
Phylogeny

Phylogeny

- A phylogeny (also known as a phylogenetic tree): a diagrammatic hypothesis about the history of the evolutionary relationships of a group of organisms.

Phylogenetic Tree of Life

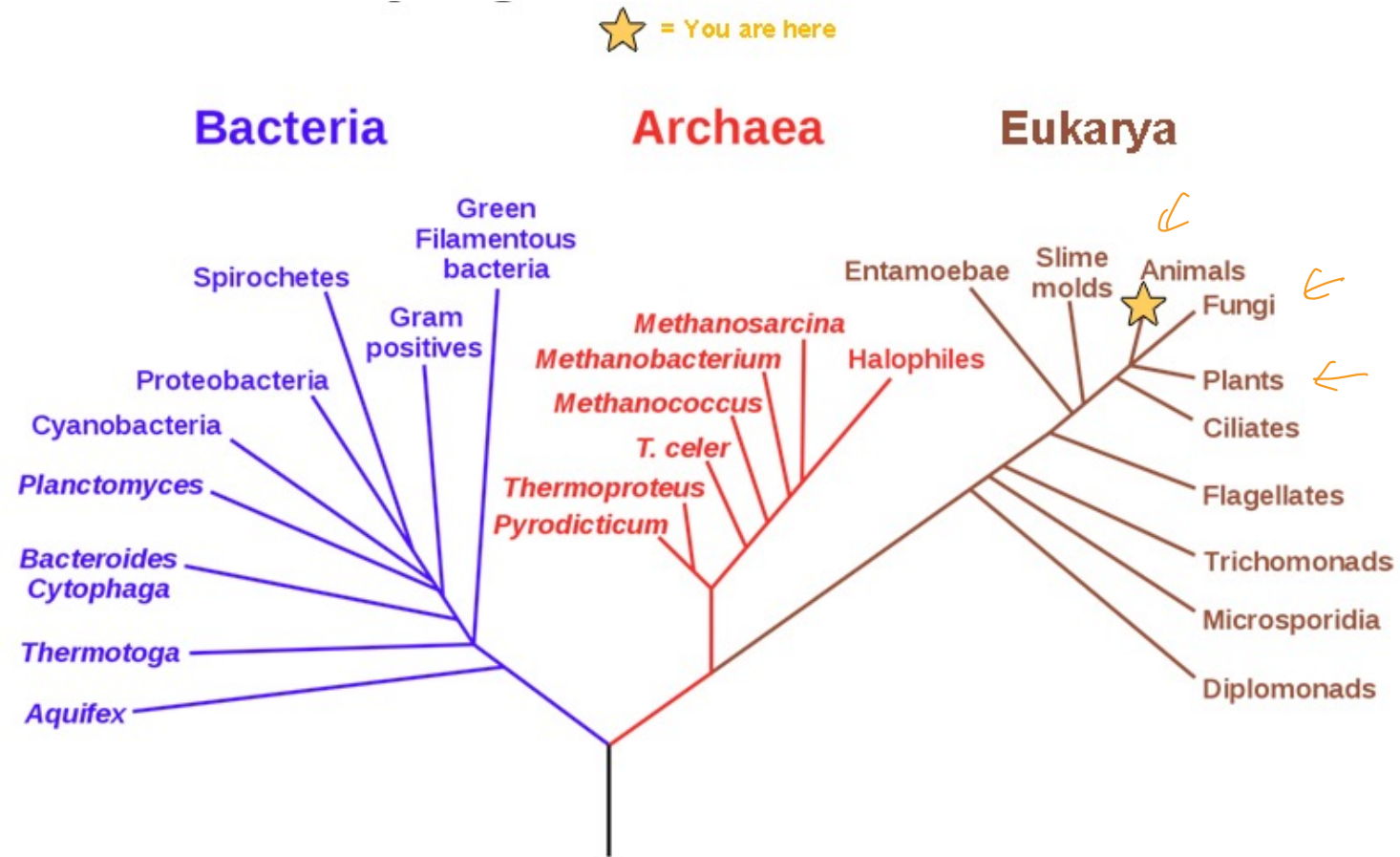
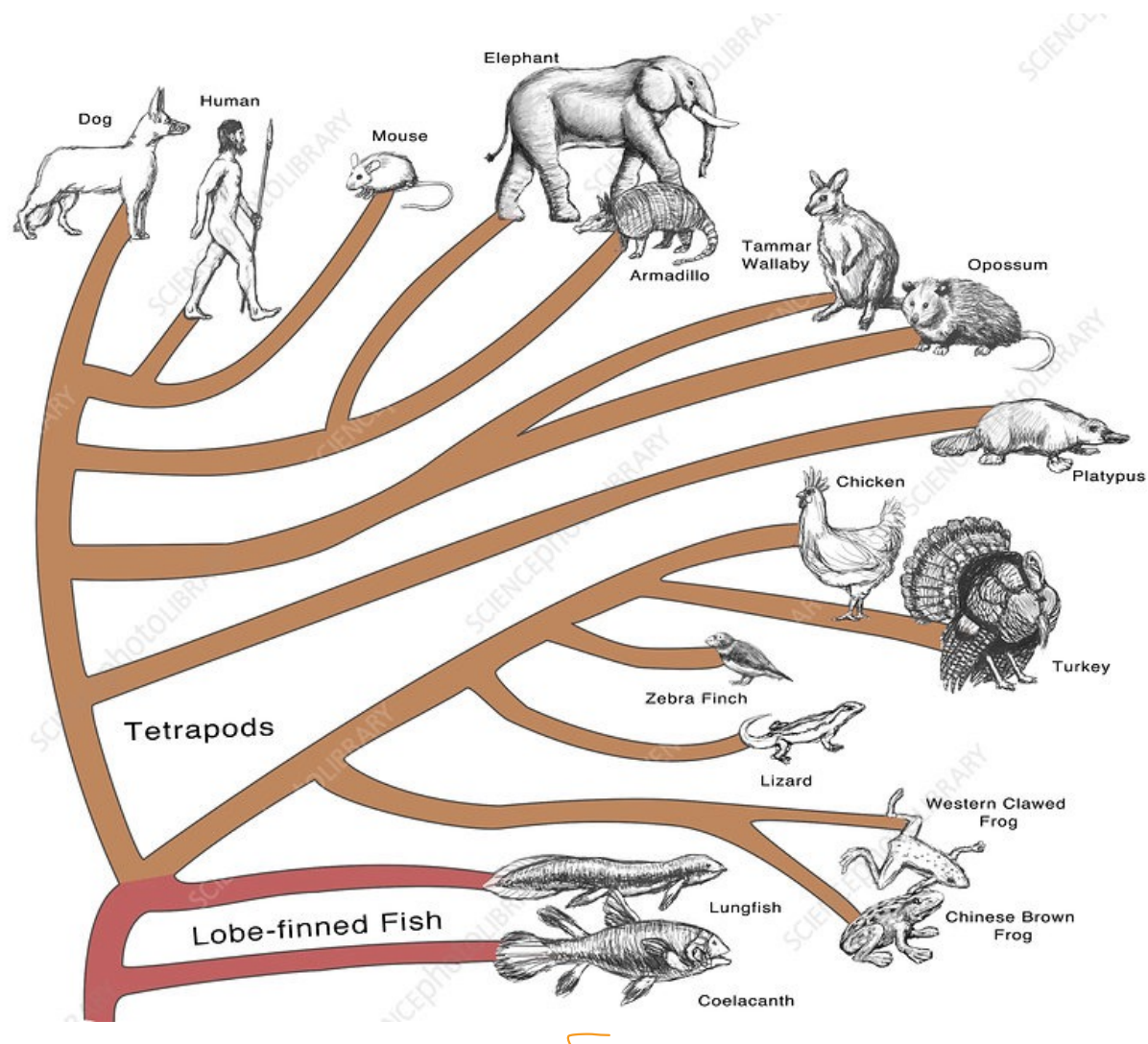
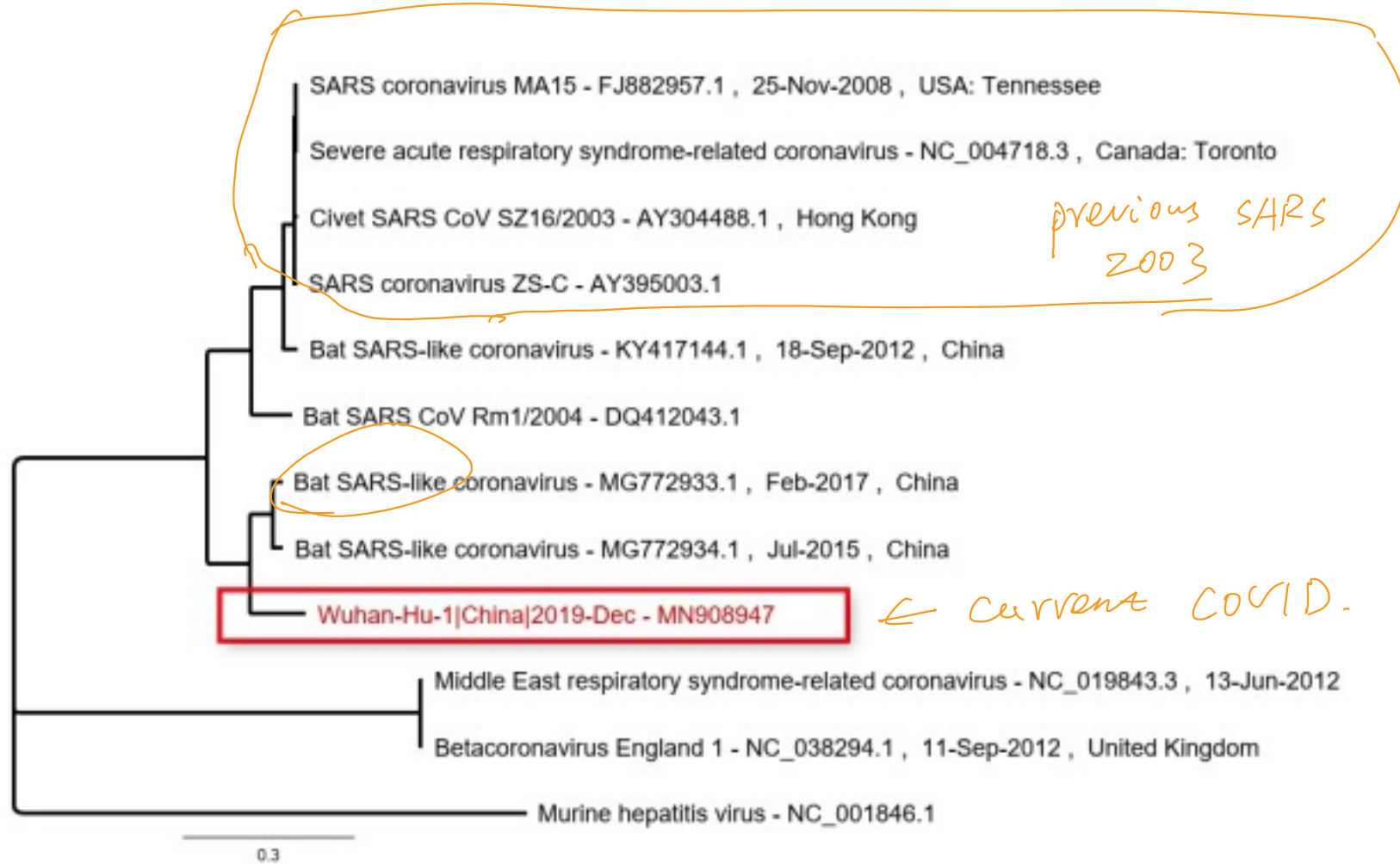


Image credit: <https://courses.lumenlearning.com/wmopen-nmbiology1/chapter/phylogenetic-trees/>

Phylogenetic Tree of Animals



Phylogeny Tree of Coronavirus



Genomic epidemiology of SARS-CoV-2 with global subsampling

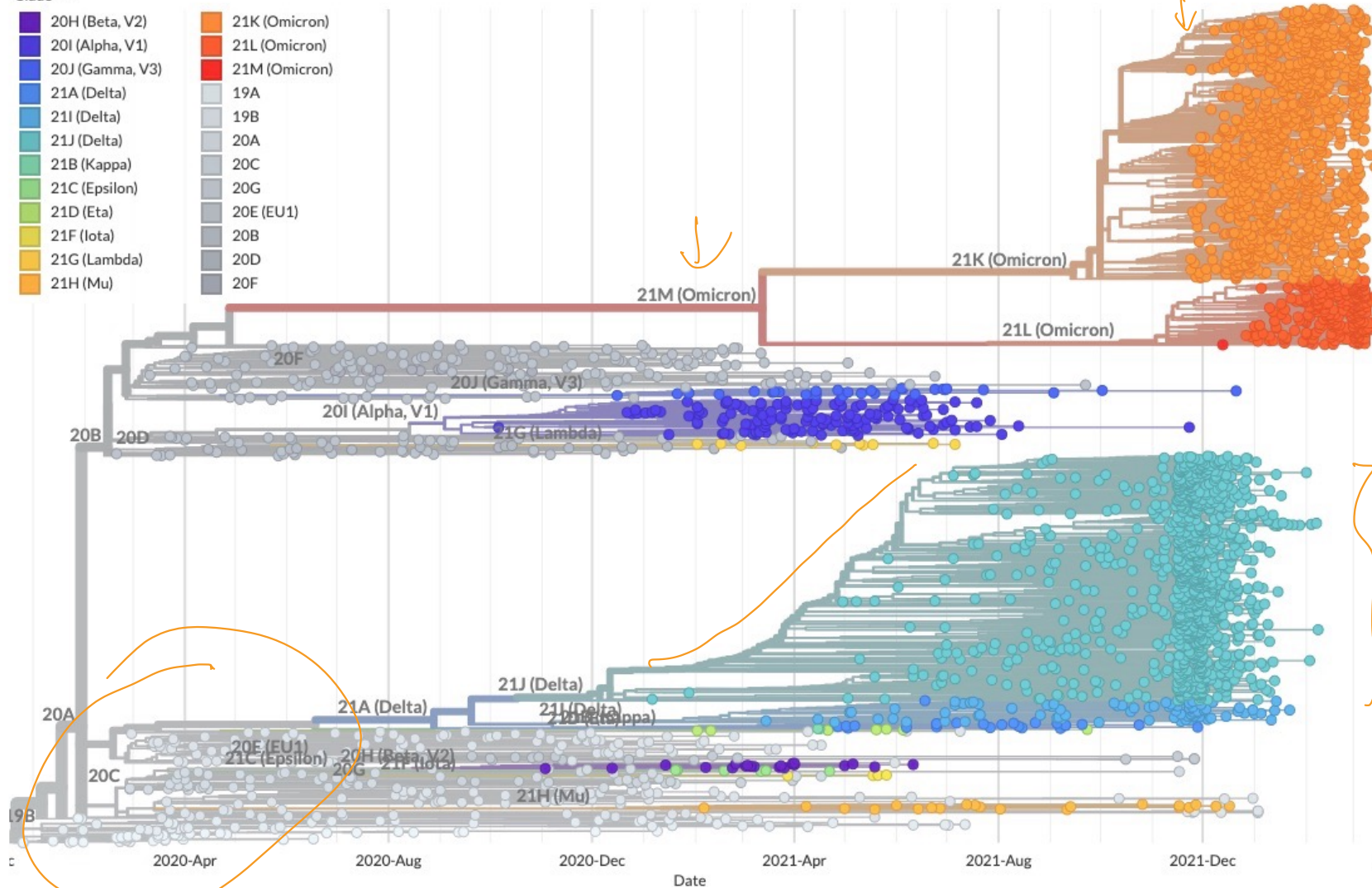
Built with [nextstrain/ncov](#). Maintained by the [Nextstrain team](#). Enabled by data from [GISAID](#).

Showing 3185 of 3185 genomes sampled between Dec 2019 and Mar 2022.

Phylogeny

Clade ^

- | | |
|-----------------|---------------|
| 20H (Beta, V2) | 21K (Omicron) |
| 20I (Alpha, V1) | 21L (Omicron) |
| 20J (Gamma, V3) | 21M (Omicron) |
| 21A (Delta) | 19A |
| 21I (Delta) | 19B |
| 21J (Delta) | 20A |
| 21B (Kappa) | 20C |
| 21C (Epsilon) | 20G |
| 21D (Eta) | 20E (EU1) |
| 21F (Iota) | 20B |
| 21G (Lambda) | 20D |
| 21H (Mu) | 20F |



delta

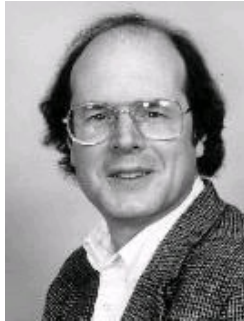
omicron

Image credit:
<https://nextstrain.org/>

Other Examples for Phylogenetic Analysis

- Examples outside of Biology:
 - Study how the news articles copy each other.
 - Study how chain letters evolve (our example to use).
- Terminologies:
 - Organisms: the studied subjects.
 - Taxon (taxa): A **taxon** is a group of one (or more) populations of organism(s).
 - Species: (usually) the largest group of organisms in which any two individuals of appropriate sexes can produce fertile offspring.

In 1997, on a Hong Kong mountain, the story begins ...



Charles H. Bennett



Ming Li

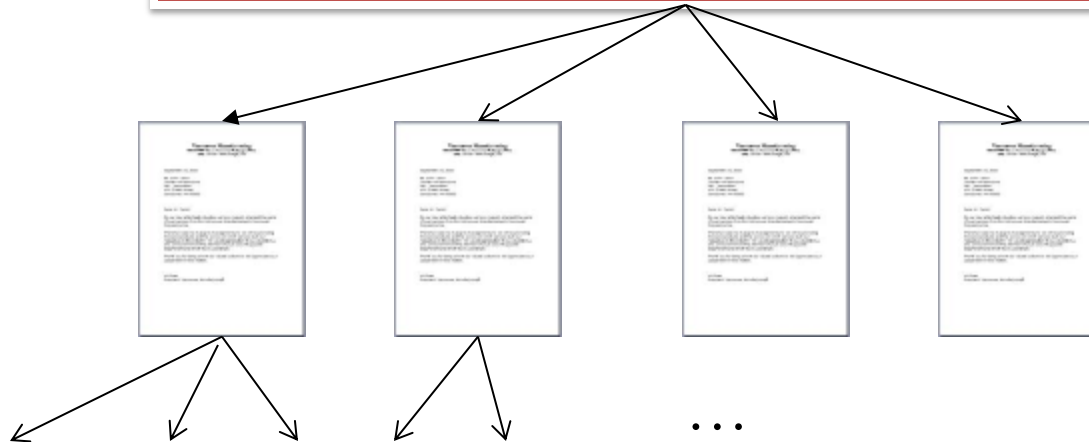


Lion Rock

Chain letters – old style

- Charles Bennett collected 33 copies of chain letters that were apparently from the same origin during 1980—1997.
- How does it work?

Make 20 copies and send to your friends.
Yes → some good things will happen
No → some bad things will happen.



Trust in the Lord with all your heart and he will acknowledge and He will light the way. This Prayer has been sent to you for good luck. The original copy is from the Netherlands. It has been around the world nine times. The luck has been brought to you. You are to receive good luck within four days of receiving this letter. This is nojoke. You will receive it in the mail. Send copies of this letter to people you think need good luck. Do not send money. Do not keep this letter. It must leave your hands within ninety six hours after you receive it. An RAF officer received \$70,000. Don Elliott received \$50,000 and lost it because he broke the chain. While in the Phillipines, General Welch lost his life six days after he received this letter. He failed to circulate the Prayer. However, before his death, he received \$775,000. Please send twenty copies and see what happens to you on the fourth day. This chain comes from Venezuela and was written by Sol Anthony De Cadif, a missionary from South America. Since this chain must make a tour of the world. you must make twenty copies identical to this one and send it to your friends, parents, and acquaintances. After a few days you will get a surprise. This is true, even if you are not superstitious. Take note of the following. Constantine Diaz received the chain in 1953. He asked his secretary to make twenty copies and send them. A few days later he won a lottery for two million dollars in his country. Carlo Craduit, and office employee, received the chain. He forgot it and in a few days lost his job. He found the chain and sent it to twenty people. Five days later he got an even better job. Dolin Moirchild received the chain and not believing in it, threw it away. Nine days later he died. For no reason what so ever should this chain be broken