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POS-59 Effect of diffusion of cell lysate in a model polymer, via pulse gradient NMR (SMC Poster)

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Nonspecific interactions of macromolecules in the cell interior lead to a phenomenon known as macromolecular crowding. Interactions between a molecule of interest and the many molecules in the cell interior can modify its characteristics. For example, crowding can cause changes in biomolecules including protein structure, enzyme kinetics and protein-protein interactions. The effect of crowding is of concern because these biological molecules are normally studied in dilute solution, rather than their real biological environment inside crowded cells. Thus, it is important to understand the behavior of such biomolecules in the presence of proteins, enzymes and DNA as the crowders.
Traditionally, biophysical studies of crowding have used simple crowding agents like dextran and ficoll and have explored their effects on the polymer polyethylene glycol. In order to move beyond simple crowding agents, we will measure the translational diffusion of polyethylene glycol, using pulsed gradient NMR, in the presence of a more realistic crowder, cell lysate, the mixture resulting when cells are sheared open. These results will provide a better understanding of complex crowding systems such as the interior of real cells. Also, the work will provide insight into parameters to optimize to obtain quality data of proteins via in-cell NMR.

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