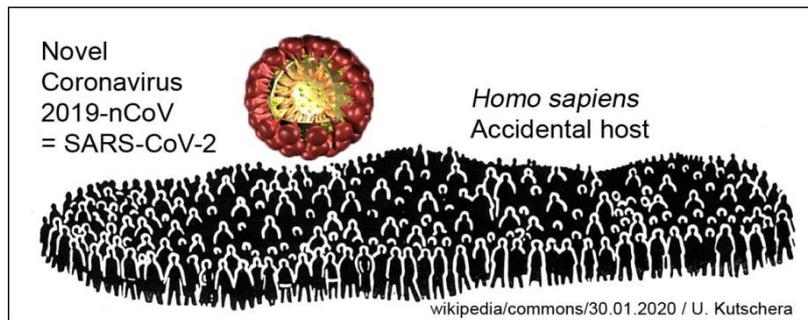


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The Coronavirus as a Personalized Enemy of Mankind

In their *Research Article* “The effect of human mobility and control measures on the COVID-19 epidemic in China” (Science abb4218, 1–5; 2020), M. U. G. Kraemer et al. write that SARS-CoV-2 was identified in early January 2020 as the “causative virus” of the lung disease Covid-19. The authors refer to a paper of N. Zhu et al. (1.), where Chinese scientists have described the extraction of “human airway epithelial cells to isolate a novel coronavirus named 2019-nCoV.” The name “2019-nCoV” was also used by D. Wrapp et al. (2.) in a major *Research Paper*, and the accompanying E-Letter entitled “Gender-specific Coronavirus infections in the light of evolution” (3.).



This inconsistency in virus terminology (SARS-CoV-2 vs. 2019-nCoV) can be resolved as follows. On Febr. 3, P. Zhou et al. (4.) published an article entitled “A pneumonia outbreak associated with a new coronavirus of probable bat origin”. In this study, the authors identified a new pathogen they “tentatively called novel coronavirus 2019 (= 2019-nCoV)”. Based on sequence data, this “species” was found to be ca. 80 % identical to SARS-CoV. Moreover, 2019-nCoV displayed a ca. 96 % identity to “a bat coronavirus”. Remarkably, in human cells, SARS-CoV and 2019-nCoV were found to use the same cell entry receptor (ACE2) (4.).

On March 5, the “Coronaviridae Study Group (CSG)” published a *Review Article* entitled “The Species *Severe acute respiratory syndrome - related coronavirus*: classifying 2019-nCoV and naming it SARS-CoV-2” (5.). In this “Consensus Statement”, the authors distinguished between three “virus species”: The “Middle East respiratory syndrome-related coronavirus (MERS-CoV)”, which causes the disease “Middle East respiratory syndrome (MERS)” (outbreak 2012), and the “Severe acute respiratory syndrome-related coronavirus (SARS-CoV)”, the causative agent of the “Severe acute respiratory syndrome (SARS)”

(outbreak 2002/2003). Due to the close sequence-similarities of SARS-CoV and 2019-nCoV, the latter was named “SARS-CoV-2”.

In evolutionary biology, species are defined as populations of sexually reproducing organisms that are reproductively isolated from other such groups of living beings displaying a similar morphology. Accordingly, only eukaryotes (fungi, plants, animals) can be classified as “true species”. Prokaryotes (bacteria), which are unable to produce (or act as) gametes, and hence lack sexuality, may be divided into “ecotypes”. These groups of microbes occupy defined microhabitats and are recognizable as DNA-sequence clusters (6.). If bacteria cannot be unequivocally characterized as “real species”, how can virologists define their non-cellular, infectious particles? Despite this lack of consensus in bacteriology (6.), the CSG described SARS-CoV-2 as a “virus species” and provided the following six-step-analogy with respect to its accidental host, the mammal *Homo sapiens*.

I. Category: Coronaviruses / Humans; II. Order: Nidovirales / Primates; III. Family: Coronaviridae / Hominidae; IV. Genus: *Betacoronavirus* / *Homo*; V. Species: *Severe acute respiratory syndrome-related coronavirus* (SARS-CoV-2) / *Homo sapiens* (*H. sapiens*); VI. Individual: SARS-CoV PC4-227 etc. / James Watson etc. As pointed out by the authors (5.), the classifications of the virus SARS-CoV-2 and the primate *H. sapiens* are based on independent criteria.

From a psychological perspective, this anthropomorphic terminology may be interpreted as follows. Virus particles are composed of a nucleic acid (RNA or DNA) that is surrounded by a protein envelope. They are non-cellular molecular parasites that lack metabolism and can only survive/reproduce by infecting host cells that are “misused” by “hijacking” their replication machinery, followed by the destruction of the corresponding protoplasmic unit. In contrast, living cells are characterized by an ATP-dependent metabolism and the presence of both types of nucleic acids (DNA and RNA) necessary for gene expression and protein biosynthesis. It follows that viruses are evolutionary ancient “connecting links” between complexes of biomolecules and living cells. Via the virus/*H. sapiens*-analogy, the CSG promoted the tiny, invisible RNA-protein-particles (size ca. 125 nm) to the rank of a “personal enemy” that attacks its human host.

Obviously, mankind can much better fight against an enemy that has a (fictive) “personality”, rather than to struggle with an elusive aggregate of biomolecules that replicates itself as a blind, steadily evolving intracellular parasite – without consciousness and the “intention” to damage (or kill) its host organism.

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References

1. N. Zhu et al., *N. Engl. J. Med.* 382, 727–733 (2020).
2. D. Wrapp et al. *Science* 367, 1260–1263 (2020).
3. U. Kutschera. *Science* 367/1260, E-Letter March 16 (2020).
4. P. Zhou et al. *Nature* 579, 270–273 (2020).
5. A. E. Gorbalenya et al. *Nat. Microbiol.* 5, 536–544 (2020).
6. F. M. Cohan. *Curr. Biol.* 29, R169–R172 (2019).

Original Article:

<https://science.sciencemag.org/content/early/2020/03/25/science.abb4218/tab-e-letters>