OPEN LETTER

April 7, 2021

CALL FOR A FULL INVESTIGATION INTO THE ORIGINS OF COVID-19

Understanding how the SARS-CoV-2 virus emerged and spread to humans is an essential foundation for prioritizing future pandemic prevention and response strategies. Yet well over a year after the initial outbreak, no robust process for examining the origins of the pandemic has been established and critical records and biological samples that could provide essential insights into pandemic origins remain inaccessible. These shortcomings pose a significant threat to everyone and future generations.

As scientists, social scientists, and science communicators, including signatories of the March 4, 2021 open letter on COVID-19 origins, we believe there is a better way forward.

- Reaction to the China-WHO joint study team report -

In our previous open letter, we outlined our fears that the joint international committee/Chinese government team *"did not have the mandate, the independence, or the necessary accesses to carry out a full and unrestricted investigation into all the relevant SARS-CoV-2 origin hypotheses."* Having read the report entitled 'WHO-convened Global Study of Origins of SARS-CoV-2: China part' and reviewed the statements made in the March 30, 2021 WHO-organized press event announcing the report's release, we have regrettably concluded that our concerns were fully justified.

In addition to the issues regarding the joint mission structure and process outlined in our previous open letter, we wish to express the following concerns regarding the joint study process and report conclusions:

- The joint study team saw its priority as seeking a zoonotic origin, not as fully examining all possible sources of the pandemic. Its Terms of Reference did not mention any possible lab-pathway and on the contrary explicitly stated a strict zoonosis origin from the very start (*"identify the zoonotic source of the virus"*).

- The published data supporting the mission report mostly present reviews of Chinese studies that have not been published, shared with, or reviewed by the international scientific community.

- Well over a year after the initial outbreak, critical records and biological samples that could provide essential insights into pandemic origins remain inaccessible. This withholding of key resources that could and should have been made available undermined the credibility of the joint study team work.

- The joint study team used different evidentiary standards for the four origin theories it considered. No solid justification is provided for why a 'lab-related accident' (whether a lab-leak or sampling accident) should be considered 'extremely unlikely', or why a natural spillover via an unknown animal host should be considered 'likely to very likely'. At this stage there is still no direct evidence for either pathway nor any verified data or evidence sufficient to rule any one out, while historical evidence amply supports both.

- In particular, a primary conclusion of the report, that SARS-CoV-2 was most probably introduced into the human population through an intermediate host, is not supported by the negative results of all the 80,000 tested samples of wildlife, livestock (35 species) and poultry. That pathway remains entirely theoretical, which at the very least shows the necessity to remain open to other pathways.

- The joint study report spends a mere 440 words examining the lab-accident pathway - less than 1% of the whole report - and does so in a dismissive and superficial way without considering all the possible versions of that pathway, including a possible infection of a sampling team member by a virus that may never have been isolated or sequenced. The joint study report also makes no mention of the Gain of Function research on bat coronaviruses that was being carried out in Wuhan in the second half of 2019.

- The 440-word assessment of the lab-accident pathway is supplemented by Annex D7 of the report, which labels the lab-pathway as a 'conspiracy theory' five times while containing disputed, incorrect, imprecise, and contradictory assertions (as detailed in the supplement below).

- The final process utilized by the joint study team for assessing the likelihood of the lab pathway – essentially a show of hands by the joint study team members based on an extremely superficial review – failed to reach some most basic standards of credible analysis and assessment. Further, it is at best unclear whether the Chinese joint study team members had the leeway to express their fair evaluation of all hypotheses in the presence of Chinese government minders.

Against these significant limitations and procedural failures that call the conclusions of the China-WHO joint study report into question, we fully support the March 30, 2021 statement by WHO Director-General Dr. Tedros Adhanom Ghebreyesus that all origin hypotheses must still be examined, including the possibility of a lab-related incident, that China must be more forthright in sharing essential data and biological samples, and that WHO is prepared to send additional missions and experts to China in order to thoroughly examine all origin hypotheses. We welcome this courageous defense of the WHO's integrity and recognize the organization's potential to lead a comprehensive investigation into pandemic origins, if given the mandate and necessary support.

We further welcome the March 30, 2021 Joint Statement on the WHO-convened COVID-19 Origins Study by 14 countries underscoring the need for "a transparent and independent analysis and evaluation, free from interference and undue influence" and voicing their shared concern that the joint study *"lacked access to complete, original data and samples."* We also recognize the European Union Statement on the WHO-led COVID-19 Origins Study underlining that the identification of the source of the SARS-CoV-2 virus will *"require full and transparent cooperation by all WHO Member States and a collaborative effort by scientists from various disciplines."*

- Next steps -

The principles articulated by the WHO Director General and the two joint statements mentioned above will require a renewed commitment by WHO and all Member States to a full and unrestricted forensic and scientific investigation based on access, transparency and timeliness. This essential goal must be realized in at least one of three possible concrete steps forward.

1. Revise existing Terms of Reference

Given the extreme limitations of the present joint study, and in line with Dr. Tedros Adhanom Ghebreyesus's statement, we do not believe a comprehensive study of the *origins of SARS-CoV-2* has yet been undertaken. Accordingly, the most logical next step would be for the existing Terms of Reference between the WHO and China for such search to be revised to make such an examination possible. These revised terms should:

- Replace the veto power by any government over the composition of the international experts team with a provision requiring final decisions regarding the make-up of the international expert group to be made by the WHO Executive Board;

- Ensure the incorporation of a wider skill-set in the international experts team, including biosafety and biosecurity experts, biodata analysts and experienced forensic investigators;

- Guarantee a transparent selection of the experts team, backed by a more robust process for dealing with possible conflicts of interest. Such a process should prevent any conflict of interest involving prior professional association with laboratories and institutions relevant to the investigation;

- Provide an official mandate allowing international experts to request full or significant access to all sites, records, and samples of interest, and to interview relevant people without the presence of government authorities and with the assistance of translators provided by the WHO; and

- Make the revised Terms of Reference public immediately after negotiation so as to be available for review by the international community and scientists.

2. *Pass new World Health Assembly resolution*

If these revisions cannot be agreed upon and implemented in the very near term, a second option would be for interested governments to propose a new resolution at the May 2021 World Health Assembly. In addition to incorporating the points above, this new resolution should:

- Call for an unrestricted international forensic and scientific investigation into the origins of the pandemic, fully examining all COVID-19 origin hypotheses, with full access to all records, samples, and personnel relevant to the investigation irrespective of location;

- Call for the timely and comprehensive sharing of raw data relevant to the emergence of COVID-19 within the framework of Open Science and the FAIR principles;

- Call for improved national and international regulatory oversight of laboratories doing high risk virology research, with specific emphasis on "gain of function research of concern" (GOFROC); and

- Empower the World Health Organization to negotiate new Terms of Reference for this full investigation based on the principles articulated above.

3. *Establish parallel international investigation*

If it should prove impossible for the Terms of Reference to be quickly revised or for a new and sufficient World Health Assembly resolution to be passed in the coming session, the best

remaining alternative would be for governments seeking a full and credible examination into the origins of the pandemic to come together to develop a new and independent process, with China's cooperation if possible but without it if not. Such a process would:

- Outline what a full and unrestricted investigation of all origins hypotheses would entail;
- Draw on the combined knowledge of government agencies and global experts to examine all origin hypotheses to the full extent possible;
- Pool knowledge and intelligence of cooperating governments in a collaborative effort to probe essential questions;
- Establish a secure whistleblower system allowing scientists and others in China and other countries to share relevant information without fear of retribution; and
- Hold transparent public hearings designed to examine all hypotheses in the most data-driven and responsible manner possible.

Calling for a full investigation into the origins of the pandemic by the best available means is not intended to point fingers at any one country. Its purpose is to leave no stone unturned in seeking to understand how this catastrophe began so we can prioritize efforts to address our greatest shortcomings for the benefit of all people and all nations.

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Supplement:

Some issues regarding Annex D7 (entitled 'Wuhan Institute of Virology') of the 'WHO-convened Global Study of Origins of SARS-CoV-2: China part'

- **Incorrect Statement:** In Annex D7 Prof. Shi Zhengli states that the *'miners had been to the cave 2 - 3 times'* in relation to the Mojiang mine deaths in 2012. Actually the miners developed symptoms after working 8 to 14 days in the mine for around 7 hours a day.

- **Disputed Statement:** In Annex D7 the 'WIV experts' are cited as saying that the Mojiang miners' deaths were *'more likely explained by fungal infections'*. The fungal infection diagnosis is however in contradiction with the diagnostic of Prof. Zhong Nanshan, the foremost Chinese SARS expert at the time, who diagnosed a most likely primary infection from a SARS-like coronavirus, with a possible secondary fungal infection in some cases (pulmonary aspergillosis). Further, the diagnosis of the 'WIV experts' also contradicts the positive bat SARS coronavirus antibody tests (IgM and/or IgG) obtained for 4 of the 6 miners (these four tests were carried out at the WIV itself and described in this PhD thesis).

- **Incorrect Statement:** Annex D7 wrongly describes the deleted database as an *'Excel spreadsheet that had been on the website for 10 years'* when actually it is a 61.5MB MySQL database that had been released only a few years ago. This database represents only one of multiple WIV databases that have been taken offline.

- **Contradictory Statement:** Annex D7 states that the database was taken offline after being attacked by hackers. On another occasion Prof. Shi Zhengli explicitly stated that the database was attacked by hackers during the pandemic and then taken offline. This is in contradiction with the fact that the database was taken offline on September 12, 2019, before the official start of the pandemic.

- **Incorrect Statement:** In Annex D7 Prof. Shi Zhengli is quoted as saying that *'all fieldwork is done with full PPE'*. This is in contradiction with statements, photographic and video records, showing limited PPE use by WIV personnel during field work. This was additionally confirmed by Shi Zhengli herself in a presentation (starting from 16:30) she gave in June 2018 (see transcript and translation) *'Although bats carry many viruses, the chance of directly infecting humans is very small. Higher-level protection measures will be taken when we know that bats in a certain location carry viruses that may be transmitted to humans, and in most cases only ordinary protection will be taken.'*

- **Imprecise/Incorrect Statement:** Annex D7 does not specify the number of people tested for antibodies (IgG) within the Wuhan Institute of Virology and other labs in Wuhan working on BatCoV. From the results (all negative) we can only infer that a small fraction of the 590 WIV staff and students were actually tested. Indeed with the reported prevailing background antibodies (IgG) positive rate of around 4% in urban Wuhan around April 2020, the probability of no positive antibodies test (IgG+) amongst any reasonable number of potentially directly exposed staff and students becomes quickly extremely small, and is effectively null for the full population of 590. A proper review of tests should instead encompass all staff (including maintenance staff), all students and all construction and temporary workers on site at the WIV, WIBP and at the other Wuhan P3 labs of interest, plus all sample collection staff (some of which may not work at labs).

- **Imprecise/Incorrect Statement:** Annex D7 states that *'all samples are stored, but not all have been examined yet'*, so there is not certitude that the WIV never collected or handled SARS-CoV-2 samples since it may still be in a non-examined sample.

- **Incorrect Statement:** Annex D7 states that *"The only SARS-CoV-2-like virus found by this group is RaTG13"*, but 8 other SARS-CoV-2 most related viruses (the 7896 clade) can be seen in slides shown by Dr. Shi Zheng Li in webinars.

- **Imprecise/Contradictory Statement:** Annex D7 states that *"none of [the viruses from the mine] has higher similarity to SARS-CoV-2 than the RaTG13 has"*, but it is actually not possible to make such an assertion when the 7896 clade viruses are also very similar to SARS-CoV-2 based on their RdRp, but have still not been fully published more than a year after the start of the pandemic (only the short RdRp sections have been published). Moreover on other occasions the existence of a 100 or so related viruses (28:20) has been mentioned.

- **Imprecise Statement:** Annex D7 states that *"None [virus from the mine] could be isolated"*. It is not clear whether this refers generally to viruses found in the Mojiang mine, or strictly to viruses similar to SARS-CoV-2. In any case, Dr. Shi herself has previously reported that some bat adenoviruses had been isolated from samples *'collected in Mojiang'*, and the WIV has also previously successfully isolated SARS-like viruses from Yunnan sites. Hence the statement may not preclude the possibility that some similar coronaviruses may also have been successfully isolated from Mojiang or elsewhere. We further note that the WIV uses a very specific naming order for live viruses isolated in their laboratory according to which there should be a WIV6 (not WIV06) isolate and a WIV15 one, which however are not mentioned anywhere in the literature.

- **Imprecise/Contradictory Statement:** In Annex D7 Yuan Zhiming (the director of the WIV P4 lab) refutes categorically any possibility of a lab-leak. Dr. Yuan Zhiming had nevertheless repeatedly denounced structural issues with many labs in China before the pandemic. As recently as October 2019, he wrote that:
    - *"Due to different investment sources, affiliations, and management systems, the implementation of these laboratories faces difficulties converging objectives and cooperation workflows. This scenario puts laboratory biosafety at risk since the implementation efficiency and timely operations are relatively compromised."*
    - *"several high-level BSLs have insufficient operational funds for routine yet vital processes. Due to the limited resources, some BSL-3 laboratories run on extremely minimal operational costs or in some cases none at all."*
    - *"Currently, most laboratories lack specialized biosafety managers and engineers. In such facilities, some of the skilled staff is composed by part-time researchers. This makes it difficult to identify and mitigate potential safety hazards in facility and equipment operation early enough."*

- **Imprecise Statement:** The few visits detailed in the Annexes (mostly D7) only cover some the institutions in Wuhan with P2 and P3 labs that were known to be involved in BatCoV research. A proper investigation should first clearly identify and then cover all the labs in Wuhan that were actively working on BatCoVs in 2019 without exception, and also the WIBP (next door to the WIV) which may have been involved in a BatCoV vaccine development program (30:20).

- **Imprecise Statement:** Annex D7 provides neither the nature nor the details of research involving bat coronaviruses in Wuhan laboratories in 2019 - including but not limited to possible BatCoV vaccine development programs, pathogenicity studies involving animal experiments, usage of passaging, Gain-Of-Function and genetic manipulation techniques (29:50) - which should be one of the very first steps towards rationally identifying some of the main risk factors in a lab-related accident scenario.