

Advanced methods for sizing nanomedicine materials

Dora Mehn¹, Fanny Caputo², Davide Magri¹, Sven Even F. Borgos², Luigi Calzolari¹

¹European Commission, Joint Research Centre, Ispra, Italy

²SINTEF Industry, Trondheim, Norway

One of the fundamental steps in nanomedicine product characterisation is to gain realistic information about their particle size distribution. Dynamic light scattering is still the most popular technique for fast and simple size measurements – despite of its known weaknesses. In our nanomedicine characterisation studies, we applied online coupling with asymmetric field flow fractionation (AF4) to improve the performance of light scattering based techniques. Moreover, analytical ultracentrifugation (AUC) was utilised not only as a confirmatory method but also as a true orthogonal solution that uses fundamentally different principles from light scattering for measuring particle size distributions. Additionally, AUC might provide information on homogeneity of very small nanoparticles such as monoclonal antibodies, on antibody-antigen interactions, on particle density (including density of floating particles), and in some cases on drug loading and release – even in complex medium. The presentation will illustrate the potential of AF4 and AUC and highlight the possible benefits of developing validated protocols for medical nanoparticle characterisation.