

Phase separation in the cell cytoplasm
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Cells exhibit a complex spatial organization, often involving organelles that are surrounded by a membrane. However, there exist many structures that are not membrane bounded. Examples are the centrosome, meiotic and mitotic spindles as well as germ granules. An interesting question is how such structures are assembled in space inside the cytoplasm which is essentially a fluid where all components usually mix? I will highlight the importance of phase coexistence and phase separation of fluid phases in the cell cytoplasm as a basic mechanism of the spatial organization of cells. Droplets in the cytoplasm can represent microreactors with different composition and chemistry as compared to the surrounding cytosol. I will discuss how such concepts shed light on the structure and organization of centrosomes and of germ granules.