Title:	Small molecules playing big roles: Tuning material properties of nucleolar condensates
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Abstract:	Living cells are enriched with fluidic materials that are full of activity. Biomolecules such as proteins, lipids, and nucleic acids, as well as small regulatory molecules like ATP, need to be organized and regulated in such a crowded milieu to perform cellular functions. Cells achieve this functional coherence by compartmentalizing their constituents into membrane-bound organelles. Intense research over the past decade has revealed that cells can also accomplish intracellular compartmentalization using membrane-less organelles or biomolecular condensates that aren formed via phase separation of proteins and nucleic acids (1). These noncanonical organelles include P bodies, stress granules, Cajal bodies, nucleoli, and others. Unlike membrane-bound organelles, these on-demand, liquid-like, highly dynamic biomolecular condensates lack the membrane barrier and are susceptible to modest perturbations in their local environment, making them tunable, permeable, and regulatable. The principal governing forces for forming these condensates are weak, noncovalent, transient, and multivalent interactions between flexible biopolymers such as intrinsically disordered proteins/regions and nucleic acids (2–4).
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