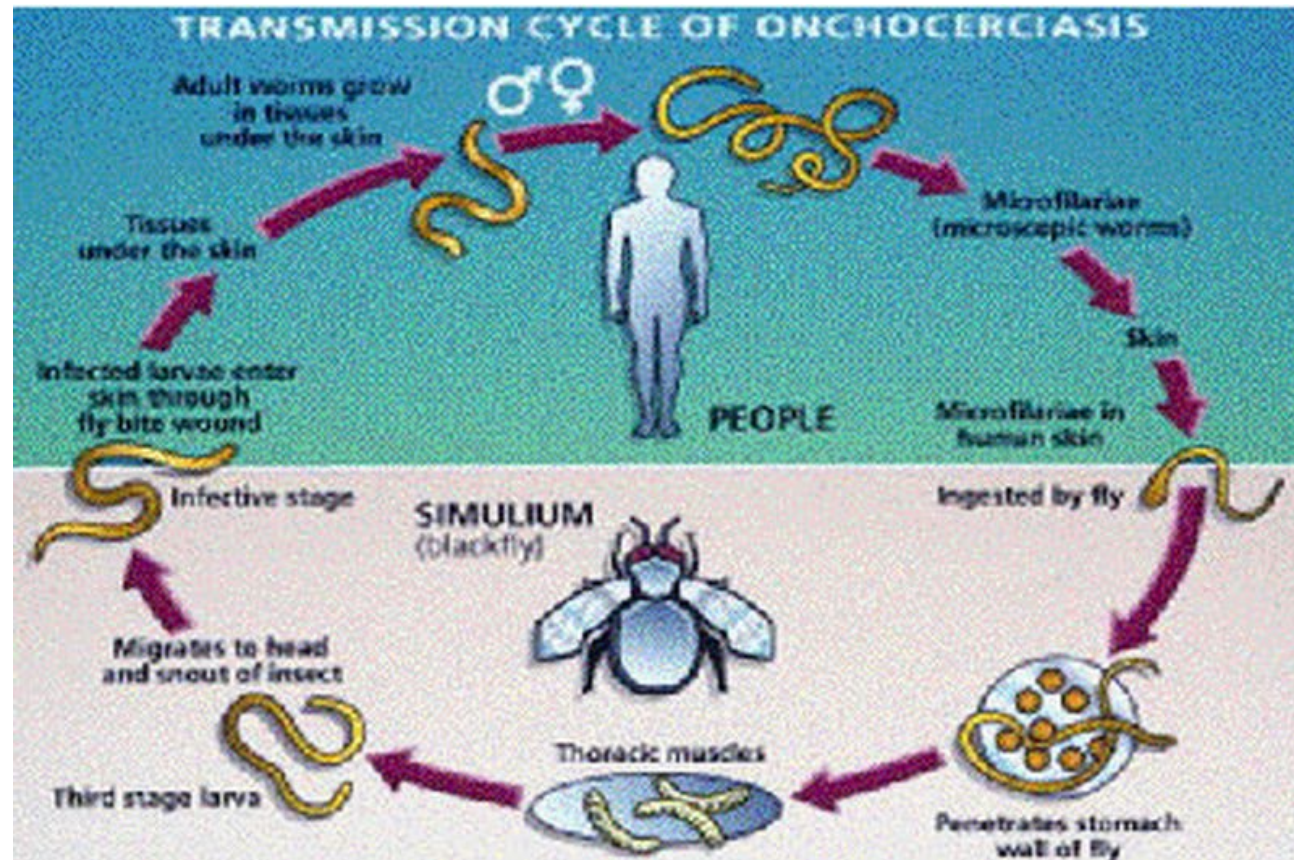


Photo: Riverblindness.Org

It's amazing how many parents went from, "*I don't understand my kid's 6th grade math homework*" to, "*I'm an infectious disease expert*" in just six months.



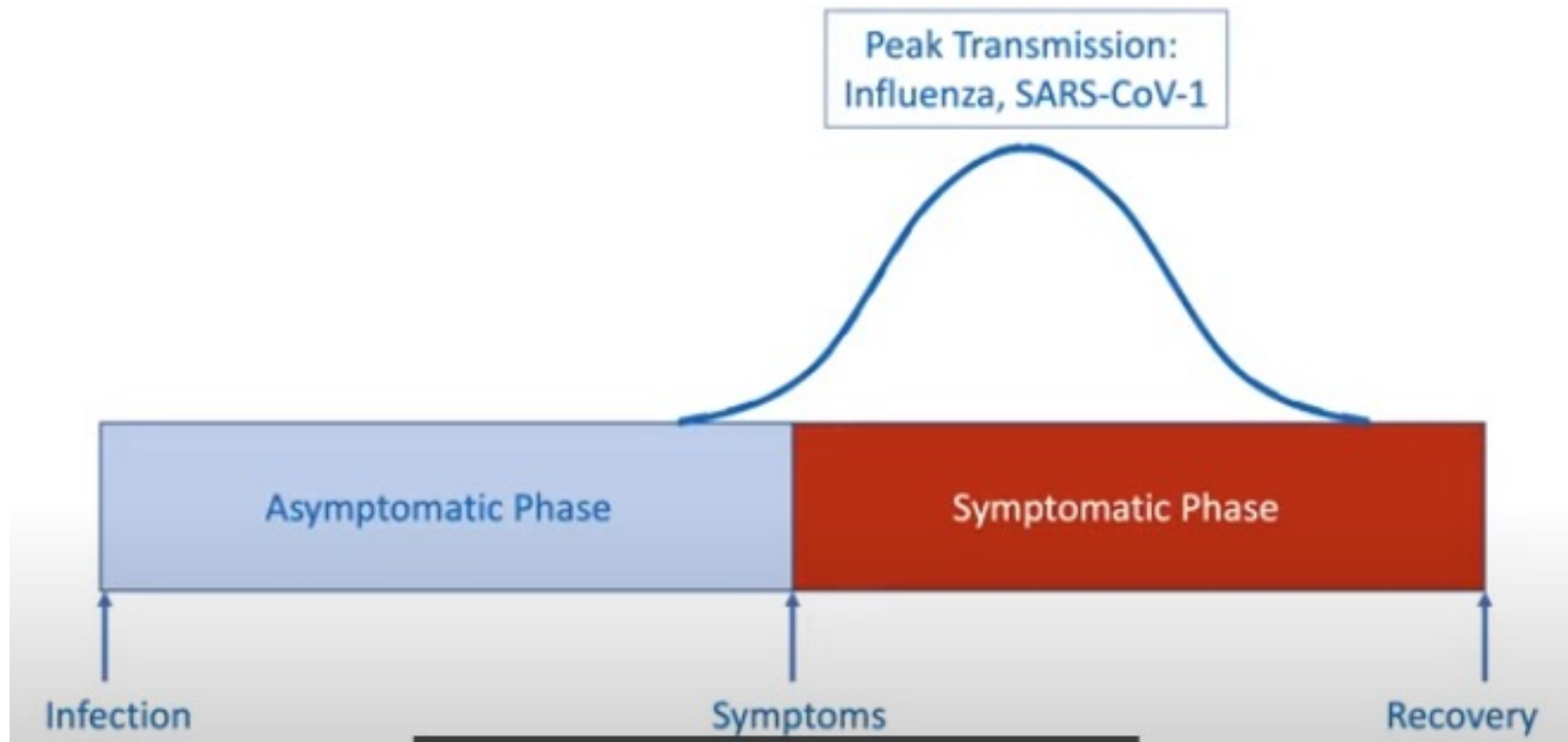


## ORIGIN

- HORSESHOE BAT (*Rhinolophus affinis*)
- PANGOLIN (*Manis pentadactyla*)

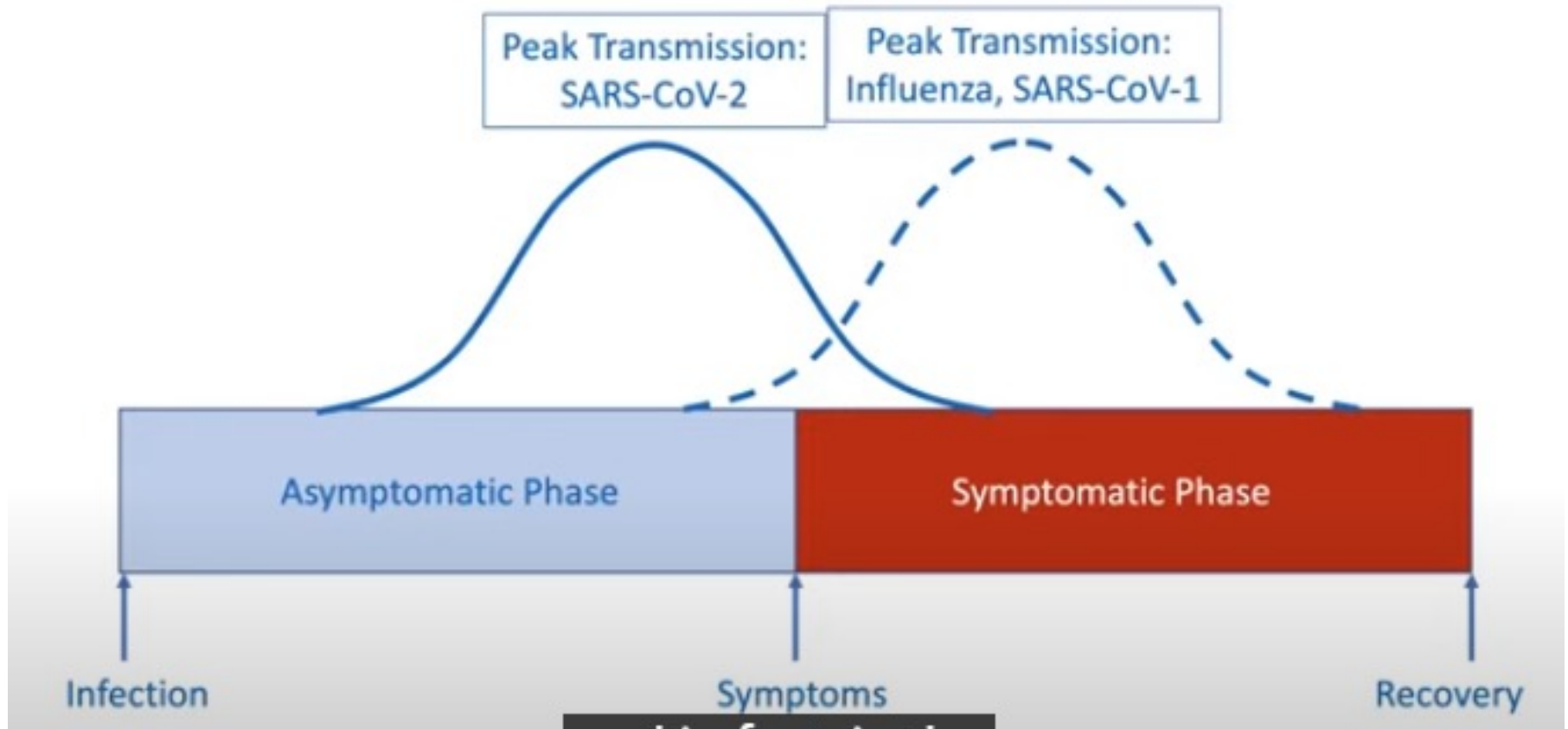


# INFLUENZA



He et al Nature Medicine 2020

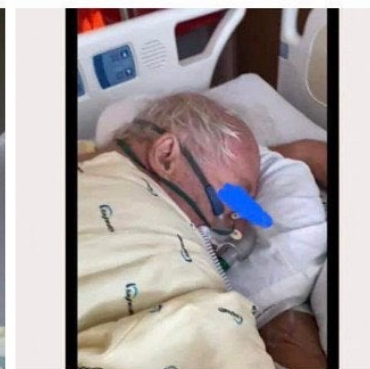
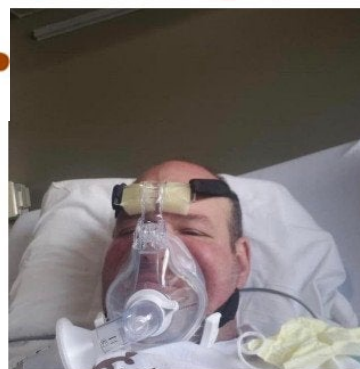
# COVID-19



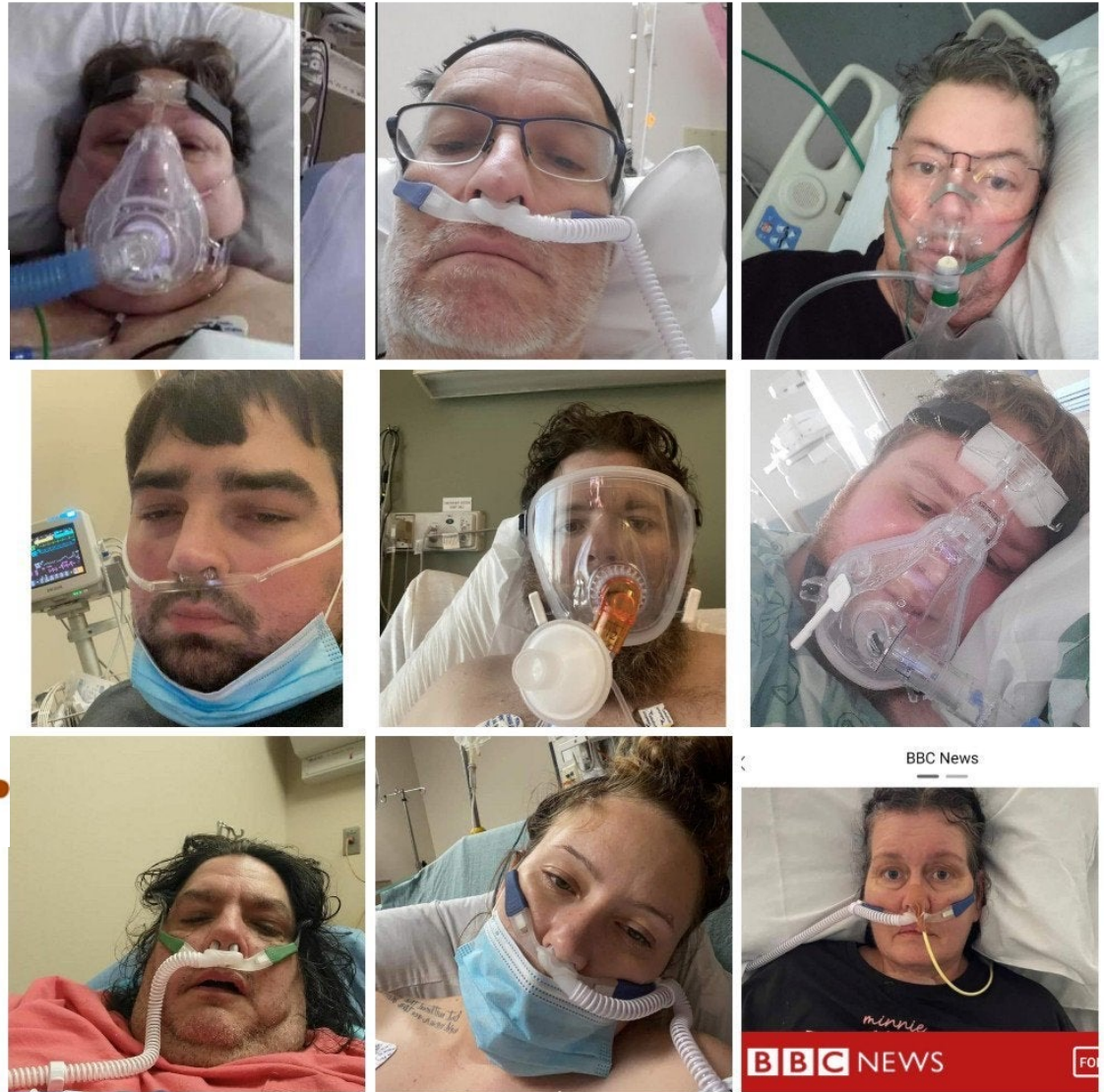
He et al Nature Medicine 2020





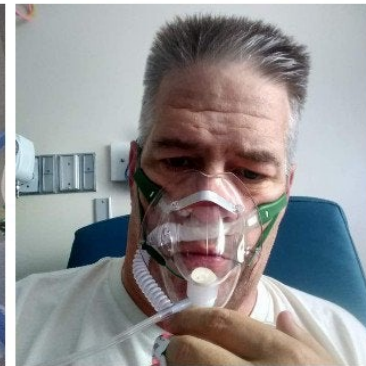








Can everyone please do me a big favor tonight Please pray for cory [redacted] he is in the hospital and his wife ask me if we can do a prayer chain for Cory tonight and hopefully he pulls threw and please share and pass it along thank u so much it would mean the world to his wife and family 🙏🙏🙏🙏🙏🙏🙏🙏



foodstaff and anyone I may have overlooked

concerns. ♥

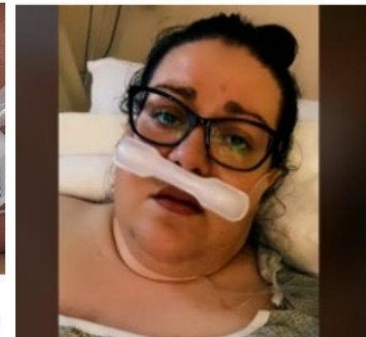


👍❤️🙏 795

👍 795

💬 391

➦ 9



The Partisanship of Deaths

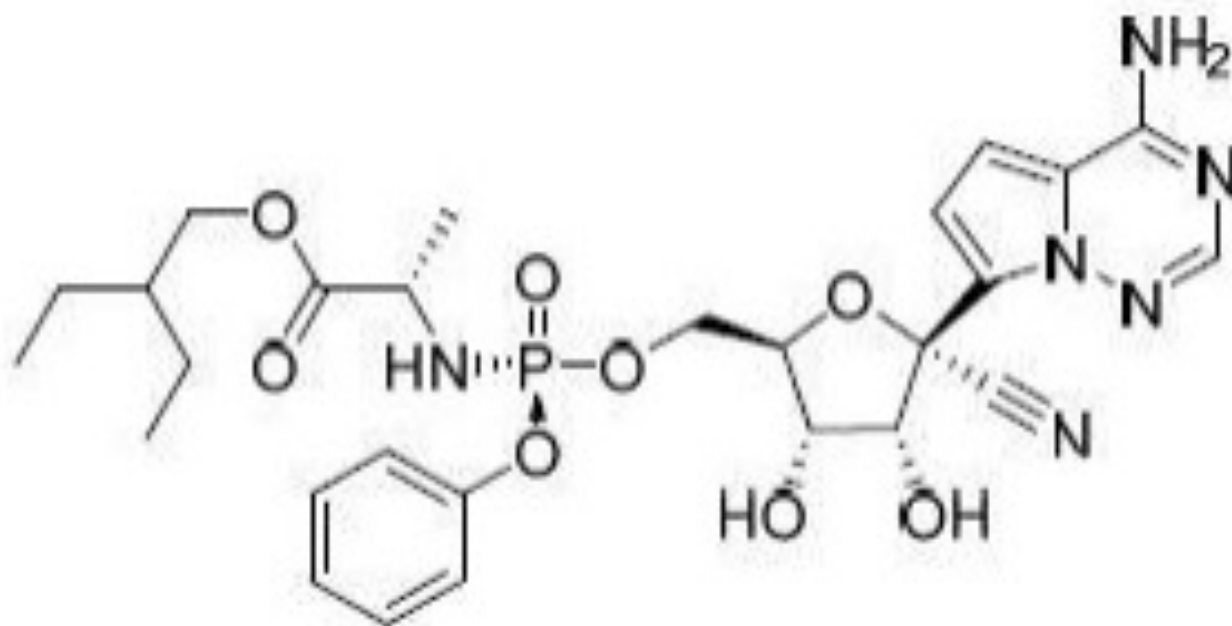
Partisan Deaths

# Remdesivir Mechanism of Action

- Remdesivir is an inhibitor of the SARS-CoV-2 RNA-dependent RNA polymerase (RdRp), which is essential for viral replication. Remdesivir is an adenosine nucleotide prodrug that distributes into cells where it is metabolized to a nucleoside monophosphate intermediate by carboxyesterase 1 and/or cathepsin A, depending upon the cell type. The nucleoside monophosphate is subsequently phosphorylated by cellular kinases to form the pharmacologically active nucleoside triphosphate metabolite (GS-443902). Remdesivir triphosphate (RDV-TP) acts as an analog of adenosine triphosphate (ATP) and competes with high selectivity (3.65-fold) over the natural ATP substrate for incorporation into nascent RNA chains by the SARS-CoV-2 RNA-dependent RNA polymerase, which results in delayed chain termination (position i+3) during replication of the viral RNA.

[https://www.gilead.com/-/media/files/pdfs/medicines/covid-19/veklury/veklury\\_pi.pdf](https://www.gilead.com/-/media/files/pdfs/medicines/covid-19/veklury/veklury_pi.pdf)

# Remdesivir





# Remdesivir

- Veklury
- Mechanism of Action
- VEKLURY is a SARS-CoV-2 nucleotide analog RNA polymerase inhibitor indicated for adults and pediatric patients (12 years of age and older and weighing at least 40 kg) for the treatment of coronavirus disease 2019 (COVID-19) requiring hospitalization. VEKLURY should only be administered in a hospital or in a healthcare setting capable of providing acute care comparable to inpatient hospital care.



# Remdesivir

- Veklury
- Coadministration of VEKLURY and chloroquine phosphate or hydroxychloroquine sulfate is not recommended based on data from cell culture experiments demonstrating a potential antagonistic effect of chloroquine on the intracellular metabolic activation and antiviral activity of VEKLURY [see Drug Interactions (7) and Microbiology (12.4)].

# Remdesivir

- Veklury
- NIAID ACTT-1 was a randomized, double-blind, placebo-controlled clinical trial in hospitalized
- subjects with mild, moderate, and severe COVID-19 treated with VEKLURY (n=532) or placebo
- (n=516) for up to 10 days. Subjects treated with VEKLURY received 200 mg on Day 1 and 100 mg
- once daily on subsequent days [see Clinical Studies (14)].

# Vaccines

- Pfizer/Biontech and Moderna
  - Contains the mRNA for the spike protein
  - Does not contain the actual virus
- Sputnik V
  - Uses two adenoviruses as vectors to deliver the RNA for the spike protein.
- Sinovac
  - Contains inactivated SARS CoV-2 virus.



BIONTECH

moderna



# The Source of the Original Variant

- Bat virus RaTG13 shares 96% whole-genome sequence identity with SARS-CoV-2, indicating a probable bat origin of SARS-CoV-2.
- The hunt for the immediate progenitor virus for SARS-CoV-2 is still underway. Likely targets are in pangolins.
- The immediate animal ancestor or progenitor virus, the equivalent of the >99% identical sequences was identified in civets during the SARS outbreak in 2003
- Source: *Nature Communications* February 2021
- <https://www.nature.com/articles/s41467-021-21240-1>



## **Questions and Discussion**