

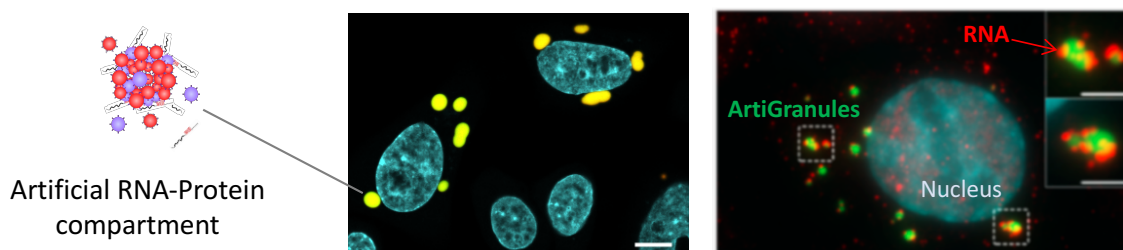
Press Release

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Building artificial organelles to examine the formation of RNA-protein compartments

Membrane-less organelles are ubiquitous functional sub-units of cells that are involved in many vital functions such as RNA regulation, shaping the general gene expression output. Importantly, their dysfunction is linked to viral infection, cancer, and neurodegenerative diseases. Beyond their molecular composition, these organelles are very complex regarding their biochemical and biophysical properties, which implies the development of novel tools for their study.

By combining biophysics and synthetic biology, the team of Z. Gueroui of the Department of Chemistry (PASTEUR (ENS/CNRS/SU)) has developed a novel methodology (ArtiGranule) to form artificial membrane-less organelles, within living cells, with tuneable biochemical and biophysical properties. The engineered synthetic granules succeed in recapitulating the intracellular phase transition process that control the formation of RNA-protein granules. The researchers found that RNA, in addition to its function as a carrier of genetic information, is a critical architectural element controlling the morphology of RNA-protein granules.



Observation of artificial RNA-protein granules, formed by phase separation in human cells.

In the future, this methodology could be expanded to study the role of other biomolecules (DNA, enzymes, pathological granules) in shaping membrane-less organelles and, furthermore, in the processes leading to their dysfunction.

Source :**RNA is a critical element for the sizing and the composition of phase-separated RNA-protein condensates**

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