Laboratory-Acquired Infections and the Pandemic. Too Much Speculation, Not Much Action! (Part 1)

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Date : March 30, 2023

By now, we all have heard the latest Wall Street Journal news (1) stating that the U.S. Energy Department believes that the Covid pandemic originated from a laboratory in China. However, what is not mentioned very often, especially by those groups that believe that the pandemic originated in the lab, is that the Energy Department analysis was labelled as "low confidence.", meaning that the evidence is not conclusive. At the same time, the FBI also supports the lab release theory. However, the National Intelligence Council and other U.S. agencies have the opposite view. In addition, new surveillance data from China indicates support for the pandemic's potential animal/human origin (2). In either case, we don't have conclusive evidence and most likely will never have (unless we find the proverbial smoking gun). Unfortunately, the split along the lines of lab theory believers and animal/human transmission supporters is getting bigger and is now becoming highly politized and neither one does really come up with solutions.

Person Zero

This pandemic started when person 0 (zero) was infected and consequently infected others. It moved from one person to another and another. That's how an infectious disease outbreak works. Either way, if person zero was a lab worker who had an accident or a person at a meat market in Wuhan, the blaming game does nothing to solve the underlying problem. What we know is, that the latter is the result of closer and closer interaction with animals that are potential carriers, and the other is that **laboratory-acquired infections (LAIs) have happened, happen today and will happen in the future**.

Generally speaking, we all have or had a share in this pandemic (some more, others less). For example, following public health advice, wearing a mask, and getting vaccinated or not. How did our respective governments respond, especially in addressing the need for support in developing countries? It was and still is a global pandemic. Independently of what we believe, the undisputed fact is that SARS-CoV-2 is an animal virus and somehow moved over into humans. It is not a "designed" and purposefully engineered bioweapon that intentionally was spread around the globe by whoever. It just shows that more and more animal viral diseases are jumping and causing human infections.

Published Covid-19 Lab Infections

Let's talk about laboratory-acquired infections (LAIs). As I mentioned, they have happened in the past, are happening right now, and will occur in the future! Yes, laboratory workers get sick with the diseases they work with, and no, current approaches to biosafety in laboratories worldwide will NOT prevent that, nor will more and more regulations (more about that in Part 2). The American Biosafety Association (ABSA), an organization for and by biosafety folks that work in laboratories, has a database that tracks LAIs (only the ones that were reported)(3). That list is long and growing every year, and as a matter of fact, it has recent records of published Covid-19 infections in the lab (just do an online search on Covid). No, this is not the Wuhan lab! These are other labs working with Covid-19 during the pandemic.

One has to understand that LAIs are not necessarily always reported! Like everyone else, laboratory staff and scientists are also ordinary folks; they have a bad day and make mistakes and accidents happen. If they get sick, they might or might not connect this to their work. Or, if they think it is work-related, they are very cautious about reporting it because of possible retribution. Yes, we still have a considerable blame culture problem in infectious disease laboratories. There is no real incentive to report your sickness because of what happened in the lab. Consequently, laboratory management has to seriously consider the “culture” in their labs.

Gain Of Function

To make matters worse, one of the other areas of significant concern in laboratories, especially the ones that do research, are now studies that involve "Gain of function" (GOF) work and "enhanced potential pandemic pathogen (ePPP) studies. In general terms, GOF work refers to research that aims to strengthen the activity of a biological entity, such as a virus, bacterium, or protein, beyond its natural capacity. This type of research seeks to understand the mechanisms by which these biological materials and agents function and to develop new treatments or vaccines based on this knowledge. At least, this is the standard justification for allowing this type of work to happen.

The potential outcome are bacteria, viruses and other microorganisms that are potentially highly transmissible and might be capable of wide, spread in human populations and highly virulent, making them likely to cause significant morbidity (sickness) and/or mortality (death) in the population.

GOF research raises serious ethical and safety concerns, as it can potentially create dangerous pathogens that could be released into the environment or intentionally used as bioweapons. Unfortunately, at this point, government and funding agency oversight is limited and no formal bioethics review is happening before approval.

Enhanced potential pandemic pathogen (ePPP) research refers to GOF research specifically involving the manipulation of pathogens, such as viruses or bacteria, that are or have caused outbreaks and pandemics. For example, it is taking the SARS-CoV-2 virus and making it more transmissible (infectious). Why would anyone do this? Well, again, the idea is to, for example, develop new treatments or vaccines based on this knowledge. The recent discussion about the modification of the SARS-CoV-2 BA 1 Omicron strain at Boston University is a case in point (4).

One has to understand that this type of research is generally done in laboratories with specific safety and security practices and special facilities (containment laboratories) to perform the work safely and securely. This is where the concept of laboratory biosafety and biosecurity aspects come in. However, as mentioned earlier, LAIs happen and will happen in the future and it is time to rethink the current approach for funding and approval of GOF and ePPP research, the use of modern concepts for managing the risks, and overall oversight of high containment laboratories since it is an international issue, not a country-specific one.

In Part 2, I will discuss possible options, like the use of an advanced biorisk management system approach, the need for a bioethics review of GOF and ePPP work, and the establishment of an international oversight body (similar to the

International Atomic Energy), but for all high containment (Level 4) laboratories. So stay tuned….

References:

1. Gordon M.R., Strobel W.P., (2023) Lab Leak Most Likely Origin of Covid-19 Pandemic, Energy Department Now Says. Wall Street Journal. Retrieved March, 2023 from: https://www.wsj.com/articles/covid-origin-china-lab-leak-807b7b0a
2. Wu K.J, (2023) The Strongest Evidence Yet That an Animal Started the Pandemic. The Atlantic. Retrieved March, 2023 from: https://www.theatlantic.com/science/archive/2023/03/covid-origins-research-raccoon-dogs-wuhan-market-lab-leak/673390/
3. American Biological Safety Association-International (2023), Laboratory-Acquired Infection (LAI) Database. Retrieved March, 2023 from: https://my.absa.org/LAI
4. Chen D.Y (2023) Role of spike in the pathogenic and antigenic behavior of SARS-CoV-2 BA.I Omicron. bioRxiv. Retrieved March, 2023 from: https://www.biorxiv.org/content/10.1101/2022.10.13.512134v2