

## **Integrative studies with solution X-ray scattering**

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### **Abstract**

Small angle X-ray scattering (SAXS) is a universal and powerful method to analyse proteins and other macromolecules in solution, in a broad range of sizes and conditions. SAXS provides direct insights in the quaternary state and structural responses to the effects of buffer composition, to interactions with other macromolecules or small ligands. Thanks to its highly complementary nature to bioanalytical techniques as well as structural methods, SAXS occupies a unique niche in the current integrative modeling landscape. The capacities of SAXS will be illustrated by recent integrative projects conducted at the high brilliance EMBL beamline P12 on the storage ring Petra-3 (DESY, Hamburg). In particular, applications will be presented to elucidate solution structures of proteins and complexes relevant for combating the COVID-19 pandemic.

These projects will include:

- (i) a rapid screening of neutralizing antibodies against SARS-CoV-2 spike protein [1];
- (ii) in combination with mass-spectroscopy, gaining insights into the organization of the virus-coded non-structural proteins nsp7 and nsp8 [2]
- (iii) analyses of lipid nanoparticles for fine-tuning of tailored mRNA delivery systems and improvements of the formulation development for future vaccines (in collaboration with BioNTech company, [3-4]).

Industrial access modes to P12 through the service provider BIOSAXS GmbH will be discussed.

### **References:**

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