

## Biomimetic hydrogel design for selective permeation of biomolecules

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The nuclear pore is a natural filtering systems which selectively separate biomolecules, with the help of mesh-like hydrogel called nucleoporin. The nucleoporin facilitate the rapid passage of macromolecules with high selectivity (< 0.1% of all proteins are allowed). The dense nucleoporin network rejects large molecules more than 5 nm by its network pore size, however, some molecules overcome this entropic barrier if there is a binding affinity between nucleoporin and transporting molecules.

The hydrogels for recognition and selective permeation (GRASP) was engineered based on two main factors involve in selective separation (entropic repulsion and binding affinity). To promote selective permeation of target molecules dominantly, the GRASP having diverse affinities with transporting molecules were designed. The GRASP successfully rejected non-specific polyclonal antibodies, whereas specifically allowed monoclonal antibodies. The rationally designed nucleoporin-inspired hydrogels showed high potential of tuning permeability and selectivity of biomolecules for separation technologies.