Is Purification of a “Virus” Necessary? Yes.

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by **Mike Stone**, *Viroliegy*
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> Purification: the act or process of making something pure and free of any contaminating, debasing, or foreign elements
>
> *https://www.dictionary.com/browse/purification*

I was not planning on doing any more articles nor devoting any more of my time to Steve Kirsch after my response to his claim that “SARS-COV-2” has been isolated. It was clear to me after reading his blog post that he did not understand what he was writing about. Even if it wasn’t clear to anyone reading, Steve took the liberty of outright admitting that he did not understand the topic as he relied on “experts” to tell him what to think and believe:

> I rely on expert opinions of people who I trust for certain issues like whether or not the virus has been “isolated.” - Steve Kirsch

After the blog post came out, there were some exchanges between Steve and Christine Massey, who has done an amazing job of destroying the “virus” isolation lie with her Freedom of Information requests. She confronted Steve about his “isolation” claim and brilliantly pointed out why he was wrong. Instead of conceding that she was right and that he clearly did not understand the topic, Steve hunkered down on his ridiculous claim and pushed her for a 5 hour live debate

with his “experts” in order to let the audience decide which side was right in the “SARS-COV-2” isolation argument. Disregarding the ridiculousness of the 5 hour time frame and the desire for the audience to decide a winner, Steve was attempting to sit on the sidelines and play matchmaker by pitting his “experts” against Christine. Once she enlisted the help of a team of her own experts, Steve seemingly panicked and decided to exit stage left.

This is just a brief summary of what transpired over the course of a few weeks in January 2022 and I may not have done the exchange justice. However, while the debate-that-never-was is an interesting story, it is not my main focus. In fact, I would have left this whole Steve Kirsch situation in the wastebasket where it belongs until I saw his parting shots at the “virus does not exist” community. In his attempt to save face by passing the responsibility of debating Christine and her experts off to his readers (which shouldn’t be shocking as he is seemingly skilled at passing responsibility off to “experts”), Steve shared some additional outlandish claims made by his “experts” regarding “virus” purification. Here are a few brief highlights from his post:

> Does anyone want to debate “Does the virus exist?”
>
> If course it does, but there are followers of Sam Bailey, Stefan Lanka, Thomas Cowan, Andrew Kaufman, and Christine Massey who claim it doesn’t.
>
> “I’m not willing to invest my time in this debate, but if you want to challenge Sam Bailey, Stefan Lanka, Thomas Cowan, Andrew Kaufman, and Christine Massey, please let me know in the comments.”
>
> “Basically, purifying a virus is difficult and there is no reason in today’s world to do it, so it isn’t done. The FOIA requests they issue are a publicity stunt that they know will fail. That’s very disingenuous of them not to

reveal that.”

“Also, the people I talk to fully acknowledge there is no purified virus, but that it isn’t needed because they can do everything they need to do without it. Lanka *et al.* claim it is needed. So it’s now just a matter of opinion. Neither side is going to convince the other side. That’s what happened.”

“The reason nobody has purified the virus is there is no need to do so in today’s world where gene sequencing is readily available.”

First, I would like to point out Steve's apparent Freudian slip while attempting to declare the "virus" exists: "**If** course it does." Not a typo on my part. I'm not here to play grammar police as I make plenty of spelling errors

myself. I just thought it was an amusingly ironic way to start his post. Since Steve is unwilling to invest his time in a debate, maybe he could devote it to proofreading?

Now that the fun is out of the way, let's get to the nitty-gritty on "virus" purification. According to Steve's "experts," the purification of a "virus" is too difficult and is no longer necessary. They believe that in today's world of molecular virology, purifying "viruses" does not need to occur as a genome can be obtained from the genetic soup full of host and other unknown "non-viral" RNA/DNA. They believe that it is possible to obtain a genome for an unknown "virus" by piecing it together from the millions of reads of random RNA aquired from these unrelated sources within the sample. Thus, Steve and Co. want you to believe that purification, i.e. the very steps used to rid a sample of contaminants, pollutants, foreign material, etc. in order to **isolate** it, is not necessary any more as technology has advanced beyond these primitive methods. Putting aside the fact that the admittance by Steve and Co. that purified "SARS-COV-2" does not exist destroys their previous claims of "virus" isolation, does Steve's "expert" advice on purification hold up?

No. Not at all. At least, not according to these experts:

> "That such **"purification" is an indispensable prerequisite** for detecting viruses and creating valid antibody and PCR tests based on them is also stated by scientists who are the most renowned in the world, among them:
>
> **White and Fenner**: "It's an essential pre-requisite."
> **Luc Montagnier**: "It is necessary."
> **Robert Gallo**: "You have to purify."
> **Marcel Tanner**: "If a pure SARS-CoV-2 isolate cannot be documented by the IVI [=Institute of Virology and Immunology] in Bern, then we have a problem." (siehe here).
> **Françoise Barré-Sinoussi**: "… you have to purify the virus

from all this mess."
Jean-Claude Chermann: "Yes, of course… Absolutely."
David Gordon: "It's a natural step from obtaining the virus in cell culture to then obtain purified virus."
Dominic Dwyer: "The purification, as far as one can go, is important in analysis of any virus or bacteria, for that matter well."
Wan Beom Park: "In the outbreak situation, isolation of causative virus is indispensable for developing and evaluating diagnostic tools, therapeutics, and vaccine candidates."

I'm not positive who Steve's "experts" are, but the people listed above are well-known and respected scientists and virologists. While they may disagree with the fact that "viruses" do not exist, they all accept that purification of a "virus" is an absolutely necessary and essential step. It is a prerequisite.

Those listed above are not the only experts claiming purification is necessary. An interview with Professor: Dr. Osamu Nakagomi from the Nagasaki University Graduate School of Biomedical Sciences Molecular Epidemiology, who is an expert on the subject matter, states as much as well:

Fundamentals of Ultracentrifugal Virus Purification

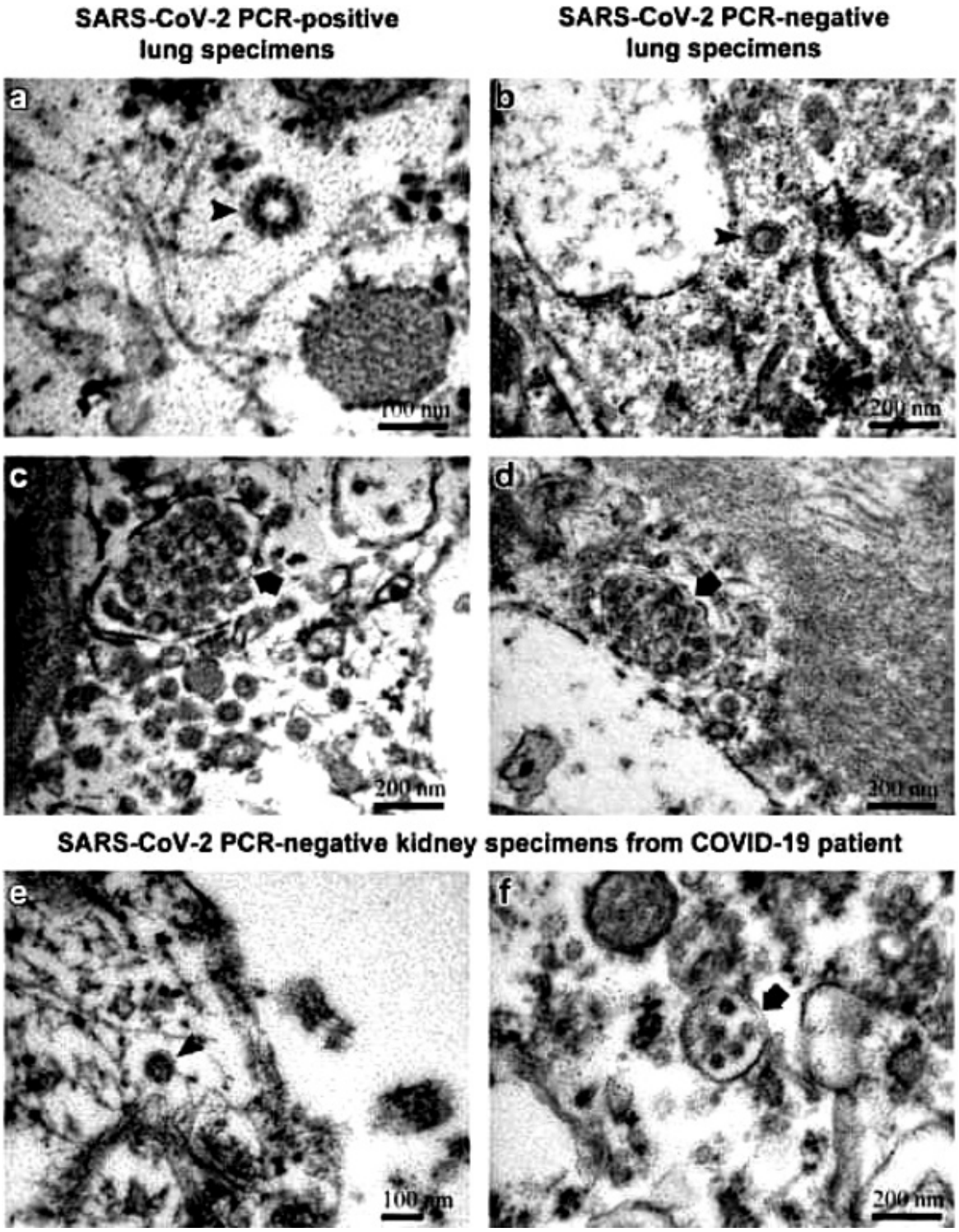
"In recent years, in virus research, it has become a standard practice to purify and analyze genomes and identify viruses from samples using commercial kits. Since for **the established viruses** their genomes have already been known, virus identification is possible even in a mixed state. **However, to carry out detailed investigation on the nature of viruses, it is first necessary to refine the virus particles in order to yield a high level of purified materials."**

Please discuss the necessity of ultracentrifugation in

virus research.

"When extracting virus genome using the classical method, **the virus particles must first be purified.** Then the virus genome extracted from the particles is examined. Ultracentrifugation plays an important role in the process. **Purifying the virus particles makes it possible from the beginning to ensure that we are dealing with the rotavirus genomes in the virus particles. Currently such analysis is performed almost all the time after hastily extracting the genome without actually purifying the specimen.** This practice is common since the genome of rotavirus is well established and it is a common knowledge that if the genome (Fig. 1) characteristic of rotavirus is present, there is no doubt that the genome is present in rotavirus particles as well. **However, suppose, for example, that we are dealing with the problem of determining what kind of host cell organelles or virus proteins and genomes are aggregated in an infected cell, ultracentrifugation becomes indispensable. Moreover, while studying new viruses, it becomes increasingly necessary to investigate whether or not the genome is present in the particle. In such cases, purification with an ultracentrifuge becomes a necessity.** Information on the buoyant density, size and sedimentation coefficient (Svedberg value, S value), all of which are taken into consideration in ultracentrifugation, is in fact the fundamental aspect of virology which taken together are called the physiochemical properties of viruses."

https://www.beckman.com/resources/reading-material/interviews/fundamentals-of-ultracentrifugal-virus-purification



> I wonder if Steve and Co. would be able to point out "SARS-COV-2" from these unpurified EM images if we took out the labels?

As can be seen by Dr. Osamu Nakagomi as well as the experts listed above, purification is entirely necessary, especially in instances with "novel viruses" such as "SARS-COV-2," which Steve and Co. admit **has never been purified.** Without purification, there are numerous host cell organelles and

other proteins, microrganisms, bacteria, etc. within the sample and thus there can be no claims of isolation. There would be no way to be able to determine that the RNA used to create the "SARS-COV-2" genome came from one source. In fact, the only time Dr. Nakagomi states purification is not necessary is when the genome is already known and established, thus purification is a neccesary step *to obtain the initial genome.* Yet this creates a bit of a conundrum. Where has it ever been shown that the particles assumed to be "viruses" were ever purified and isolated directly from a sick human in order to obtain the original genome for any "virus?" At some point in the history of "viral" genomes, this purification and isolation process must have been carried out before any genome for any "virus" could have been obtained and considered accurate and reliable. However, it has never been done, especially for "coronaviruses" as I outlined here.

The "SARS-COV-2" genome was nonexistent and there was no prior knowledge of its sequence. The genome was created from unpurified broncoalveloar fluid (BALF) from one patient and cobbled together in a computer from other unpurified reference genomes made in a similar way. In a document by the WHO regarding sequencing genomes using metagenomics, such as was done for the original "SARS-COV-2" genome, it is admitted that high "non-viral" host material will also be sequenced. They claim that purification steps such as centrifugation and filtration are supposed to be done yet even purifying samples will still lead to a high number of "off-target, non-viral" reads:

> **Genomic sequencing of SARS-CoV-2**
>
> **"Depletion of host or other non-SARS-CoV-2 genetic material in a sample leads to a higher proportion of SARS-CoV-2 reads in generated sequence data and therefore a higher chance of recovering a full genome. SARS-CoV-2 metagenomic approaches therefore typically include steps to remove host and bacterial cells, through either centrifugation or**

filtration prior to RNA extraction, or chemical or enzymatic removal of unwanted DNA/RNA. This is easier for liquid samples, from which cells can be more easily separated, such as bronchoalveolar lavage (Table 4). Ribosomal RNA (rRNA) and DNA content are also commonly depleted during library preparation for virus RNA sequencing, and carrier RNA is often omitted from extractions or replaced with linear polyacrylamide. **Despite such measures, samples may still contain high quantities of off-target host DNA/RNA that may also be sequenced.** Metagenomic approaches therefore generally benefit from input of samples with high virus loads (such that a reasonable proportion of the genetic material in the sample is virus)."

"Metagenomic sequencing typically produces high numbers of off-target, non-virus reads. It is also often (though not always, depending on the sequencing platform and multiplexing) more costly than targeted capture-based or amplicon-based sequencing approaches, because more data have to be produced to generate one SARS-CoV-2 genome. **Moreover, pretreatment steps that are particularly beneficial for metagenomics, such as centrifugation, are not typically performed for molecular diagnostic assays so new extractions that incorporate pretreatment steps may have to be performed for metagenomic sequencing."**

Another source on the advantages and disadvantages of genomic sequencing states that contamination, such as that by bacteria which is sure to be present without purification, will lead to inaccurate genomes:

[Advantages and Limitations of Genome Sequencing]

"Factors outside the control of the service provider tasked with isolation and sequencing of DNA can negatively influence the quality of the genome sequence and therefore its interpretation. This can include the quality of the DNA

> sample provided for analysis, such as low quantity, **high bacterial contamination,** or sample degradation. **Such factors can even prevent the procedure from being undertaken.** In such a circumstance, the client might be obliged to deliver a new sample."

https://merogenomics.ca/en/advantages-and-limitations-of-genome-sequencing/

Since Steve and Co. admit that "SARS-COV-2" has never been purified, yet purification is a prerequisite for "novel viruses" in order to obtain an accurate genome, how can they claim that this step is unnecessary?

It's probably due to the other fact which Steve admitted to: **purification is difficult.** However, I would go one step further and say that when dealing with nano-sized particles, purification is **impossible.** I will not go into too much detail in this post as I have outlined the purification problems here and here. However, it has been admitted numerous times that it is impossible to separate "viruses" from exosomes and other extracellular vesicles that co-sediment together. There is no one method, whether ultracentrifugation, filtration, precipitation, etc., that can completely purify the "viruses." Although you can find similar statements in some of the posts I linked, I will provide a recent article which focused on the need for purifying RNA for epigenetic studies. The authors supply various purification methods and then admit that none of them alone are sufficient to purify "viruses" from host-derived impurities. These impurities then impact the creation of the genome and any study relating to it. Even when combined, they can only claim that these methods will increase "virus" yield and quality, not completely purify the particles.

> "The relatively low abundance of viral genomic material within the nucleic acid milieu of clinical samples places constraints on the utility of epigenetics-related

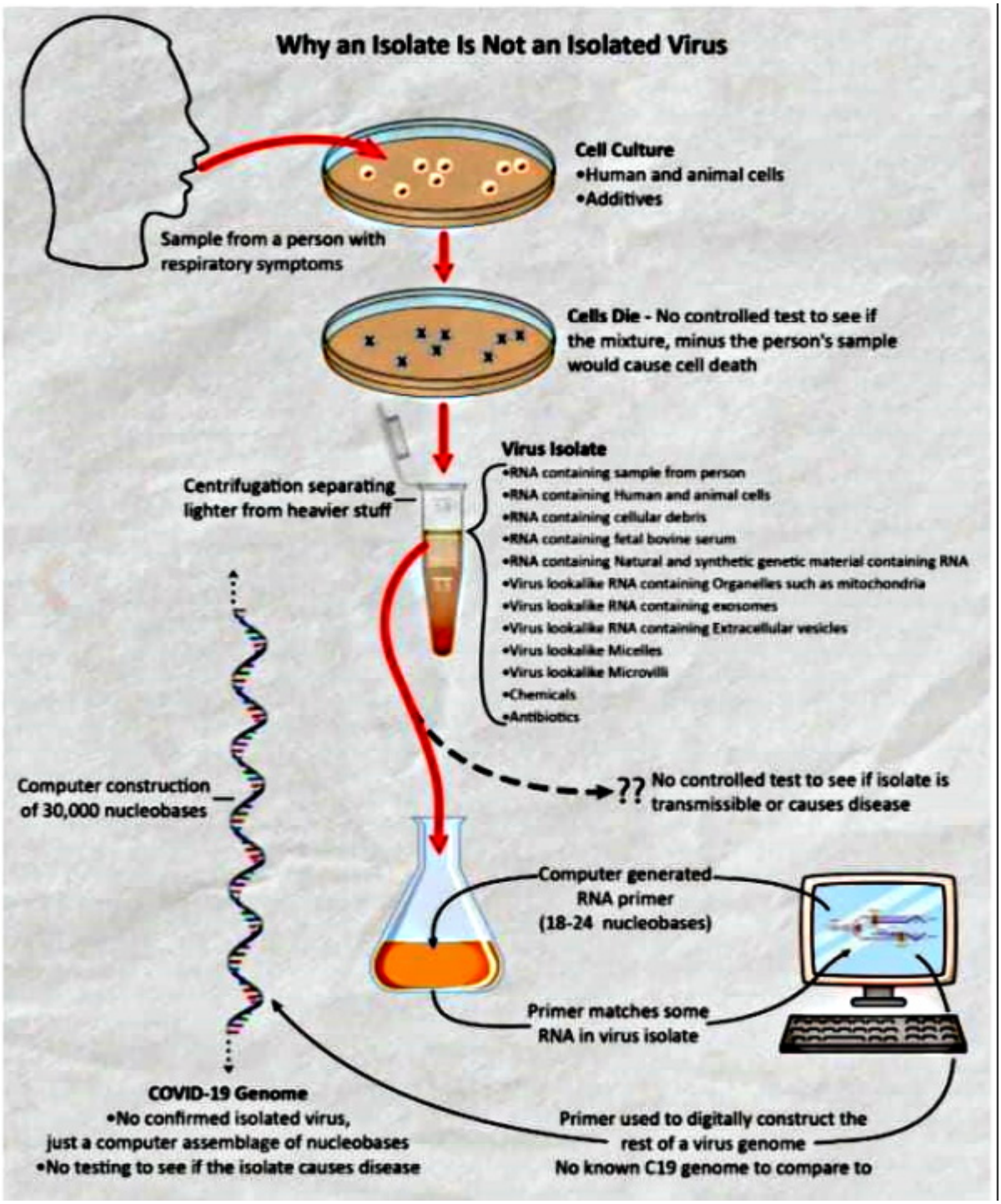
> applications, like m^{6}A RNA methylation ELISAs, to specifically study the virus epigenome. **Such assays require highly pure input material, free from host-derived impurities whose epigenetic modifications can also be detected and interfere with results."**
>
> **"The methods included above are generally not sufficient, when performed alone, for adequate purification of viruses.** Studies focused on the virus epigenome require highly pure input material, **without interference from the epigenetic modifications of host DNA, RNA, or protein.** Combinations of the aforementioned methods can increase viral recovery, yield, and quality."
>
> https://www.epigentek.com/catalog/methods-of-virus-Purification-n-41.html

Even when the purification steps are performed on samples, there will always be many known and unknown identical particles with various sources of genetic material within the sample. Contamination is a widespread problem both in cell culturing and genomics. This makes electron microscopy imaging and the creation of a genome utterly meaningless and useless as proof of a "virus." In order to hammer this point home, here are a few highlights from a 1996 Manuel on "virus" purification:

> "Virus purification is the physical separation of virus in a concentrated form from the host cell milieu in which it has grown. **Viruses need to be purified for many studies in which properties or structure of the virus must be distinguished from those of the host cells or culture medium, such as analyses of structure of viral polypeptides, function of membrane glycoproteins, etc."**
>
> **Criteria of purity**

> “The observation of particles in the electron microscope, **whilst not a good criterion of purity, does allow the detection of ‘unwanted structures’.**
>
> **It would be expected that constituents of the medium would form a major part of the contaminants of purified virus preparations.** This can be monitored by gel diffusion tests, where antisera raised against e.g. calf serum, or uninfected cells can be reacted with virus preparation.”

https://dx.doi.org/10.1016%2FB978-012465330-6%2F50005-1



As can be seen, “viruses” must be purified in order for the structure and physical properties of the “virus” to be distinguished from host cells and the culture medium. The constituents of the culture medium are said to be the bulk of the contaminants in purified “virus.” This would include the fetal bovine serum which is added to nearly every culture which is a completely separate source of RNA from the host source. They fail to mention the added animal RNA which would come from the Vero cells regularly used for culturing as in

the case of “SARS-COV-2.” All of this “non-viral” material would need to be eliminated first along with the host material as well as possible contamination from bacteria, exosomes, MVB’s, other microrganisms, etc. before a genome could be considered valid. Otherwise, there is no realistic way of knowing which RNA belongs to which source within the mixture and whether or not the computer-generated genome is an amalgamation of the RNA stitched together from those numerous sources.

It is clear that purification is an absolutely necessary process, even though the methods themselves are flawed and unable to completely purify these preparations. This is why Steve and Co. claim it is “difficult” (i.e. impossible) to purify “viruses,” that it is no longer necessary, and why they want to skip over this step entirely. They know it is impossible. They know that they can not supply a single study where the particles claimed to be “viruses” were completely purified and isolated directly from a sick host. They can not even show this in papers where “viruses” are cultured. They want you to believe that technology has advanced to a point where it can pick through these unpurified mixtures of RNA in order to piece together a theoretical representation of an unseen “virus” in the form of a genome. Even if this was a logical argument (it’s not), a genome from unpurified samples would be *at best* INDIRECT evidence, not DIRECT evidence of a “virus.”

Fortunately, even disregarding the sources I’ve shared above which completely dispute Steve and Co., we can rely on logic and critical thinking to understand that their claims are ridiculous. In order for a genome to be considered valid evidence, the entity being sequenced must be shown to actually exist in reality first. One can not just assume an unseen “virus” is within the unpurified sample from the start without ever verifying that it actually exists to begin with. This requires that the particles claimed to be “viruses” be found

in a state completely free of contaminants, pollutants, and foreign material as well as separated from everything else. In order for this to occur, the sample must be put through the steps of purification (centrifugation, filtration, precipitation, etc.) so that it can be shown to exist in an isolated state. Only then can proof of pathogeniticity be aquired using the purified particles as a valid independent variable in order to establish cause and effect. Only then can the particles identified in EM images be said to be the "virus." Only then could a genome be aquired. Only then can the "virus" be fully characterized.

Without purification, Steve and Co. have no "virus."

And so we get to the crux of the problem with relying on "experts" to do the thinking for you. Steve has relied on his "experts" to tell him that the purification process is unnecessary. He allowed the "experts" to tell him that the definition of isolation means to add many things together rather than what it actually means which is to exist in a state separated from everything else. He did not do a cursory bit of research to understand that his so-called "experts" are wrong. However, their inaccurate claims are now his to defend. Sadly, Steve is adamant that, while he was willing to invest the time to write a blog post about his unwillingness to do a debate, he is not willing to invest his time to actually defend his claims in a debate. So the way I see it, Steve has three options:

1. Find the time to debate Christine and her experts to defend his ridiculous claims.
2. Find new "experts" who understand the methods used for the purification and isolation of "viruses" and why they are necessary.
3. Find the time to do his own research and utilize critical thinking and logic to discern truth for himself rather than relying on "experts" to do the thinking for him.

I’m hoping Steve chooses option # 3. However, I’m not holding my breath.

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