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Structural Studies of Macromolecular Complexes in Solution by Small-Angle X-Ray and Neutron Scattering.

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Small-angle scattering of X-rays and neutrons (SAS) is an increasingly important tool for the study of biological macromolecules in solution. The method allows one to study low resolution (1-2nm) structure of native particles, from individual proteins to large macromolecular complexes and also to analyse structural responses to variations in external conditions. Recent progress in instrumentation and data analysis (1) significantly enhanced resolution and reliability of structural models provided by the technique. Advanced methods to analyze X-ray and neutron scattering data from solutions of biological macromolecules will be presented including (i) *ab initio* low resolution shape and domain structure determination; (ii) modeling of quaternary structure by rigid body refinement; (iii) specific deuteration combined with contrast variation in neutron scattering to study multi-component complexes; (iv) quantitative analysis of equilibrium mixtures. Practical applications of the methods will be illustrated by recent examples.

Koch, M. H. J., Vachette, P. & Svergun, D. I. (2003) *Quart. Rev. Biophys.* 36, 147–227.