CHANGING THE GAME OF AMYLOID FIBRIL & PROTEIN CONDENSATE RESEARCH WITH FIDA

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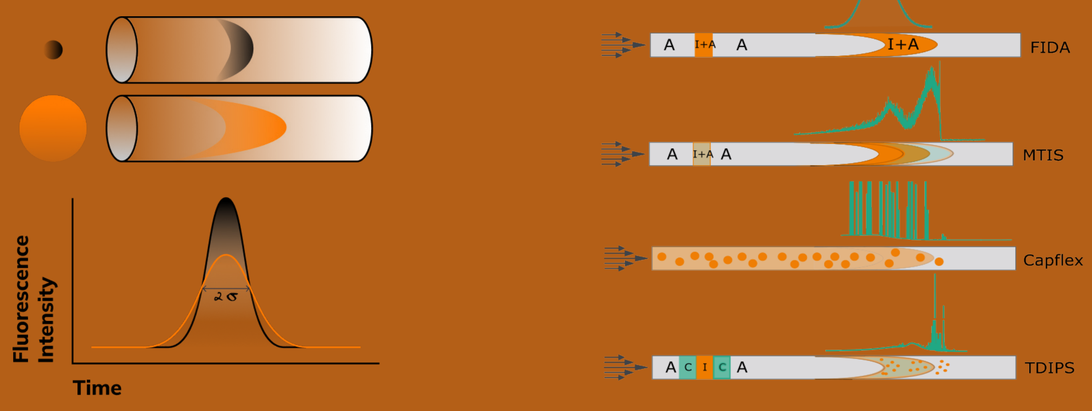
Method introduction

Flow Induced Dispersion Analysis (FIDA) is a first-principle technique used to measure the hydrodynamic radius of molecules. FIDA is highly sample-efficient, requiring only 40 nL of sample per measurement, and operates without any buffer constraints. Recently, specialized methods to study amyloid fibrils and protein condensate have been developed with the Fida instruments (MTIS[1], Capflex[2], TDIPS[3]).



Studying Fibril Kinetics & Interactions quantitatively with FIDA

1. FIDA enables you to **detect and measure** the size of monomers, small oligomers and fibrils with out any size bias. From the hydrodynamic radius determined by FIDA, the **length of the fibrils** can be calculated.
2. It monitors the development (size increase) of fibrils over time, allowing you to **capture fibril growth kinetics**.
3. It allows you to monitor fibril **growth inhibition**
4. It enables you to work directly on patient-derived fibrils e.g. cerebral spinal fluid, with only **nanolitres to microlitres of sample required.**

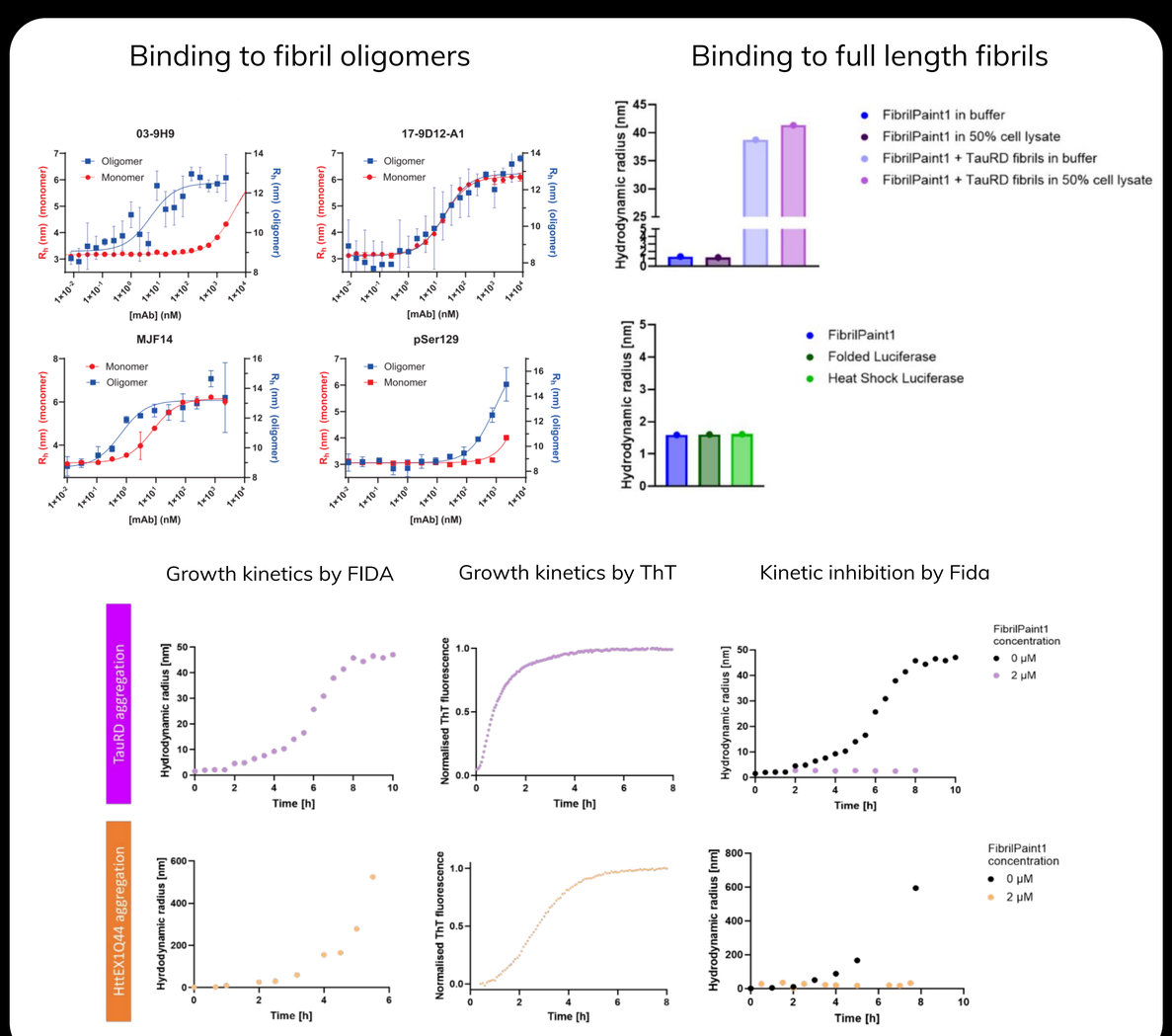


Figure 1: a) Affinity determination of antibodies against fibril oligomers[4]. b) Binding to full length fibrils[5]. c) Monitoring fibril growth and fibril growth inhibition by FIDA using Fibril Paint[5].

Fibril polymorphism with MTIS

1. MTIS performs an **automated** ΔG comparison for diverse polymorphs.
2. It seamlessly integrates the precision of separation-based techniques with the **speed and efficiency** of bulk methods.
3. MTIS quantifies **both** monomer concentration and total concentration **in the same assay.**

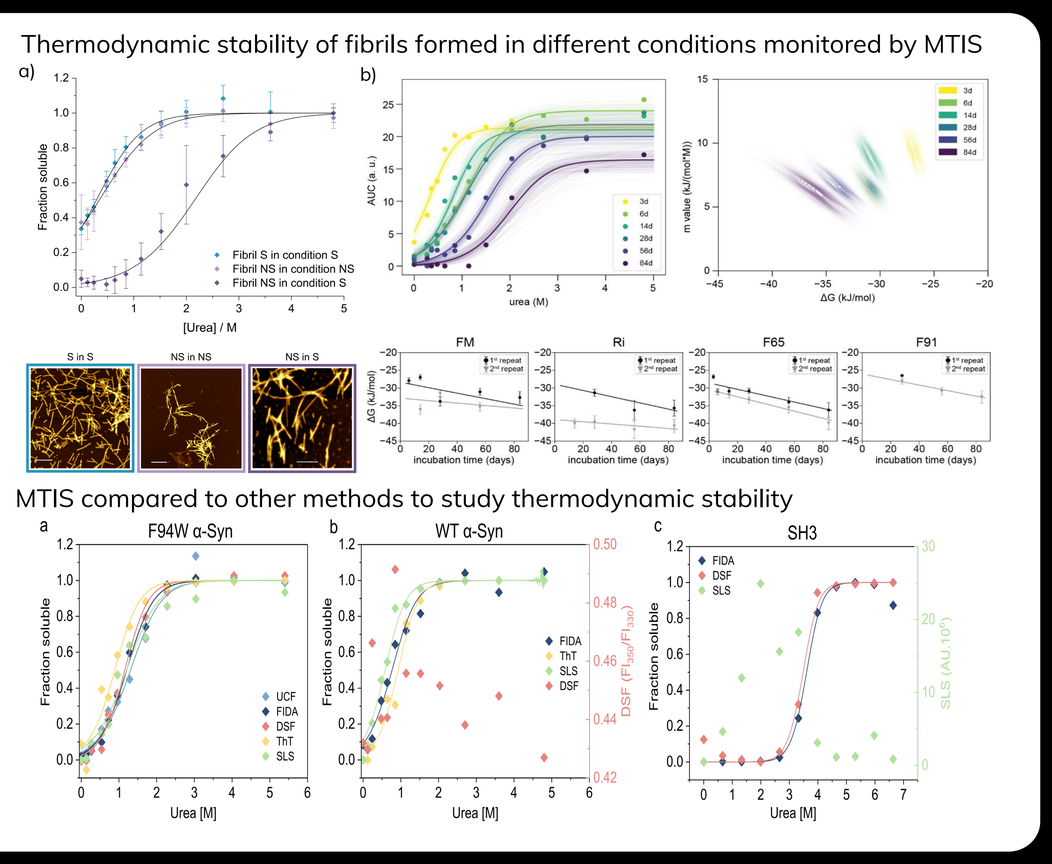


Figure 2: a-b) Thermodynamic stability data from MTIS of aSyn fibrils formed under different conditions compared to AFM1 and ΔG values calculated and compared[6]. c) Thermodynamic stability of three different amyloid fibrils measured with different techniques and compared to MTIS (FIDA)[1].

Studying protein condensates with Capflex and TDIPS in FIDA

1. Capflex allows you to measure dilute phase concentration, along with **the quantification of number and size** of the condensates. It can also account for the aging of condensates.
2. TDIPS allows you to screen conditions for condensate formation using **nL of your sample**. It also allows you to record phase diagrams label free with nL of your sample.

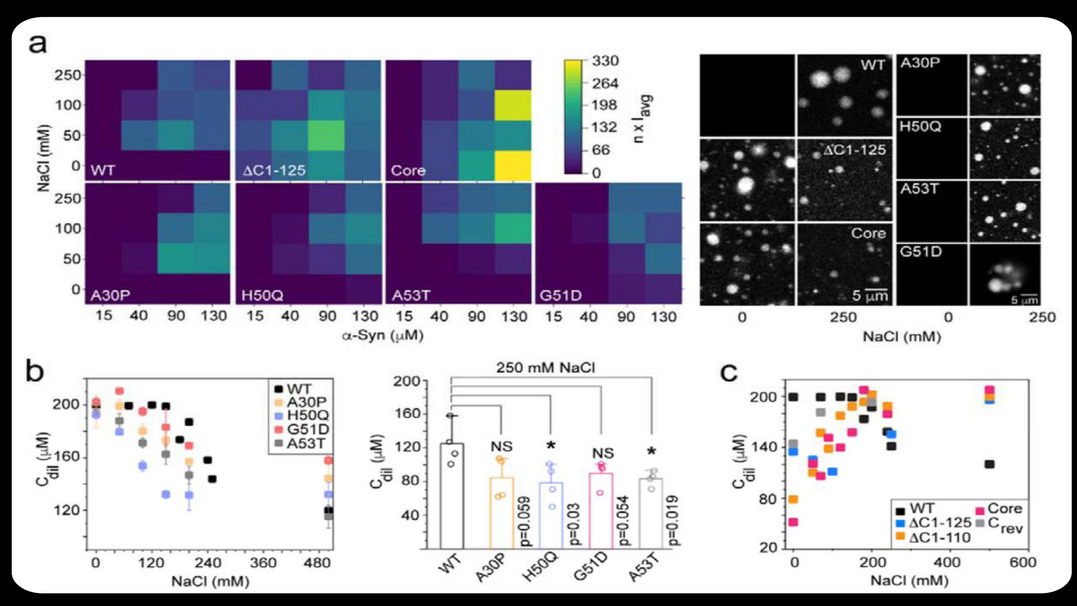


Figure 3: a) Phase diagrams of aSyn variants recorded with TDIPS, confirmed by confocal microscopy. b-d) Dilute phase concentration of aSyn variants measured with Capflex and confirmed by confocal microscopy[7].

References

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