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A complementary approach to quantify weak interactions in protein solutions with high throughput

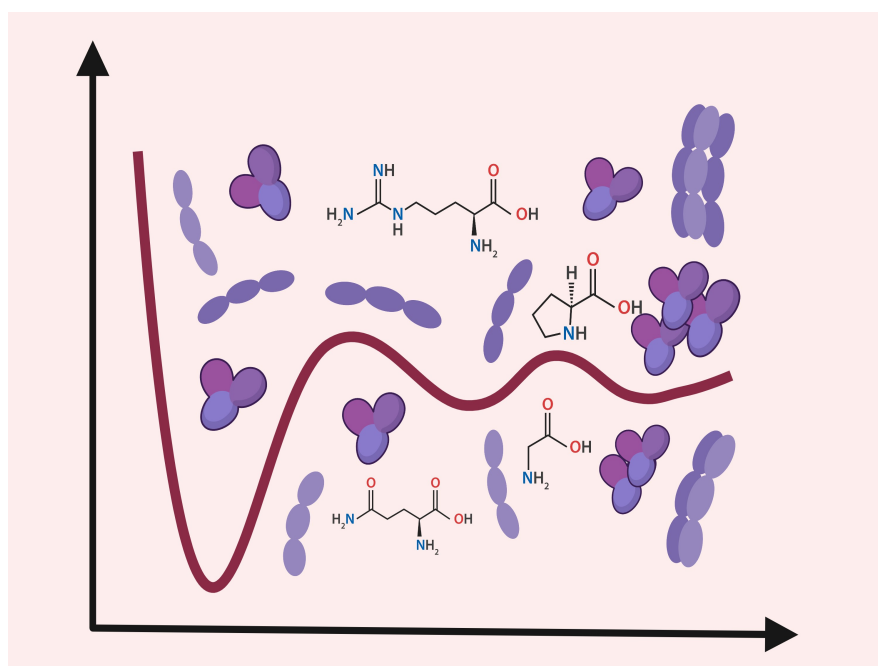
Weak interactions are predominantly responsible for proteins to form complex colloids and solutions [1]. However, they are not fully understood yet. When studying solutions, weak interactions are often characterized using the osmotic second virial coefficient (B22) that describes the non-ideality of the solution. B22 has been used to quantify intermolecular forces between molecules in solution [2]. Most commonly B22 is measured with traditional colloidal characterization techniques including static light scattering and sedimentation equilibrium analytical ultra-centrifugation (SE-AUC). Recently, self-interaction chromatography (SIC) has been introduced as an efficient technique with the potential to perform high-throughput screening while still yielding comparable results [3].

Here we combine SIC and SE-AUC to determine B22 for proteins in different solution conditions for example in the presence or absence of salts. To corroborate SIC as an efficient screening tool, we first monitor the self-aggregation of the two model proteins Lysozyme and BSA. By acquiring statistics of retention volumes we robustly derive B22 for the two proteins for various ionic strengths of the buffer solution. On selected samples we compare the obtained B22 from SIC with SE-AUC measurements and discuss the quantitative agreement. Then we apply our combined SIC-AUC approach to quantify the presence of molecules that have been found to efficiently screen protein interactions trying to understand the mechanism behind this effect. We are currently exploiting our complementary approach to set up a library of protein interactions quantified by their respective B22.

[1] Chandler, D. Nature 437, 640–647 (2005).

[2] Neal, B.L., Asthagiri, D., and Lenhoff A.M.; BioPhys J. 75 2469-2477 (1998).

[3] Tessier P.M., Lenhoff, A. M. and Sandler, S.I.; BioPhys J. 82 1620-1631 (2002).



Date:

Location: lecture hall HS 05.01, Karl-Franzens University, Universitätsplatz 5

Online: <https://unitube.uni-graz.at/portal/streaming.html?id=event21>

Host: Joachim Krenn

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