Combining NMR, SANS and molecular dynamics in the context of biomolecular interactions. Application to proteasomal and lysosomal degradation.

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Abstract

The structure and dynamics of molecules play a key role at any level in different processes from physics to life science. In the latter case, structural information cannot solely explain the exquisite function of biomolecules and one has to take into account dynamical information. For instance, a central problem in understanding biological events at a molecular level is the elucidation of how the active conformation of biomacromolecules is achieved on time scales necessary for function. From the different techniques available for the study of dynamical processes, NMR spectroscopy has a unique capacity to investigate both the structure and dynamics of molecules at an atomic resolution and on a broad range of time scale. Through different examples covering biomolecular interactions in the context of the protesomal or lysosomal degradation, we will see how NMR can expand our vision of biological processes at an atomic level. Finally, we will see how the recent advances in computational hardware and software design combined with NMR and small-angle neutron scattering (SANS) will probably boost our understanding of more complex molecular systems in a near future.

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