

Review of: "Nucleocytoviricota Viral Factories Are Transient Organelles Made by Phase Separation"

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Potential competing interests: No potential competing interests to declare.

This is a beautiful work showing the biochemical and biophysical basis of NCLDV's viral factory formation. It contains the most advanced techniques in the area, performed with pristine quality. All the knowledge acquired in recent years was put to great use in this manuscript. MS-based identification of Ips, genetic manipulation of both the host and the virus, and so on. Especially the knockout strategy, which is a specialty of one of the authors. It is a great contribution to the field, and it should be treated as such. In this sense, I would like to respectfully ask the authors to make an extensive review of the text. The writing is hampering the honor that the work deserves.

Please reduce the acronyms to maybe 1 or 2 max for the entire text. And please make sure that the ones you choose have the respective explanation. For example, GV is not explained. For the audience that is not familiar with the field, it would be important to make it clear. The authors do not mention the giant virus until Figure 4's legend. The large number of acronyms makes the reading of the manuscript very difficult.

The introduction is written for experts in the phase separation field. Please explain the jargon such as client protein, scaffolding protein, biphasic formation, etc. Making these aspects clearer will surely help with the understanding of this beautiful work.

When authors first mention Figure 1A, there is no explanation of the result. The description of what is seen in the figure is also not described in the Legend. I found it hard to see everything each picture has to offer. A more descriptive text would be very helpful and again, give the praise the work so deserves.

What are the shells that should be clearly seen?

Please make the Figure 1B legend clearer. What is "ten minutes after 3h, 2h, 6h, and 6h pi..."? Write the hours in crescent order.

Figure 1C talks about Mollivirus being stained in red. Why? Didn't mention anything about this in the text.

The text needs a big revision up to Figure 3. After that, the text becomes more reader-friendly.

Figures could use some simple adjustments. The blue and red lettering on a black background makes it hard to read (Example: Figs 6C & 6H). Some graphs are way too small.

In summary: describe the results with more detail, extensively review the text, and dramatically reduce the use of

acronyms, and recheck your figures to make them more readable. Other than that, the work is amazing. Congratulations.