

Isolation versus Purification

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Version 1

I have been saying since the beginning of the COVID-19 pandemic panic that the virus has not been purified, and therefore probably does not exist. But people are continually pointing me to papers that claim isolation of the virus.

There is a saying regarding politicians, that you can tell if a politician is lying if their lips are moving. With virologists you can tell when they are lying when they use the word “isolation”.

Virologists must know that the common definition of isolation and purification are virtually identical. For example, according to the Oxford English Dictionary:

- Isolation • “The action of isolating; the fact or condition of being isolated or standing alone; separation from other things or persons; solitariness”.
- Purification • “Freeing from dirt or defilement; cleansing; separation of dross, dregs, refuse, or other debasing or deteriorating matter, so as to obtain the substance in a pure condition”.

One can argue about subtleties, but if you took some ore and isolated gold, it would be the same as purifying gold. But with viruses, virologists have completely debased the word “isolation” while rarely using the word “purification”.

What is COVID-19 Isolation?

In a paper using transgenic (genetically modified) mice:

- Impure materials called a virus isolate were obtained, antibiotics were added, and then the material was cultured in vero cells with various growth stimulating substances.
- Experiments only worked on transgenic mice, not regular mice.
- 7 transgenic mice were injected intranasally (in the nose by a hypodermic) with cell culture material. 3 transgenic control mice were injected with PBS (phosphate buffered saline).
- Treated transgenic mice (but not regular mice) lost weight and showed interstitial pneumonia. Maybe some of the cell culture material got into the lungs and caused an immune reaction, infection etc, in mice that could not fight it off like normal, robust, wild-type mice. By comparison, saline wouldn't cause these problems.
- Isolation was defined as “cytopathic effects” (i.e. some cells in the cell culture died).
- The authors claimed to fulfil Koch's postulates but in the absence of virus purification, this is a bald faced lie.

[Bao L et al. The Pathogenicity of 2019 Novel Coronavirus in hACE2 Transgenic Mice. bioRxiv. 2020 Feb 7.](#)

In a paper claiming isolation of COVID-19 virus from a patient in Korea:

- Impure materials were obtained (nose and throat swabs), antibiotics were added, and then the material was cultured in vero cells with various growth stimulating substances.
- Isolation was defined as “cytopathic effects” (i.e. some cells in the cell culture died).

- They noted that the same RNA was obtained at the end of the process that they had put in at the beginning, but in greater quantity. However, because RT-qPCR is not reliably quantitative, this is not a supportable statement, and cannot be used as proof that a virus was replicating.

[Kim JM et al. Identification of Coronavirus Isolated from a Patient in Korea with COVID-19. Osong Public Health Res Perspect. 2020 Feb; 11\(1\): 3-7.](#)

What is Purification?

Perhaps a psychologist could explain why virologists feel free to abuse the word “isolation” so freely, but are scared to death of even writing the word “purification”

Purification clearly means separating the virus from all other organic materials. Logically, this requires the following steps:

1. Culturing materials believed to contain a virus in other cells (e.g. the Vero cells mentioned above) as viruses are not believed to replicate outside target cells.
2. Purifying virus particles by removing the liquid on top of the culture (supernatant) believed to contain the free viral particles, by filtering (to eliminate particles larger than a virus), by centrifugation (to separate particles by density).
3. Putting a portion of the material under an electron microscope to verify that almost all that can be seen is particles of the same size and shape.
4. Breaking down the proteins and genetic material (RNA or DNA, depending on the virus) in the rest of the sample and analyzing them (e.g. sequencing the RNA or DNA).

Note that only now can tests be developed because you have the pure proteins, RNA or DNA required to ensure that the test really is for viral materials. Furthermore, purification is the only way to validate tests once they are developed. People who test positive (whether it is an RNA, DNA and, depending on the virus, antibody tests) should have the virus purifiable, and those who test negative should not.