

Submitted to *The Lancet* Feb 3 2020- a revision of earlier letter

Comment on the origin of the 2019 Novel Coronavirus

The recent paper by Huang et al (1) and the commentary by Cohen in *Science* (2) highlights many unusual aspects of the outbreak of nCoV-2019. The evidence demonstrates that many cases of disease (about 30% of case reports) arose in locations unconnected with the Wuhan seafood and meat market, and the total tally continues to increase. Phylogenetic analyses of nCoV-2019 sequences show little by way of sequence variation thus indicating low mutation rates thus approximating closely to what would be expected for a pure culture (3, 4). This fact combined with epidemiological data points to little or no human-to-human transmission thus far (e.g. see the latest report by the Australian Department of Health, 5). In any case current data suggest that the human-to-human spread rate is unusually low, and may be dependent on proximity and dose of virus delivered at very close quarters. The “lethality” or “death rate” from this or any other epidemic disease increases in older patients with pre-existing conditions so wider global estimates yield a death rate at 3% of infected. These basic facts now appear agreed. The traditional explanation of the new epidemic of nCoV-2019 that it jumped from bats (possibly via snakes) to humans and then spread by human to human contact mutating at a high rate is thus at odds with the data at present.

Combining all the available facts we cannot rule out a viral in-fall event targeting the Wuhan province and the wider region around it as an explanation as a first cause of the epidemic. This would fit with the admittedly heterodox view of viral pandemics first proposed by Hoyle and Wickramasinghe as far back as 1978 (6, 7, 8, 9). This concept accords with the theory of cosmic biology for which growing evidence have recently been reviewed by Steele et al (10,11). This theory posits a sporadic input of cosmic bacteria and viruses that has the potential to interact with evolving terrestrial life forms.

In the case of the current Corona virus pandemic in China it is interesting to note that an exceptionally bright fireball event was seen on October 11 2019 over Songjyan City in the Jilin Province of NE China (See Fig.1). It is tempting to speculate that this event had a crucial role to play in what is now unfolding in throughout China. If a fragment of a loosely held carbonaceous meteorite carrying a cargo of viruses/bacteria entered the mesosphere and stratosphere at high speed $\sim 30\text{km/s}$, its inner core which survived incandescence would have got dispersed in the stratosphere and troposphere. The fall time through the atmosphere of 1-10 micrometre-sized solid particles could range from a few months to well over a year on the basis of straightforward calculations (e.g. in the appendix of ref. 6). Because dispersal at ground level depends on the vagaries of meteorology and precipitation the deposition of virus at ground level is expected to be patchy in regard to both time and place. This is certainly consistent (thus far) with what has happened in relation to the new coronavirus epidemic between November 2018 and the present day (3 February 2020). Following the initial deposition of infective particles in a small localised region (e.g. Wuhan, Hubei province, China) particles that have already become dispersed through over a wider area in the troposphere will fall to ground in a higgledy-piggledy manner, and this process could be extended over a typical timescale of 1-2 years until an initial inoculant of the infective agent would be drained. This accords well with many new strains of viruses including influenza that have appeared in recent years (9).



Fig 1 – From Space.com- <https://www.space.com/china-midnight-meteor-brilliant-fireball-october-2019.html>

The possible link of sunspots with pandemics has been discussed over many years (9, 12) and is worthy of brief comment. The present cycle (interface between cycles 25 and 25) has seen the lowest minimum for well over a century with many sunspot free days recorded in the last months of 2019. Sunspot minima are associated with a weakening of the interplanetary magnetic field near the Earth, which in turn allows easy ingress of Galactic Cosmic Rays (GCRs) and electrically charged bacteria and viruses to the Earth. The mutagenic role of GCRs can cause genetic changes in already circulating viruses, but it is primarily to an enhanced flux of new infective particles exploding meteoroid that we turn.

We conclude by noting that we expect the pattern of further spread of the new coronavirus (nCoV) to be dictated mostly by primary infall until a high level of person-to-person infectivity might *possibly* be achieved and the virus then acquires the status of an endemic virus.

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