



	Experiment title: Structure and stability of ferritins for magnetosensitive applications	Experiment number: LS-2948
Beamline: ID02	Date of experiment: from: 01/12/2020 to: 03/12/2020	Date of report:
Shifts: 6	Local contact(s): Thomas Zinn Lauren Matthews	<i>Received at ESRF:</i>
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Report:

Ferritin is considered the main iron storage protein found in about all organisms. It consists of a multi-subunit protein shell (apo-ferritin) that can enclose a mineral core of hydrated ferric oxide (holo-ferritin), with an external diameter of 12 nm and thickness of about 2.5 nm.

We performed our measurements on apoferritin from *pyrococcus furiosus* and its iron filled form (4500 fe/ft). Samples were obtained with different protocols and show different degree of purification. In Figure 1 are reported apoferritin measurements. Interestingly, at lower q-values samples purified with the second and third method show a fractal structure, suggesting the presence of hierarchical aggregates.

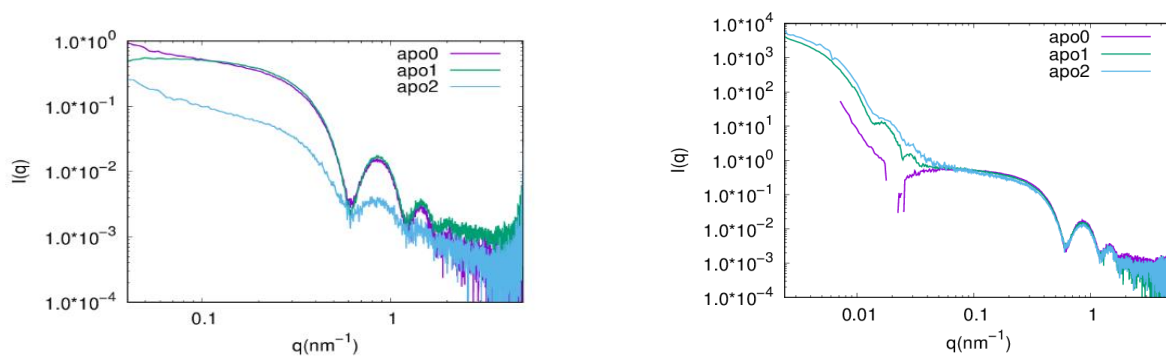


Fig.1

Samples in holo form (with the core of the protein filled with iron) suggest the same results, showing a different degree of stability depending on the protocol. The efficiency of the iron cargo is biased by the different protein families present in solution. In Figure 2 we report, as an example, two protein from different purifying protocols.

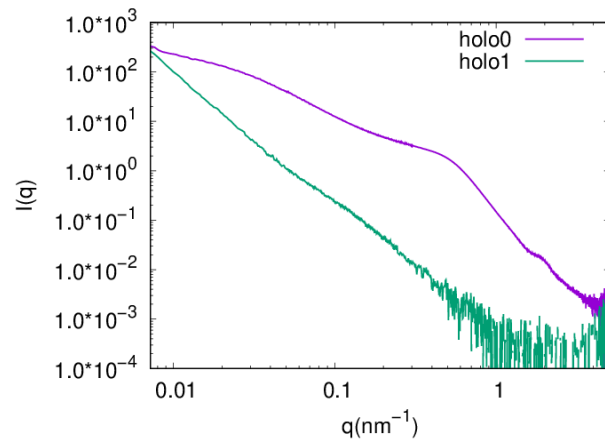


Fig. 2

Since the focus of the project is the activation of the construct upon magnetic stimulation, we tested the effect of an oscillating magnetic field on the protein stability. We observed the holo-ferritin after 2h treatment with RF (performed before mailing our samples, thus 3 days before the effective measurement). In Figure 3 can be observed a modulation of the iron leakage depending on the sample, that will be further analysed.

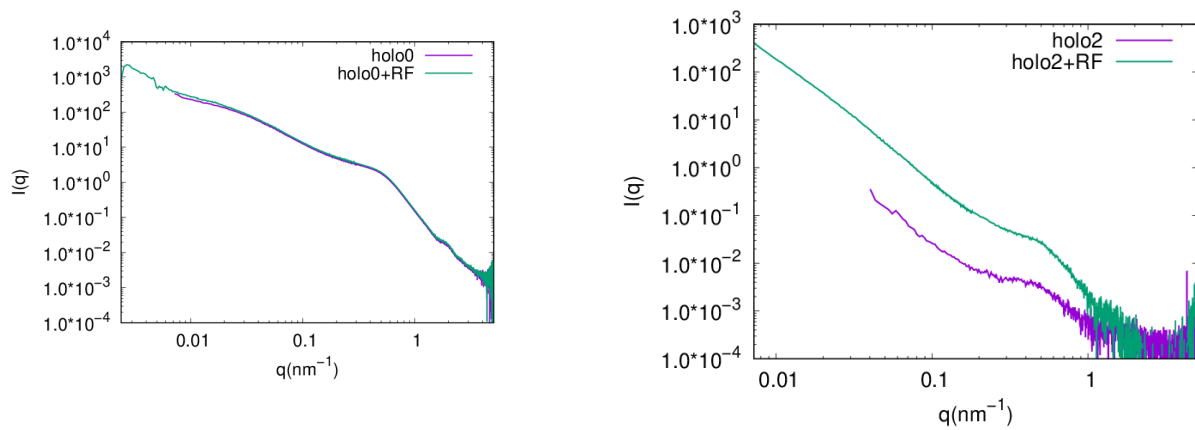


Fig.3

Small fragment of the construct (ion channel+ferritin) have been characterized.