

MISCONCEPTIONS AND SCIENCE OF COVID- 19

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ABSTRACT

Over the years, there has been conspiracy theories about every single disease outbreak that is new and without enough information about the particular causative agent(s) and even vaccines developed against the disease. COVID-19 and its vaccines are not exception for these theories that are continuously circulating across the globe and particularly in developing countries. These misconceptions are so serious and has negatively affected the efforts being made to curb this disease. Some of the commonest misconceptions have been briefly explained in the perspective of the conspirators. Therefore, the positions of science on these misconceptions were reviewed to debunk the already existing speculations.

INTRODUCTION

Towards the end of 2019 right into the 2020 and still persisting, the world is witnessing a global pandemic, COVID-19, that is widely misunderstood. This paper seeks to look at the scale of misconception, clarify scientific positions with a view to sensitizing global stakeholders, to enable a collective understanding, buy-in and action. Examined below are some popular misconceptions.

1.1 That COVID – 19 is Just a Common Cold

The first and most common misconception about COVID -19 is the thought that the disease is merely a common cold. Although COVID 19 and common cold present similar symptoms, they can be differentiated in terms of severity, transmission and molecular diagnosis: Polymerase Chain Reaction (WHO, 2020a). The common symptoms that COVID-19 and flu share include. Fever, cough, shortness of breath, fatigue, sore throat, runny nose, muscle pain and headache (CDCP, 2020).

1.2 That 5G is Responsible for COVID- 19

The internet broadband technology, the 5G, has been attributed to be responsible for this pandemic bbc.com/news/av/stories-53285610. This misconception became widespread in the wake of an advancement in broadband technology for easy and fast internet connections. In Nigeria, a renowned pastor, explains in his own view the relationship between 5G and COVID-19 on his TV channel.

1.3 That SARS – COV 2 was Created

The misconception that the virus was created from its primary precursors (nucleotides, proteins and sugar) is another controversy peddled by religious leaders, politicians and some pressure groups who neither have science background or knowledge. On the 28th of March, 2020, a prominent personality held a lecture titled “Corona virus from the perspective of Islam”. In his opinion, viruses are CREATED and are not living things. According to him, because viruses do not have organelles but are made up of the basic building blocks (Guanine, Adenine, Thymine and Cytosine all components of DNA while Uracil is substituted for Thymine in RNA) which constitute their genetic materials, they cannot be alive in all senses. He also disagreed totally with the concept of evolution or mutation as postulated by Charles Darwin.

Furthermore, he accused the USA of being responsible for SARS-COV2 as well as for HIV, Asian flu, and Bubonic plague (Black Death) which are deployed as biological weapons targeted to control world population, especially that of Blacks and Muslims. He further related his with the Malthusian theory of population and the Darwinian theory of natural selection.

1.4 That SARS – COV 2 is a Product of Modification for Biological Warfare

An interesting assumption is the misconception that SARS-COV2 is a modified strain from an existing virus that is deployed as biological weapon to target specific population: race, religion, continent etc. For instance, the Black community in the United States, feels threatened and assumed the phenomena as a conspiracy of the white

supremacists against their population. This thought is seemingly partially justified by the glaring statistics of the number of cases and deaths recorded in the Community, where the mortality rate for blacks and indigenous Americans have been reported to be the highest in the country. For each 100,000 Americans 124 and 133 of Blacks and indigenous Americans died of COVID-19 respectively. In 16 states of Columbia, more than 100 per 100,000 blacks died within the period under review (8th Dec., 2020). Therefore, blacks are 2.7 times more likely to die of COVID -19 than whites nationwide (APM Research Lab Staff, 2020). Also, religious leaders of the Abrahamic faiths (Christianity, Jew and Islam) have separately accused each other and or world powers of a conspiracy against practicing their religions and hence the deliberate plot to make people forget religion and consequently, God.

1.5 That SARS- COV 2 cannot Thrive in Temperate Condition

Surely, temperature is a factor for the survival of any virus. This understanding inspired people to erroneously think SARS-COV2 is active only in cold environment and as such cannot thrive in temperate climes. Therefore, according to them, Africa and Sub-Sahara countries are immuned to COVID-19.

1.6 That Alcohol Consumption and COVID- 19 Prevention

Alcohol consumption has also been falsely linked with prevention or treatment of COVID- 19. However, the understanding that alcohol has germicidal property has led people to think that consuming liquors is an alternative preventive method. This misconception is so widespread that people intentionally fault the preventive guidelines given by the authorities for effective management of transmission and prevention of the disease.

1.7 That Vaccines Developed/being developed are aimed at Depopulation

The suspicion that vaccines developed or being at some level of trials for immunization are aimed at reducing human population is another trending issue, especially with the news of countries receiving the delivery of the vaccines. So far, Pfizer/BioNtech, Moderna, Sinopharm and Oxford among others are the notable companies leading the research and development of the vaccines. The doubts are not entirely baseless, without reasons because some of these companies have in the past in several instances provided more reasons for the public to be skeptical about their intentions and products. Widespread campaign against the vaccines is ongoing insisting that they contain compounds that have the potential of making people sterile (polyethylene glycol) and carcinogens (analogues that could be incorporated into our DNA and consequently cause mutation). It was reported in The Guardian Newspaper in 2011 that Pfizer developed *Trovan* (an antibiotics for the treatment of meningitis) in 1996 and used the drug on children (age 1-

13) in Kano for trial study without the consent of their guardians or parents. In the end, the drug caused a great deal of morbidity and mortality as the patients suffered liver damage and in some cases life threatening conditions. It was reported that 11 children died in Kano.

1.8 That Vaccines are Developed as Nanoparticles to Track and Control Population

Advancement in technology is no doubt a significant milestone in human civilization. Therefore, the thought/ misconception that vaccines for COVID-19 that are developed as Nanoparticles are tracking devices to undermine human privacy is also one of the most ridiculous conspiracy theories. To substantiate this claim, the contributions made (on research and vaccine development) by Bill Gate, have been cynically interpreted as a ploy to create a New World Order. These skeptics allude his affiliation to developing microchips or particles that will be injected beneath the skin disguising as a vaccine.

1.9 That COVID-19 is Exaggerated Hence Vaccination is not Required

The skeptical thought that COVID -19 is exaggerated in all aspects (number of cases, deaths recorded, transmission, virulence etc) is yet another setback in the fight against SARS-COV2. This understanding is astonishingly backed by some life scientists and physicians who rightly said COVID- 19 is treatable with a combination of Zithromax, Zinc and Hydroxy-chloroquine. However, their attitudes and or words have shown that vaccination is not required. These scholars have expressed doubts that the vaccines might not be safe and could contribute to deterioration of human health. Recent reports show that there is a serious rare allergic reactions resulting from the usage of the vaccine produced by Pfizer and Moderna as they contain Poly Ethylene Glycol (Vrieze, 2020).

2.0 SCIENCE OF COVID- 19

2.1 COVID – 19 is not Just a Common Cold

COVID- 19 is not a common cold. Even though both conditions are contagious respiratory illnesses and present similar symptoms, they are caused by different viruses. COVID-19 is caused by SARS-COV2, a family of coronavirus and not an influenza virus. The incubation period, transmission and severity of COVID-19 is higher than that of influenza virus (CDCP, 2020).

2.2 The 5G Tech is not responsible for COVID- 19

To correlate the emergence of 5G tech, a technology that would help reduce internet traffic and ease the cost of doing businesses with SARS-COV2 is mischievous and cruel. This literarily means COVID -19 would be active only in countries with 5G capabilities. However, this claim has been debunked with the spread of the disease across the globe. For example, Nigeria and other African countries have no 5G connection but are equally battling with COVID- 19. Nigeria has recorded 1,39748 cases out of 1,398,630 of which 24,556 are active cases and 1,667

deaths as of 8th February 2020 (NCDC, 2021). Further scientifically debunking the claim against 5G tech, Simon Clarke Associate Professor of Cellular Microbiology at the University of Readings, in a recent interview with the BBC news, explains that 5G radio waves are not powerful enough to damage the cells of our body or even transmit the virus. This is because the radio waves used in 3G, 4G and 5G are low frequency and non-ionizing radiation (bbc.com/news/52168096). Consequently, 5G CANNOT weaken the immune system or be responsible for the upsurge of the Coronavirus.

2.3 SARS-COV2 Created/Modified/Naturally Occurring

We live in interesting times where everything is seen from the prism of politics, religion or culture. One of such is the claim that SARS-COV2 was MODIFIED in the laboratory for political and/or religious manipulations. This claim even though unsubstantiated, should not be discarded without thorough investigations. But it is **erroneous** to assert that viruses were **CREATED** from starting precursors (Adenine, Guanine, Thymine or Uracil and Cytosine and amino acids that make up the DNA, RNA and protein coat of the virus) and not **MODIFIED** or **ENGINEERED** from naturally occurring viruses by either enhancement or suppression of a desired attribute(s). Scientifically, going by the law of thermodynamics, “**energy can neither be CREATED nor destroyed but can be transformed or converted into other forms**”. So, to claim with confidence, without proof, but speculations, that this virus was CREATED is ridiculous and unscientific. Moreso, even if the virus was engineered for an ulterior motive, it must be substantiated with facts from reliable sources (i.e. life scientists working on the virus). Microorganisms can be engineered or modified to have high infectivity to cause a great deal of morbidity and mortality. But SARS-COV 2 is not a product of modification. When Kristian Andersen, an Immunology and Microbiology researcher at Scripps Research Institute and other scientists said a comparison of the available genome sequence data for known coronavirus strains, strongly shows that SARS-CoV-2 originated through natural processes (Anderson, 2020). These researchers looked into two components of spike proteins: the receptor-binding domain, which latches onto healthy host cells, and the cleavage site, which opens up the virus and allows it to penetrate the host cell.

The scientists found that the receptor-binding domain of the spike protein had evolved to target ACE2 so effectively that it could only have been the result of natural selection and not of genetic engineering and also showed that SARS-COV-2 was not engineered as a pathogen, because it would have been constructed from the backbone of a virus known to cause illness. Therefore, the researchers concluded that mutations in the RBD portion of the spike protein and its distinct backbone — rule out laboratory manipulation as a potential origin for SARS-CoV-2.

Sometimes, micro-organisms find their way into other species out of either negligence from scientists or sheer accident (e.g. from bats to humans). These viruses become conscious of a better host and display unimaginable virulence, transmissibility, infectivity, and toxicity that are consequential to high rate of illnesses and deaths. The following questions will guide us to understand the status of SARS-COV2.

- Do we have any scientific proof that SARS-COV2 was CREATED or MODIFIED?
- Is there any possibility that SARS-COV2 escaped into the human species unintentionally or by accident?
- Is there any criteria laid down for identifying biological weapons produced from engineering micro-organisms?

2.4 SARS- COV 2 Cannot Thrive in Temperate Condition

The upsurge in this pandemic across the globe has weakened this assertion. However, there are recent reports of significant correlations between transmission and temperature in tropical environments. Prata and Bermejo, (2020), observed that annual average temperature and confirmed cases was approximately linear in the range of less than 25.8^oC and became flat above 25.8^oC. Additionally, Huang *et al.*, (2020) found that 60% of confirmed COVID- 19 cases occurred in places where the air temperature ranged from 5^oC to 15^oC and concluded that SARS-COV2 appears to be spreading towards higher latitudes. Therefore, there seems to be an optimal temperature for effective transmission of the virus, but this does not make temperate climes immuned to COVID- 19.

2.5 Alcohol Consumption and COVID- 19 Prevention

It is astonishing as well as overwhelming to hear people talk about preventing COVID- 19 by drinking alcohol. This is completely unscientific because according to the World Health Organization, (2020b), the percentage of pure alcohol needed to sanitize even our hands, is greater or equal to 65% and 70% to disinfect surfaces. However, this concentration or percentage is poisonous and when consumed, would destroy liver cells and other vital organs leading to death in few hours. According to William Kerr, a Senior Scientist at the Alcohol Research Group of the Public Health Institute, the average percentage of alcohol in beverages are usually around 4.5% for beer, 11.6% for wine and 37% in liquor (Bryner, 2010).

2.6 Vaccines Developed/Being Developed are Aimed at Depopulation

Vaccine is a suspension of weakened, killed or fragmented microorganism or toxins; or of antibodies or lymphocytes that is administered primarily to prevent disease (Brunson, 2020).

Up until now, there has not been any proof as to whether these vaccines contain sterilizing agents or carcinogens. Even the claim that a nanoparticle, Polyethylene glycol,

(a component of the COVID-19 vaccine) could be a sterilizing agent, is not true but mere speculations. This compound has been used in different drugs (Acetaminophen 500mg, Cetirizine Hydrochloride 10 mg, Cyclobenzaprine Hydrochloride 10 mg, Diclofenac Sodium Delayed Release 75 mg, Famotidine 20 mg, Ibuprofen 200 mg, Methocarbamol 500 mg, OxyContin 10 mg, Tramadol Hydrochloride 50 mg) over a decade ago and has not been found to affect sex cells quality, conception or cause **serious** allergic reactions (PEG, 2020). Moreso, the severe reaction experienced by a handful is statistically insignificant with 1 in 90,000 people in the US (Greshko, 2021). The second claim about incorporating viral genetic material with human is another impossibility because the viral mRNA does not even enter into the human nucleus but is translated in the functional spike protein in the cytosol. Exclusively, proteins are made in the cytosol.

The COVID-19 vaccines produced are made up of viral vector and mRNA (part of virus genetic code). The viral vectors are genetically modified virus that has lost its ability to replicate or even infect the host cell. While the mRNA vaccines are part of the genetic code of the virus that is translated into an immunodominant protein in the cytosol. This protein and the viral vectors mimic a part/whole of the viable virus and hence elicit immunological response that upon secondary encounter, the body's natural immune system is thus better equipped to fight the infection. This is the simplest explanation on how vaccines are developed for many disease over the years.

2.7 Cases of Infection after Immunization

There have been reports of few cases of re-infection or deaths after vaccination. According to a BBC health reporter, Rachel Schraer, (2021), said 531 over-60s, out of almost 750,000 fully vaccinated, tested positive for coronavirus (0.07%) in Israel. He added that the medical records of almost a million people in total - 743,845 of whom were over the age of 60 - until at least seven days after they received a second dose of the vaccine. There were three deaths in vaccinated over-60s - although it is possible they contracted the infection earlier, before their immunity had time to build. Before the vaccine had time to take effect, more than 7,000 infections were recorded, just under 700 cases of moderate to critical illness and 307 deaths.

Sadly, the anti-vaccine campaigners have used this reason to justify their position against COVID-19 vaccines. However, the scientific hallmark for vaccine research, development and administration are dependent on potency, efficacy and safety. Therefore, the possibility of the vaccines to be less effective or non-viable could be as a result of the following factors.

- **Storage condition**

Storage is an essential aspect of vaccine viability and hence any changes in temperature outside the standard

recommendations for vaccines could lead to activation of insufficient immune response for the prevention of the disease. Therefore, the optimal temperature for storage must be maintained in the facilities before, during and after transportation, to ensure its stability and sustained efficacy. According to the CDC, every vaccine storage unit must have a reliable temperature monitoring devices called the digital data logger for continuous monitoring and recording of temperature.

- **Strain or Mutation**

The mRNA vaccines developed are translated into a spike protein that is recognized by a receptor, Angiotensin-Converting Enzyme 2 (ACE 2). SARS-COV 2 just as SARS-COV uses similar protein for adhesion and invasion. Hence, mRNA or the genetically modified viral vector used as vaccines, can be effective in both viruses above. So, a vaccine developed for different strain with different recognition protein cannot neutralize or kill another strain of the microbe. Infection after vaccination could also be a result of viral mutation to escape and survive the attack of the body's natural immune system. Scientifically, a vaccine could only become non-viable when the microorganism changes its genetic code(s) (these codes must also reflect on the protein functional structure) used in the development of the vaccine.

- **Dose**

The vaccines developed have gone through efficacy or potency tests and in some of the trial phases a single dose was observed to be sufficient to elicit the required amount of immune cells for disease prevention. However in other vaccines, double doses are necessary for prevention of COVID-19. Therefore when sufficient immunological response is not elicited, especially due to inadequate dose, there is a high chance of re-infection even after the first vaccination.

- **Negligence**

Sometimes in an attempt to prevent COVID-19 using the vaccines developed, contamination and false negative results could be attributed to re-infection after immunization. Therefore, it is important to ensure that the health personnel are tested negative and with PPE, laboratory environment properly sanitized and patients accurately tested before vaccination.

2.8 Academic Debate on Aliveness of Viruses

The academic side of the debates on the "aliveness" of viruses has continued to divide scholars for years, hence brewing further the controversies as to whether coronavirus was created or naturally occurring. Hence, the status of viruses on aliveness continues to be a mystery. It was first thought to be a form of poison, then a life-form and now between the borderline of living and non-living (Ganesh, 2015). The earliest studies conducted on viruses was in 1892 and 1898 by Ivanovsky and Beijerinck respectively. These two scientists surmised that viruses are live reproducing

infectious organisms that differed from other organisms (Koonin, Senkerich and Dolja, 2006). Virologists Marc H. V. of the University of Strasbourg in France and Brian W. J. of Centre for Disease Control and Prevention have recently said because viruses depend on other host cells, they lead 'a borrowed life' (Villareal, 2008).

However, this is not to say there are no other scientists who have contrary opinions on this matter. For example, To clear the air, there is need for a holistic understanding of a virus.

Virus: According Microbiology Society, a virus is made up of a core of genetic material, either DNA or RNA, surrounded by a protective coat called the capsid which is made up of protein.

2.9 Dead or alive/ living or non- living thing

The uncertainty and confusion about aliveness or otherwise have raised fundamental questions of life such as.

- What is being alive?
- Is a cell the simplest form of life?
- Can life forms be in a dormancy phase?
- What is the position of a seed with respect to being alive?
- Is there any relationship in terms of dormancy between a seed and a virus?

Now as for the first two questions, some biologists say to be alive is to be able to carry out life processes independent of other organisms as a cell (Koshland, 2002). This definition cannot be absolute owing to the fact that the inability of a living thing to exhibit one or few characteristic(s) of living things should not be the basis for not being alive. This is because certain life forms enter dormancy phase as non-living but still have the potential of being active under favorable conditions. Thus, seeds of plants are made of numerous cells but because of their inactive forms, are unable to multiply unless with available resources like water and oxygen. Therefore, this analogy justifies the claim that viruses are living things because it switch to being active and carrying out certain biological processes when in its host cells.

In the cells, viruses camouflage to trick the cell. Its capsid or receptor proteins look like nutrients the cell needs. When the virus receptor binds to the cell receptor, the cell thinks the virus is a nutrient, and pulls it in for a sole motive of replication.

As to whether a cell is the simplest form of life, the question I continue to ask is.

How definitive and absolute is this definition?

Is everything less than a cell dead?

Therefore, in my opinion viruses are living things.

2.10 Reasons for 'Aliveness'

• **Reproduction/Replication**

The ability to reproduce progenies for life continuity is an important factor and characteristics of all living things. SARS-COV2 just as any virus, are intracellular pathogens that hijack their host machineries to replicate their progenies (varions) (Weiss and Navas-Martin, 2005) a characteristic so unique and peculiar for a host of living things. Therefore, the mechanisms involved might not necessarily be fully developed as compared to advanced forms of life. Thus, the potential or tendency of multiplication even though only effective in their host is a proof for aliveness.

• **Adaptation to Changing Environment**

Adaptation to constantly changing environmental conditions lead to evolution in living organisms. Viruses exhibit this important characteristics in two different phases: the actively replicating phase (lytic phase) and the passive phase called the lysogenic phase. The switch between these phases is to adjust accordingly to availability of resources (lack of or insufficient energy or supplies of nutrients supports lysogenic phase and vice versa) (Williamson, 2004).

Viruses adapt to their hosts by evading defense mechanisms and taking over cellular metabolism for their own benefit. For example, adaptation exhibited by HIV is a result of mutation to constantly escape attack by the immune cells, new drugs and even vaccines.

Alterations in cell metabolism as well as side-effects of antiviral responses contribute to symptoms development and virulence. Sometimes, a virus spill over from its usual host species into a novel one, where usually will fail to successfully infect and further transmit to new host. However, in some cases, the virus transmits and persists after fixing beneficial mutations that allow for a better exploitation of the new host (Romero, 2008).

Another example of adaptation, is Resistance to drug. This property allows viruses to become unaffected to treatment with a particular drug. Technically, genetic mutation observed from sequencing of the viral genome has been used to detect point of resistance and also targets for drug discovery (Houldcroft, Beale and Breuer, 2017). This tendency of adjusting for survival at all cost by viruses is an important characteristics of all living things.

• **Response to changes of environmental factors**

There has not been enough research done to definitively say viruses do not respond to stimuli or are not sensitive to certain environmental cues such as light, oxygen or even carbon dioxide in abiotic environments (Countryman, et al., 2009). However, viruses can respond to stimuli and adjust to changes in their immediate environment (i.e from abiotic to biotic environment) and subsequently initiate the process of hijacking cellular processes for an ultimate energy

dependent replication. This will therefore point to another strong reason to believe that viruses are living thing.

Nutrition and Competition for Source of Energy

The assemblage of nucleic acid and capsid is certainly an energy dependent process. But these viruses make use of energy from the metabolic processes of the host (Fenner et al., 1987).

It is believed that respiratory viruses may be competing for resources in the respiratory track and that it may be that these viruses compete for specific cells to infect, or that a person's immune response to one virus makes it harder for the other virus to also cause infection (Pinky and Dobrovolny, 2016).

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