

Abstract

Membraneless organelles (MLOs) are a newly described type of cellular compartments. They consist of protein and nucleic acid molecules that undergo liquid-liquid phase separation (LLPS). MLOs are able to fulfill unique biological roles, because they are highly dynamic and their composition can be effectively regulated. Composition and function of these formations are swiftly being elucidated. The work summarizes the basic principles of LLPS in living organisms and further focuses on several types of MLOs functionally connected to microtubules (MTs). Their recurrent feature is the ability to nucleate MTs. This eventual role corresponds well with their high temporal and spatial dynamics.