

General Commentary On A Published Paper:

“Lethal Pneumonia Cases in Mojiang Miners (2012) and the Mineshaft Could Provide Important Clues to the Origin of SARS-CoV-2”

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Introduction

Recently, the Chinese government has rejected the proposal of a second probe by the World Health Organization to investigate the origins of SARS CoV-2. Biden administration ordered a ninety-day intelligence probe in the same which would soon end. It is highly critical for investigators worldwide to look at the clues regarding the origins of this virus that are already present. We had published one such vital clue linking a mine in Mojiang, Yunnan, to the WIV, Wuhan, where the SARS-CoV2 outbreak started (Rahalkar and Bahulikar, 2020a). In 2012, six people cleaned an abandoned bat-infested mineshaft in Tongguan, Mojiang, Yunnan, and suffered from severe pneumonia followed by death in three of them. Zhong Nanshan, the renowned doctor in China, had remotely observed the serious cases and had diagnosed pneumonia to be of primary viral origin. WIV was invited to inspect the bat coronaviruses as SARS-like bat coronaviruses were suspected to be the culprits as per a Master thesis by a medical student who studied the cases (Xu, 2013). WIV collected several samples from this mine, of which one was a SARS-like coronavirus, RaTG13, the original name being Ra4991. However, Shi Zhengli did not explain the relationship between the mine, RaTG13, and the details of pneumonia in any of her papers till July 2020, where she explained that TG was Tongguan mine (www.sciencemag.org, Zhengli Shi Q and A). We published first a pre-print and then a detailed perspective article connecting all these dots and highlighted the features of lethal pneumonia, which resembled COVID-19 (Rahalkar and Bahulikar, 2020b; a).

Later a commentary on our paper was published by Alex Speciale (Alex, 2021), highlighting the importance of this clue and how several questions asked in our original article still remain unanswered.

Addendum: Late and incomplete

After the publication of our article (Rahalkar and Bahulikar, 2020a), an addendum was published by Zhengli Shi and others (Zhou et al., 2020a), where they revealed the fact that the WIV visited the mineshaft, for a total of three years from 2012-2015. They collected a total of 1322 bat coronavirus samples and were brought in WIV for storage and future study, a fact not disclosed in their prior publications (Ge et al., 2016) (Zhou et al., 2020b). They also disclosed that there were eight more SARS-like coronaviruses in the 1322 samples, which were probably recognized using RdRp PCR. However, neither the sequence ids nor the sequences of these eight isolates were mentioned in the Addendum article (Zhou et al., 2020a). Also, the addendum did not reveal detailed information of 2012 miners' pneumonia, which was the main reason behind their three-year hunt for coronaviruses in the Mojiang mine. They reported analyzing four samples of miners without. No reference about the details of the miners' illness documented in a Masters' thesis (Xu, 2013) and a Ph.D. thesis (Huang, 2016) were mentioned in the addendum (<https://www.documentcloud.org/documents/6981198-Analysis-of-Six-Patients-With-Unknown-Viruses.html>, <https://www.documentcloud.org/documents/20694207-canping-huang-phd-novel-virus-discovery-in-bat-isn-translation>).

The addendum also states that they had tested the serum samples collected from the patients from July to October 2012 were tested by RT PCR, for SARS-like coronaviruses. Serum samples are not suitable samples to detect the virus by RdRp PCR, as the viral amount in the blood, if any, would be much lower, as it is a respiratory illness. Secondly, the sample collected for doing a direct RdRp PCR is too late, as the miners suffered from the disease in April 2012, and the samples were collected 3-4 months later. Also, a PhD thesis by Canping Huang, guided by George Gao, the present CDC director, China, clearly mentioned that four of the tested four miners had shown positive IgG antibodies to SARS or SARS-like coronaviruses. Whereas, in the Addendum, it is said that the serum samples did not show antibodies to SARS-like RP3

checked (probably) in 2012 (exact date not mentioned) as well as to SARS-CoV-2 as tested in 2020 (Zhou et al., 2020a). It is unclear whether they tested the SARS-CoV-2 antigens or antibodies in 2020.

China's CDC director, George Gao, who was also the Ph.D. guide of Canping Huang, was asked the same question in a documentary by France2 television. He replied that the miners had antibodies to SARS, but these could have been from an earlier infection or by an unknown virus .

Mojiang mineshaft cluster: Undisclosed till May 2021

A pre-print recently published on Biorxiv by Shi Zhengli, reveals collection of eight SARS-like coronaviruses (7909, 7896, etc.) from the Tongguan mine (Guo et al., 2021). These sequences were briefly mentioned in a collaborative paper of WIV with Ecohealth Alliance (Latinne et al., 2020). Surprisingly, the earlier paper (Latinne et al., 2020) had not given the exact location of the samples- 7896, 7907, 7909, etc. as the Tongguan mineshaft or even the location, Mojiang was missing. In (Guo et al., 2021), they mentioned that the RdRp of these samples belonged to the RaTG13-SARS-CoV-2 clade, and therefore the whole genome of 7909 was sequenced postpandemic and named as RaTG15. Further, added that all the eight viruses were more or less the same. However, in a Master Thesis found on the cnki.net by Yu Ping, published in 2019, guided by Shi Zhengli clearly indicated that WIV had the sequences of S protein, RdRp, and ORF8 genes from the sample 7909 (later renamed as RaTG15 in 2021). RaTG13 was also sequenced in 2018 itself, as per Shi Zhengli in a Science Q and A session but in (Zhou et al., 2020b) it is mentioned that it was sequenced post-pandemic. All of the above facts indicate that the details of sampling carried out from the mine were either not disclosed timely or very late or never. Since the main database describing the information about ~22,000 bat and rodent sequences and other details of the collected viruses, is offline, the world

cannot verify the information. The WHO report also lacks the sequence ids or the sequences Tongguan mineshaft.

Mojiang Mine: inaccessibility and mine closed for outsiders

After the incident of 6 miners in 2012 in Mojiang, China, researchers visited the mine between 2012 and 2015. The Mojiang mine, at the center of everyone's attention, is now inaccessible. Reporters from the Associated Press, BBC, France2, WSJ, and many other media groups could not reach the area because of roadblocks and secret police. The Wall Street Journal reported that one of its reporters was detained by police, and the photo was deleted. In December 2020, Associated Press had reported China was keeping the Mojiang mine off-limits to researchers and journalists. A bat research team that visited recently had their samples confiscated, as per the report.

About this incident and visits to the mine, Zhengli Shi mentioned in her Scientific American interview (Qiu, 2020) that the mine was promptly closed. Since WIV and the CDC teams were the only teams which sampled from 2012-2015 (Huang, 2016; Zhou et al., 2020a) and that the mine was closed for the outsiders, it is clear that except the researchers no other people went in the mine.

Discussion:

No human to human transmission of the miners pneumonia

Based on available reports pneumonia in miners did not spread naturally to nearby places. There are no reports of any similar outbreak in Yunnan. Shi Zhengli when asked about this in the Science Q and A , July 2020, has said that there were no antibodies detected in the villagers near the TG mine (Q and A session Science journal, Zhengli Shi. "Thus, the claim that the so-called "patient zero" was living near the mining area and then went to Wuhan is false", Shi Zhengli had said. Thus, it is clear that the SARS-like corona virus which had affected the TG

miners would not have directly affected any of the human population around. Therefore, the concern that the virus was already naturally circulating for many years cannot be true. The virus which affected the miners probably needed genetic manipulation to get converted to a human-to-human transmitting virus. The initial step where it affected the miners was probably a zoonotic jump and due to high viral load it affected the miners, which were exposed to large amounts of bat guano. The fact that the samples of the miners and the bat SARS-like coronaviruses were brought to WIV, Wuhan, a laboratory famous for the collection and genetic manipulation of coronaviruses, is crucial.

China has rejected the possibility of investigation by WHO in the second phase. The possibility that one of the viruses brought to the laboratory in Wuhan, from the mine or the miners' sample could have been the progenitors of the virus and the plausibility of a lab leak of these samples or cultured viruses cannot be tested or verified. As commented by Alex Speciale (Alex, 2021), the possibility of Mojiang Miner's passage, as proposed by Jonathan Latham, where the viral entry into the lungs might have resulted in rapid evolution, also could be true and should be verified.

Without transparency on this matter, the Mojiang mine and the miners' cases and their straight connection to the Wuhan lab still remains an important clue. Complete transparency, including the release of the sequences and information about all the viruses collected, sequenced, cloned, and cultured from the mines and miners, providing all the samples collected from the mineshaft related work to the international community could be helpful for solving this part of the riddle. Also, most of the questions asked in our perspective paper still remain valid and un-answered. The whole world expects transparency in this matter from China.

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