

The proximal origin of SARS-CoV-2

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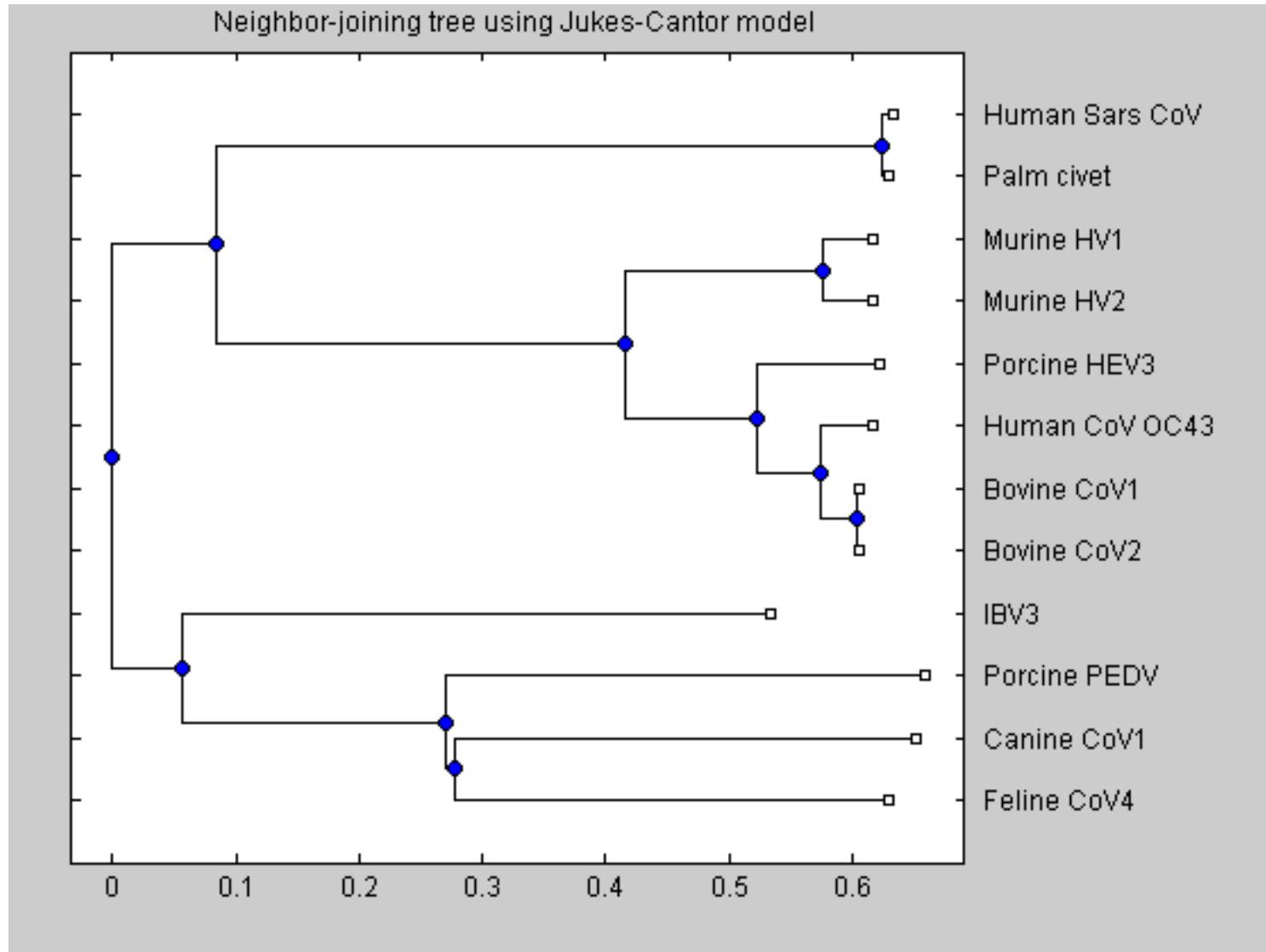
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SARS-CoV



Origin of SARS-CoV

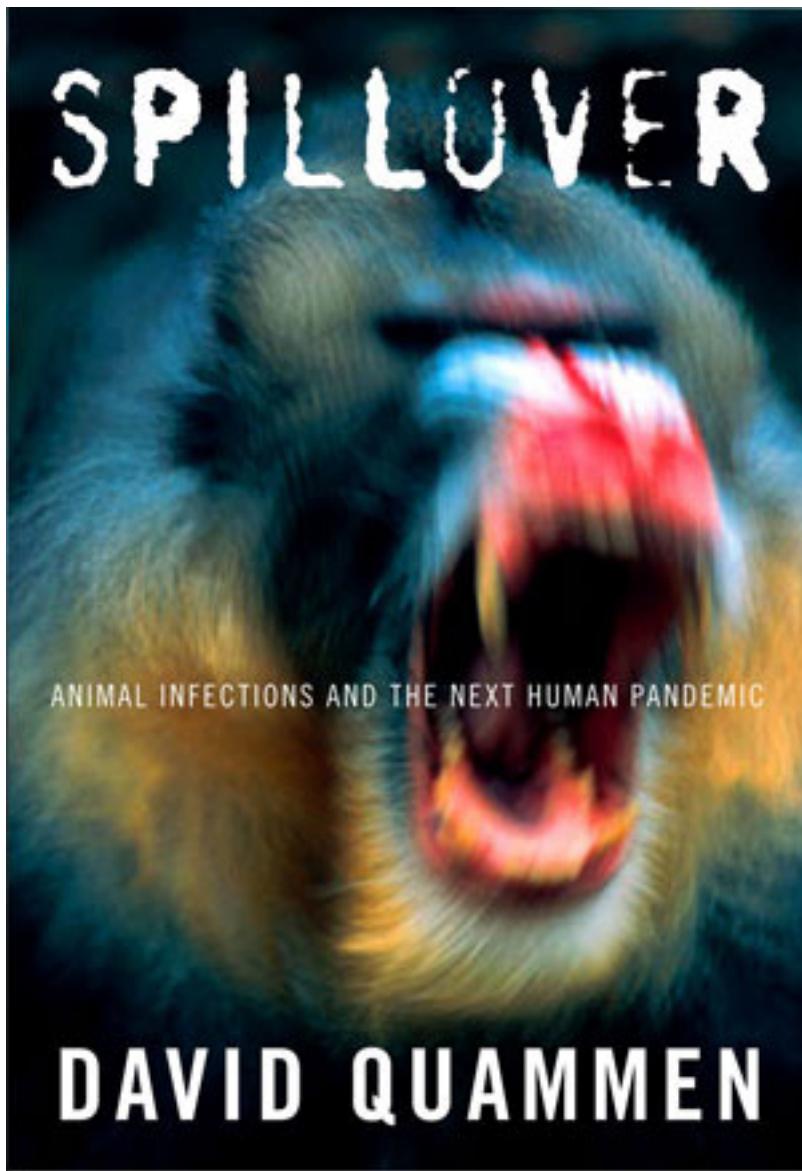


computationalgenomics.blogs.bristol.ac.uk/case_studies/sars_demo



[wikipedia.org/wiki/Masked_palm_civet](https://en.wikipedia.org/wiki/Masked_palm_civet)

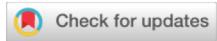
SARS-CoV



[wikipedia.org/wiki/Horseshoe_bat](https://en.wikipedia.org/wiki/Horseshoe_bat)



[wikipedia.org/wiki/Masked_palm_civet](https://en.wikipedia.org/wiki/Masked_palm_civet)



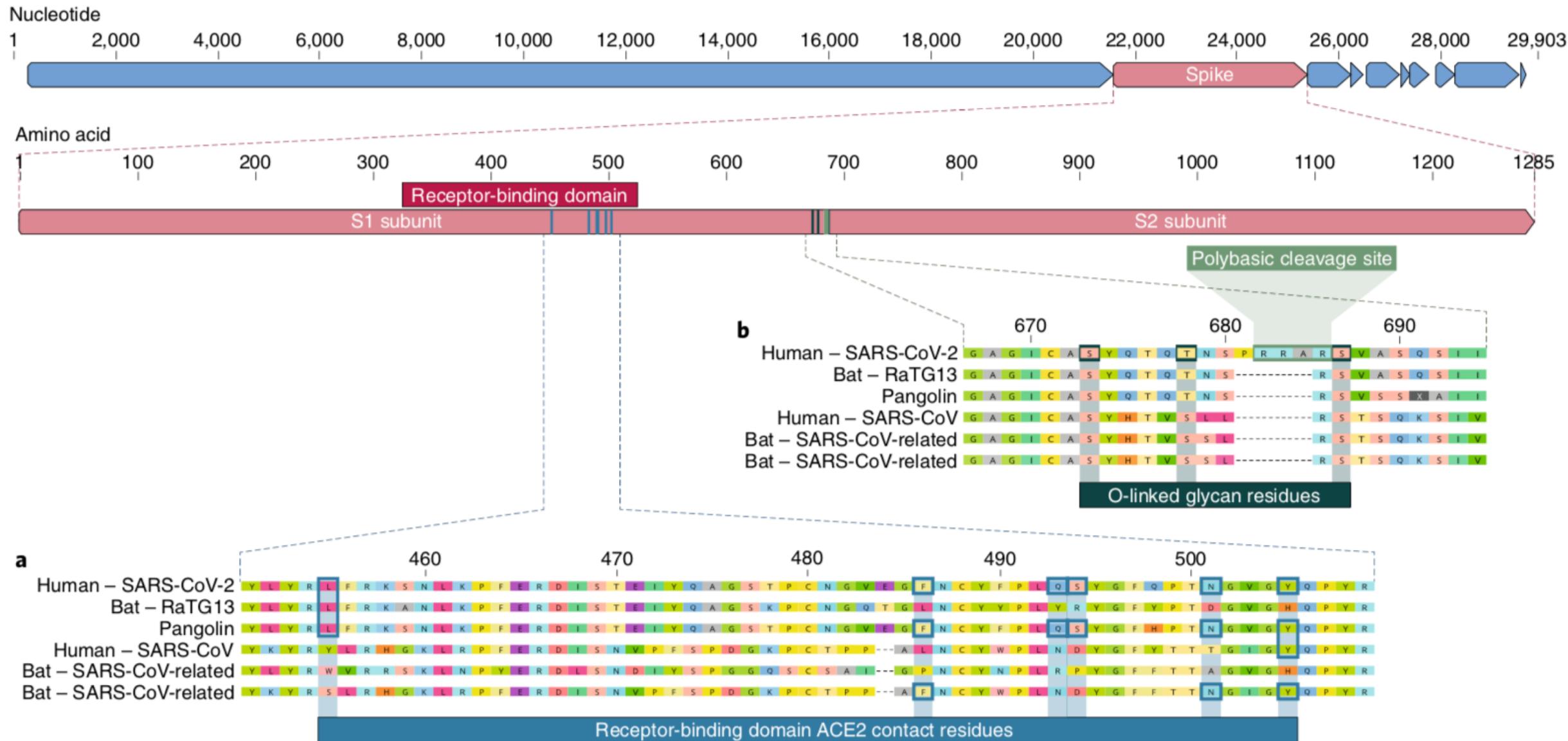
correspondence

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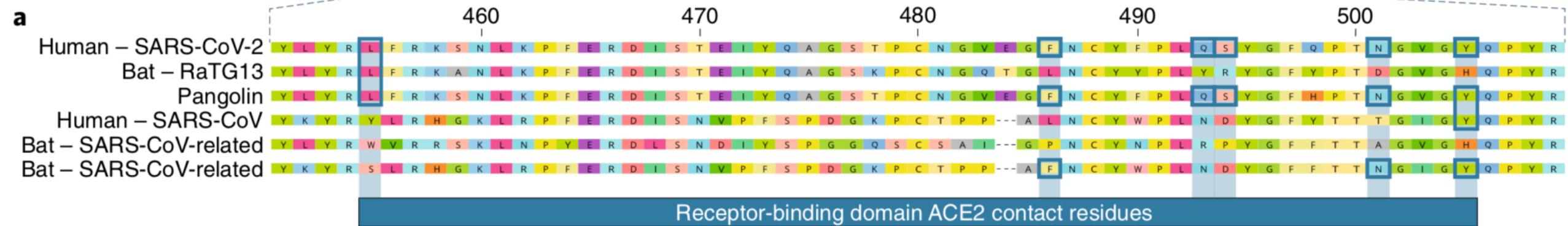
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Our analyses clearly show that SARS-CoV-2 is not a laboratory construct or a purposefully manipulated virus.

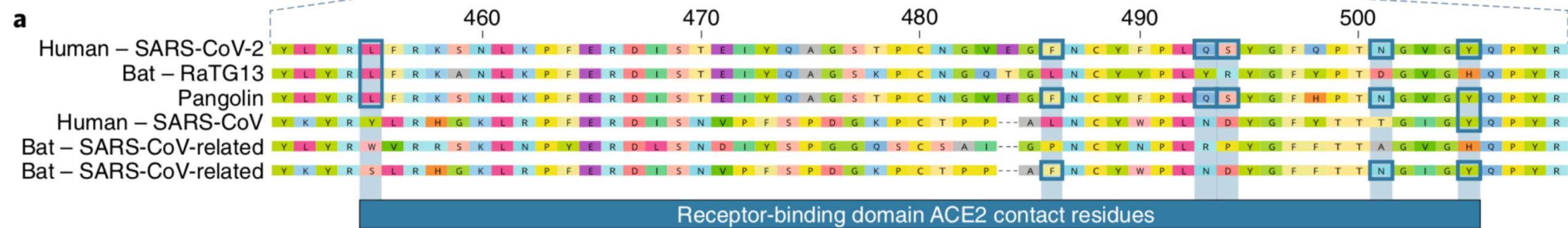
Notable features of the SARS-CoV-2 genome



Mutations in the receptor-binding domain of SARS-CoV-2

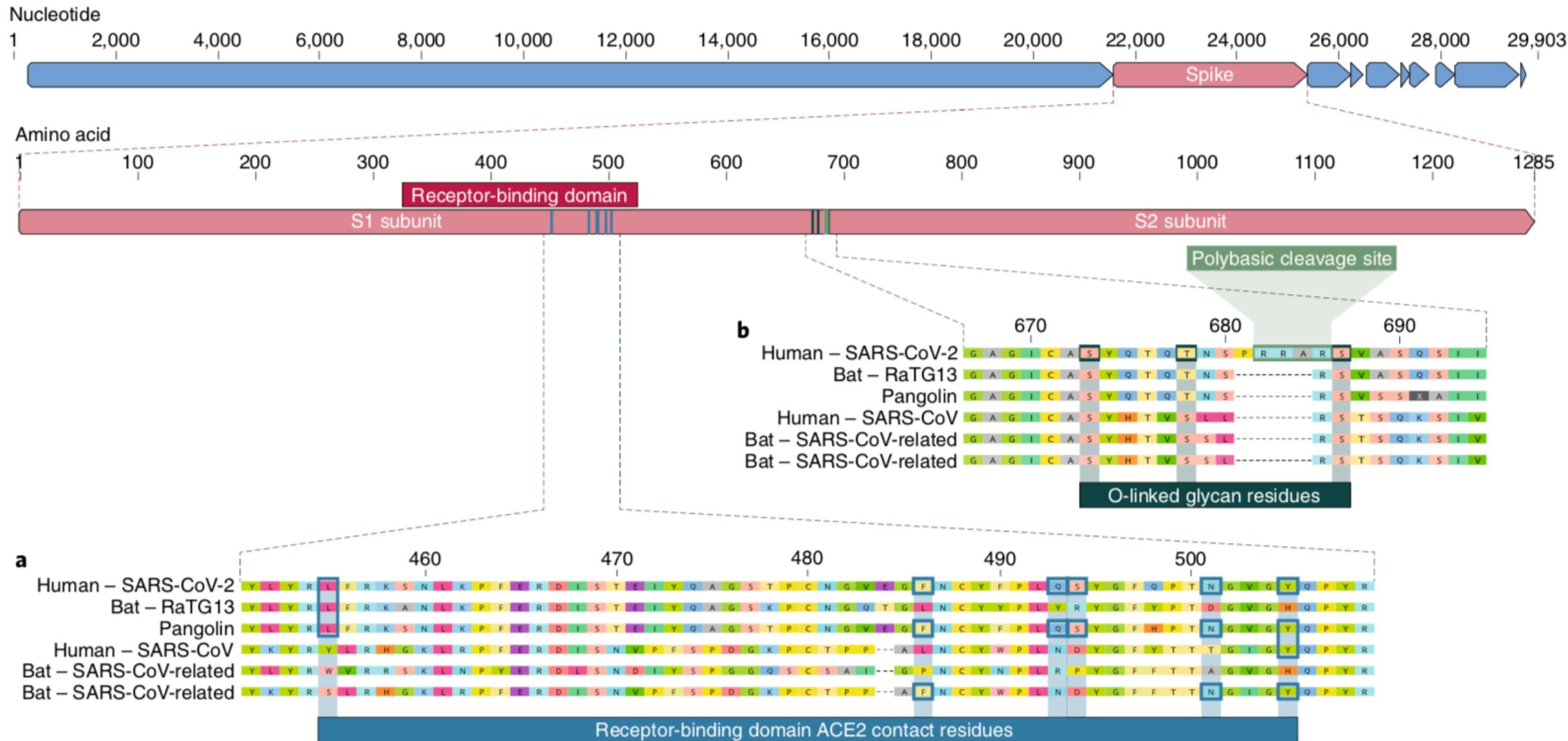


Mutations in the receptor-binding domain of SARS-CoV-2



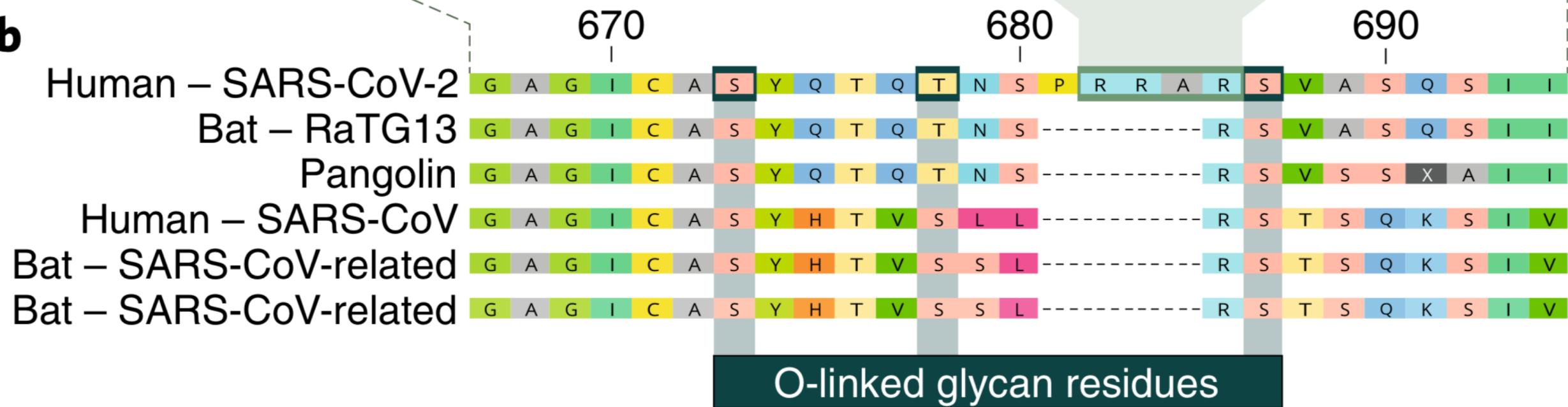
	Confirmed Cases	Confirmed Deaths	Fatality (%)	Notes
Human – SARS-CoV	8,422	916	11	doi:10.1046/j.1440-1843.2003.00518.x
Human – SARS-CoV2	1,026,974	53,975	3.4*	coronavirus.jhu.edu/map.html
Bats – RaTG13	?	?	?	
Pangolin	?	?	?	

Notable features of the SARS-CoV-2 genome



Polybasic furin cleavage site and O-linked glycans.

b

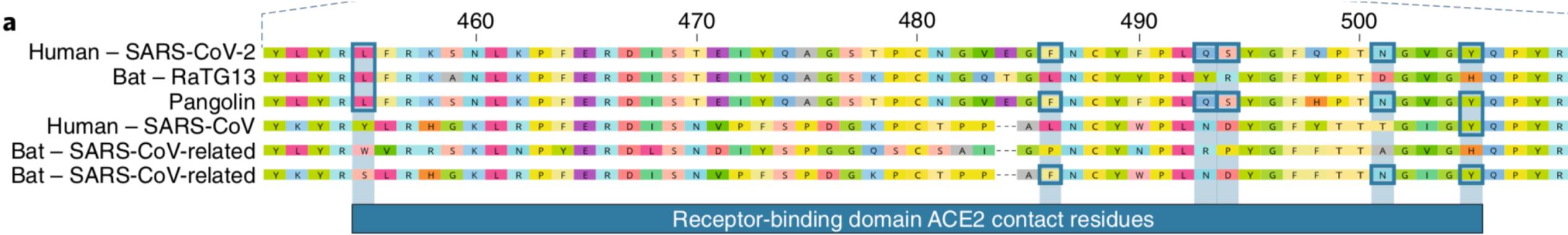


Theories of SARS-CoV-2 origins

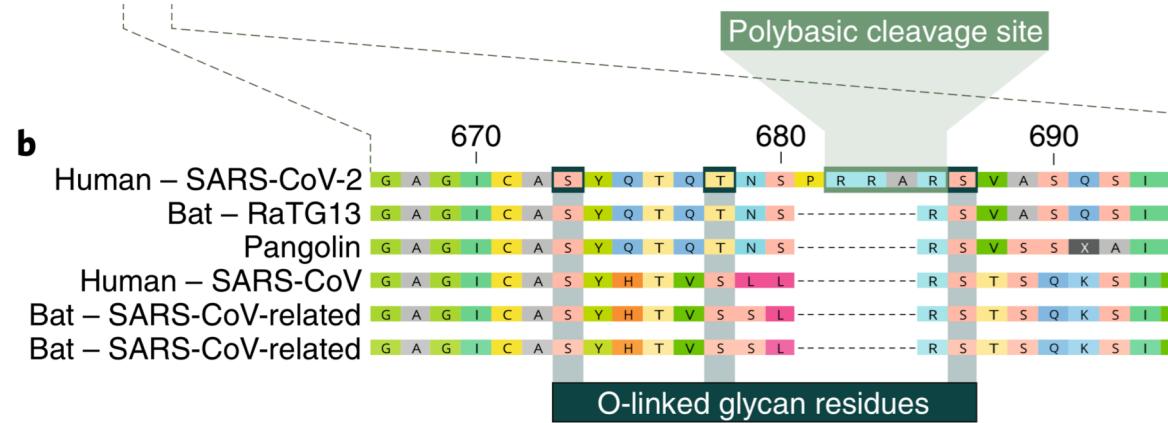
Instead, we propose two scenarios that can plausibly explain the origin of SARS-CoV-2: (i) natural selection in an animal host before zoonotic transfer; and (ii) natural selection in humans following zoonotic transfer.

Natural selection in an animal host before zoonotic transfer

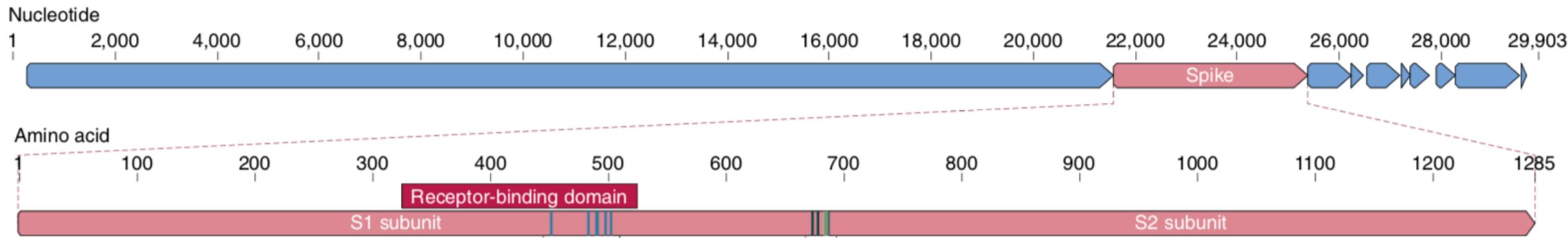
a



Natural selection in humans following zoonotic transfer



The rest of the SARS-CoV2 genome?



Human host to animal zoonotic transfer?



Helen Davidson *in Hong Kong*

 @heldavidson  Email

Thu 5 Mar 2020 03.54 GMT

Hong Kong warns residents not to kiss pets after dog contracts coronavirus

Pomeranian tested a 'weak positive' for virus after owner was infected, authorities say

Animal to animal transfer



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Susceptibility of ferrets, cats, dogs, and different domestic animals to SARS-coronavirus-2

Hualan Chen

doi: <https://doi.org/10.1101/2020.03.30.015347>

This article is a preprint and has not been certified by peer review [what does this mean?].

Posted March 31, 2020.

Animal to animal transfer



bioRxiv

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Susceptibility of ferrets, cats, dogs, and different domestic animals to SARS-coronavirus-2

We found that SARS-CoV-2 replicates poorly in dogs, pigs, chickens, and ducks, but efficiently in ferrets and cats.

Thank you!



University of
BRISTOL

Professor Nello Cristianini

Further Reading

The Atlantic

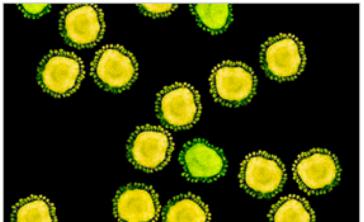
ED YONG



Connect



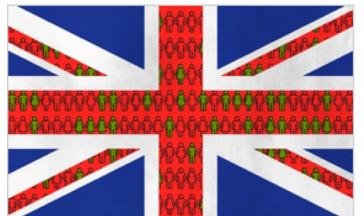
Ed Yong is a staff writer at *The Atlantic*, where he covers science.



Why the Coronavirus Has Been So Successful

We've known about SARS-CoV-2 for only three months, but scientists can make some educated guesses about where it came from and why it's behaving in such an extreme way.

ED YONG MARCH 20, 2020



The U.K.'s Coronavirus 'Herd Immunity' Debacle

The country is not aiming for 60 percent of the populace to get COVID-19, but you'd be forgiven for thinking so based on how badly the actual plan has been explained.

ED YONG MARCH 16, 2020



Joan Wong

How the Pandemic Will End

The U.S. may end up with the worst COVID-19 outbreak in the industrialized world. This is how it's going to play out.

ED YONG MARCH 25, 2020