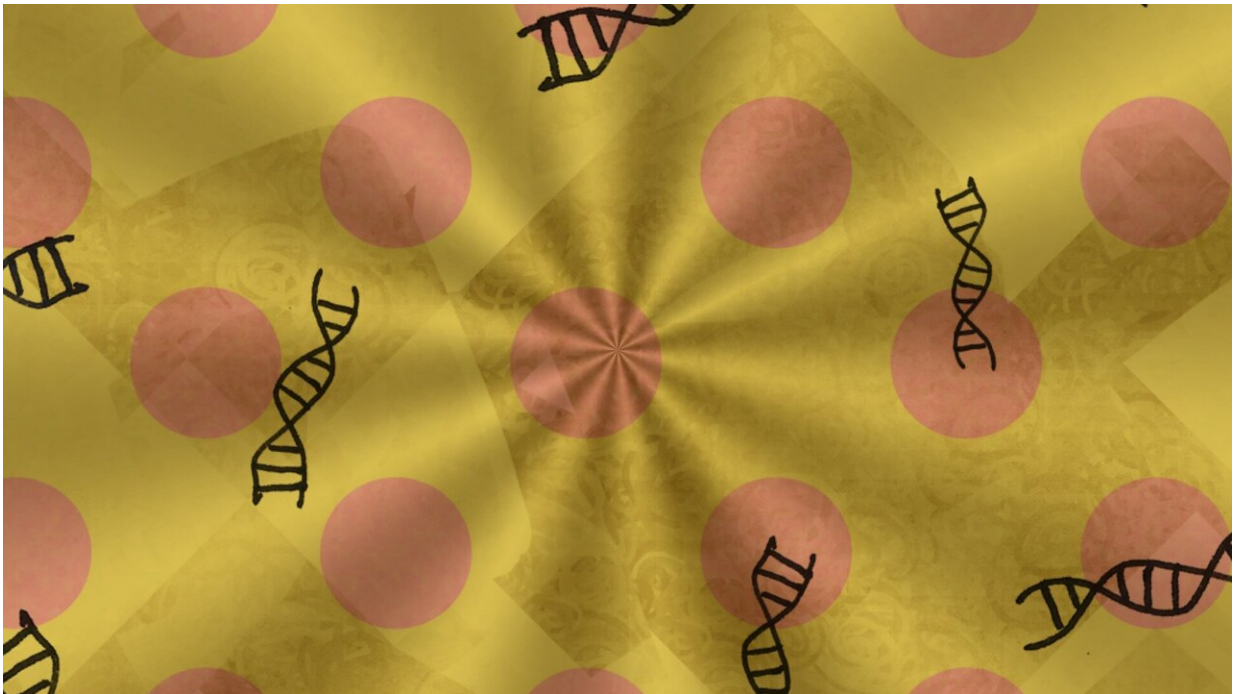


Phase-separated compartments support human cytomegalovirus replication

March 9 2022, by Franziska Ahnert- Michel



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Human cytomegalovirus (HCMV) replicates its DNA genome in specialized replication compartments, whose exact formation was thus far unclear. A research team from the Leibniz Institute for Experimental Virology (HPI) and the Center for Structural Systems Biology (CSSB) has now shown that the formation of phase-separated compartments around viral genomes is necessary to recruit the viral DNA polymerase.

To form these phase-separated compartments, HCMV uses its UL112-113 proteins. The results have been published in the journal *Cell Reports*.

HCMV is a leading cause of illness and mortality in immunocompromised transplant patients and the most common cause of congenital infections worldwide.

Upon HCMV infection, the virus replicates its DNA genome in specialized replication compartments in the nucleus of the host cell. These membrane-less organelles emerge as round structures and increase in size over time. However, the exact mechanism of replication compartment biogenesis remains unknown.

In the study now published in *Cell Reports*, the research team, led by professor Wolfram Brune (HPI) and professor Jens B. Bosse (MHH, CSSB, HPI), used live-cell imaging and photo-oligomerization methods to show that the HCMV proteins UL112-113 undergo [liquid-liquid phase separation](#), which supports the formation of replication compartments in the nucleus. These phase-separated pre-replication compartments are necessary to recruit viral DNA polymerase for viral genome replication.

"Our results show that phase separation is crucial for the formation of pre-replication compartments and viral DNA replication. In this context, the UL112-113 proteins perform an essential function by creating a replication-promoting environment around viral genomes," explains professor Wolfram Brune, head of the HPI research department Virus-Host-Interaction.

"Phase separation by the UL112-113 proteins is not only important for the spatial organization of HCMV pre-replication compartments, but also essential for the recruitment of proteins for viral DNA [replication](#)," professor Jens B. Bosse, head of the HPI-associated Quantitative

Virology group, comments on the results.

More information: Enrico Caragliano et al, Human cytomegalovirus forms phase-separated compartments at viral genomes to facilitate viral replication, *Cell Reports* (2022). [DOI: 10.1016/j.celrep.2022.110469](https://doi.org/10.1016/j.celrep.2022.110469)

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