

Membraneless organelles, also called biomolecular condensates or protein droplets, are liquid spheric bodies present in an every cell compartment. Their composition and density is only slightly different from their surroundings. They consist of hundreds of types of proteins and nucleic acids and they are responsible for various biological functions. They are formed via liquid-liquid phase separation that creates a phase boundary in a solution of macromolecules in order to decrease the low free energy of the system. This process is initiated by external stress, internal cell processes or mutations in DNA. There are many identified types of membraneless organelles and each year there are more added on the list. Their functions include localization of macromolecules and related biochemical reactions, tuning of biochemical reactions and transport of macromolecules throughout the cell. This thesis presents a brief summary of the topic of membraneless organelles with several specific examples and very briefly describes several selected methods of their study.