Contribution ID: **1742** Type: **Poster**

SEC-SAXS structural studies of ferritin-based heterooligomers

Monday 28 October 2024 18:50 (20 minutes)

SEC-SAXS structural studies of ferritin-based heterooligomers

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Ferritin is an iron storing protein complex typical for almost all living organisms. Ferritin complex poses the ability to self-assemble into a hollow sphere from 24 identical subunits. Stability of the globule in a wide range of temperatures and pH makes ferritin a promising tool for biomedical applications such as vaccines or drug delivery [1]. Ferritin-based hybrids are the cutting edge of biotechnological applications of this protein complex [2, 3, 4], especially, in case of ferritin from Helicobacter pylori, which is widely utilized as a platform to combat various pathogenic diseases [5]. We suppose that the oligomeric composition of such hybrid molecules might play important role in vaccine efficiency

In this work we investigated hybrid recombinant protein complex based on ferritin subunits from H. pylori and ones fused with a homologue of the Small Ubiquitin-like Modifier protein obtained via pH dis-/reassembly by SEC-SAXS. Small angle X-ray scattering coupled with size exclusion chromatography (SEC-SAXS) allows for obtaining SAXS data of higher quality and precise understanding of every component of the mixture which is crucial in studying hybrid samples [7]. In our case, we defined macro parameters such as Rg, Dmax and Vp for different fractions of the sample of hybrid recombinant protein complex and made further conclusions on the stoichiometry of these hybrid globules. We supposed that these macro parameters in different fractions of SEC correspond to hybrid 24-meric globules, separate monomers of both types of subunits and their dimers. In addition, there is a fraction of SEC that allows for the assumption of the existence of heterodimer in this sample. Its composition is under discussion in this report.

The study was supported by the Ministry of Science and Higher Education of the Russian Federation (agreement 075-03-2024-117, project FSMG-2021-0002)

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Session Classification: Poster session & Welcome drinks

Track Classification: Life Science