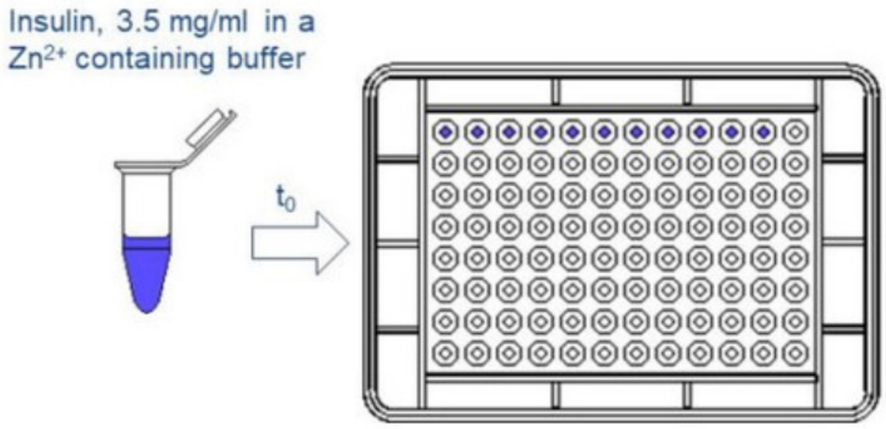
Xtal Concepts

Newsletter

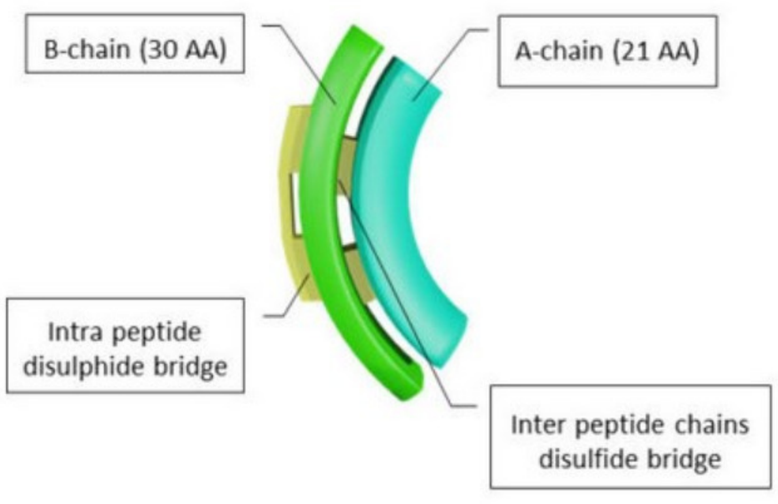
Dimer/Hexamer Transition Monitoring via *in situ* DLS

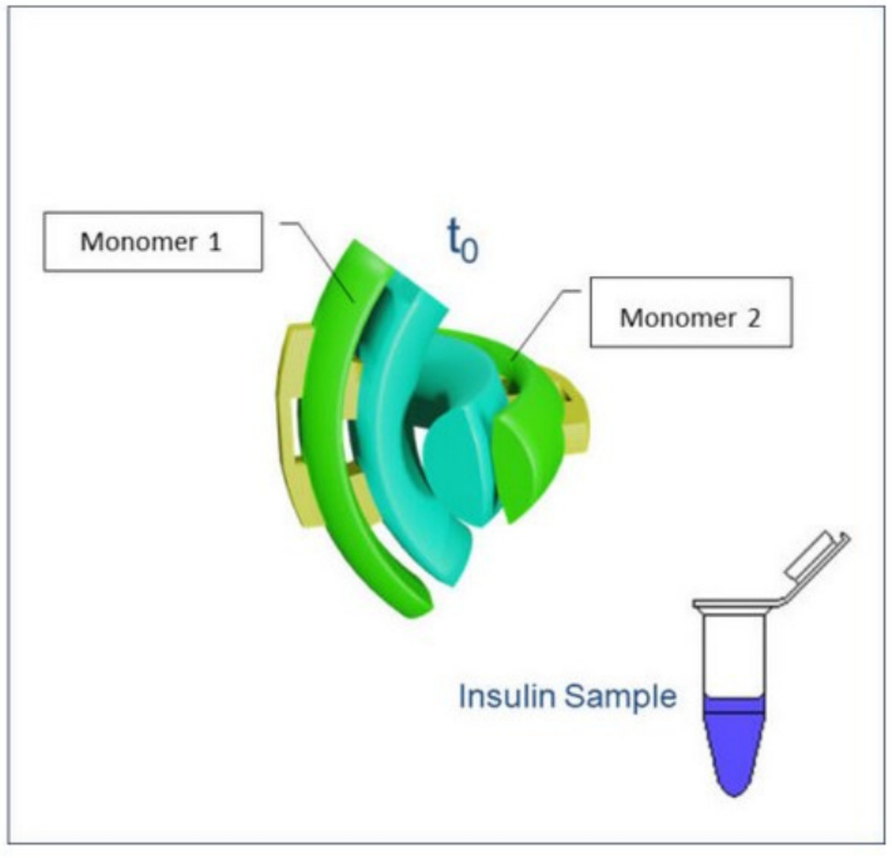
Insulin is an example of a dimeric to hexameric transition in the presence of zinc ions. Hexamer formation starts immediately after zinc addition and is completed within two to three days at room temperature.



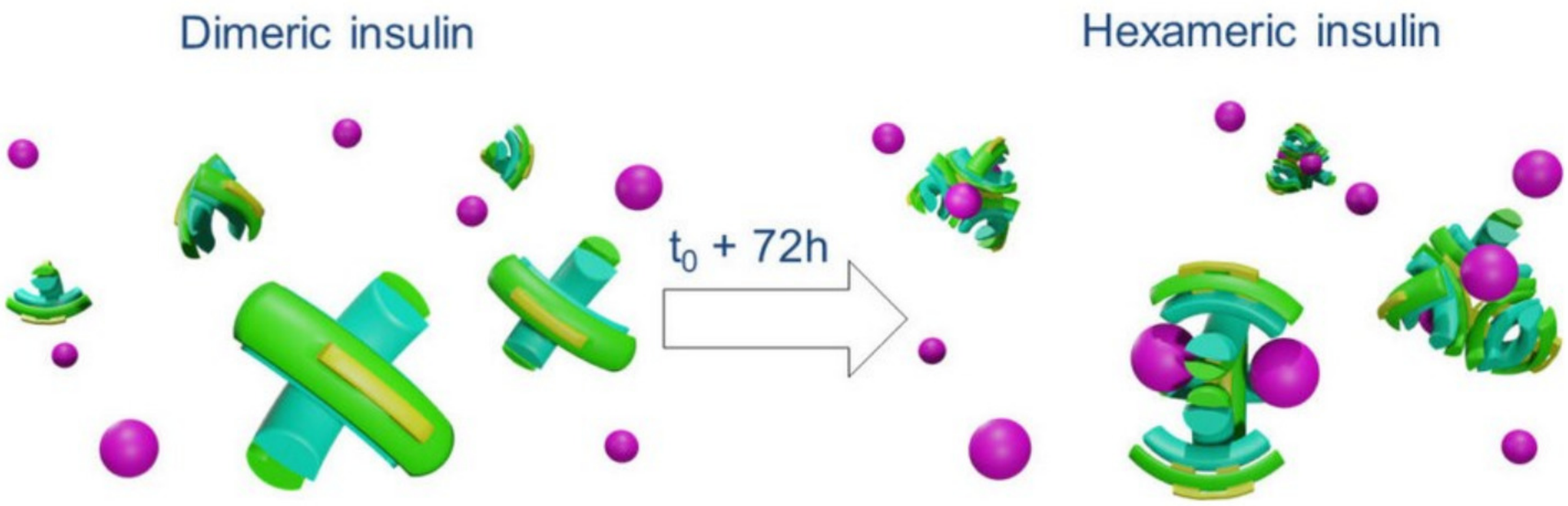
The insulin model

Monomeric insulin, consisting of A and B chains covalently linked by an inter-peptide disufiide bridge. In solution, insulin has a tendency to form dimers.



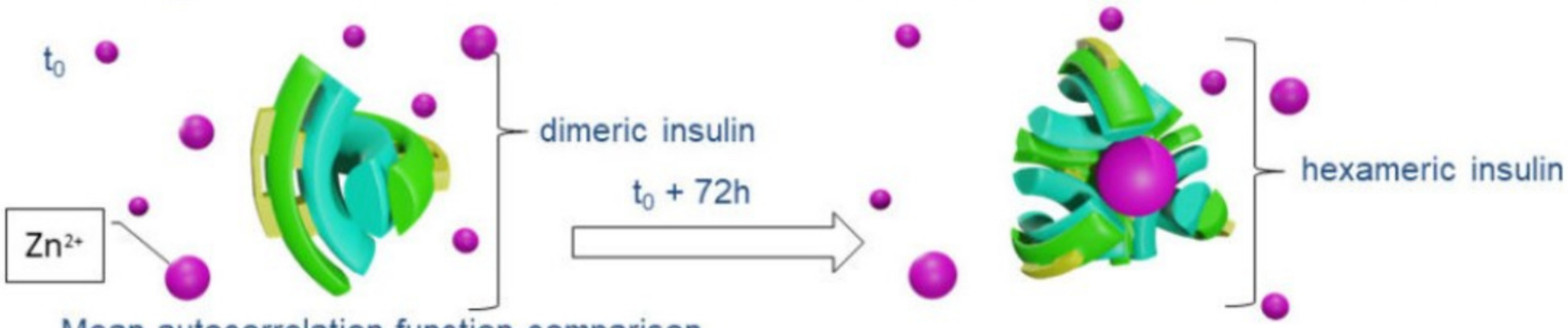


Monitoring the Transition from a dimeric to a hexameric State of Insulin in Presence of Zn^{2+}

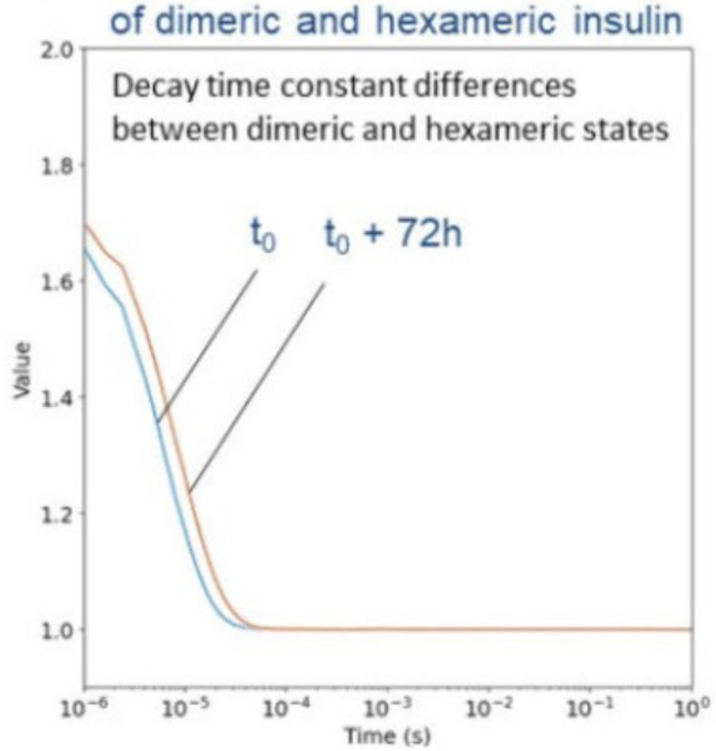


Autocorrelation and Size Differences indicate the Transition to Hexamers

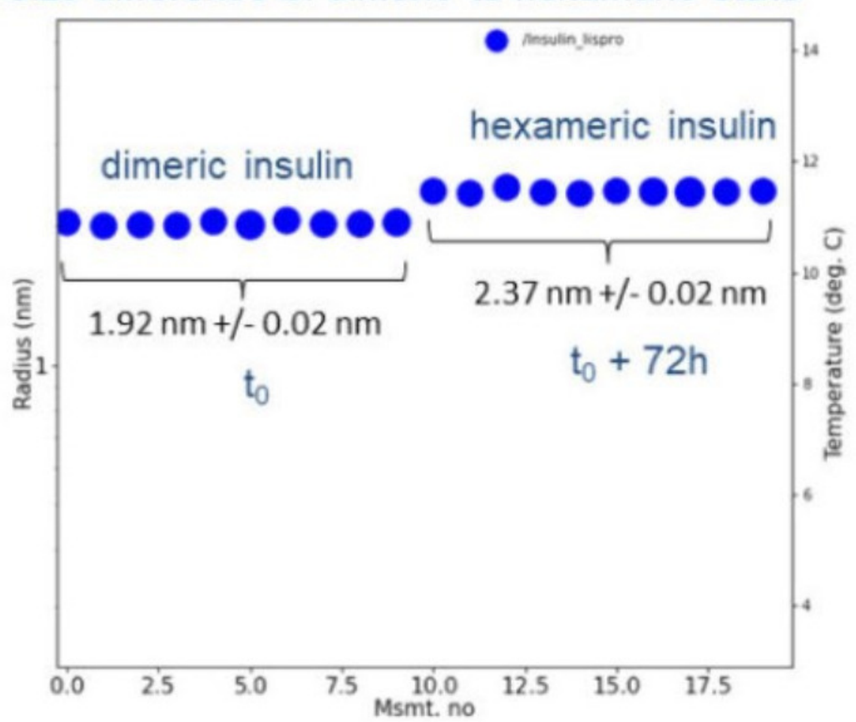
Monitoring of the transition from dimeric to hexameric insulin in presence of Zn^{2+} ions



Mean autocorrelation function comparison of dimeric and hexameric insulin

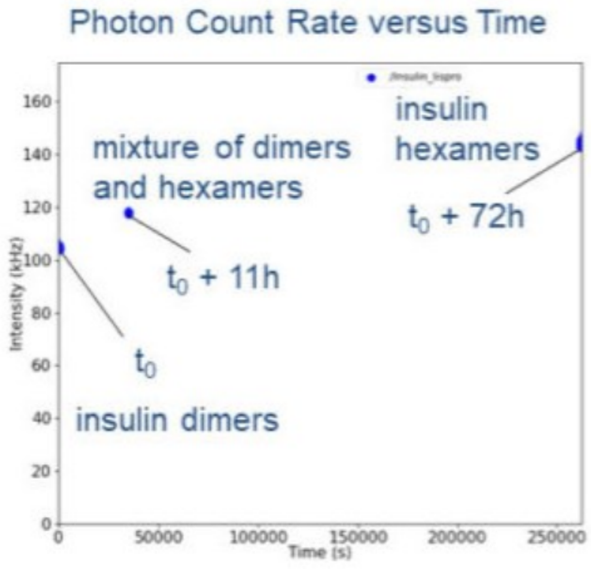


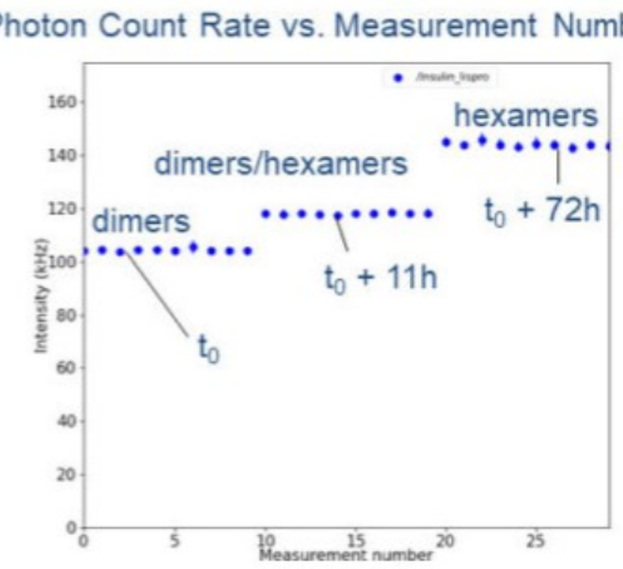
Size difference of dimeric to hexameric state



The dimer/hexamer Transition is a continuous Process, indicated by the Photon Count Rate in the DLS.

The dimer/hexamer transition is a comparably slow process. Therefore, changes in the photon count rate are visible when DLS measurements are taken at time intervals of several hours.

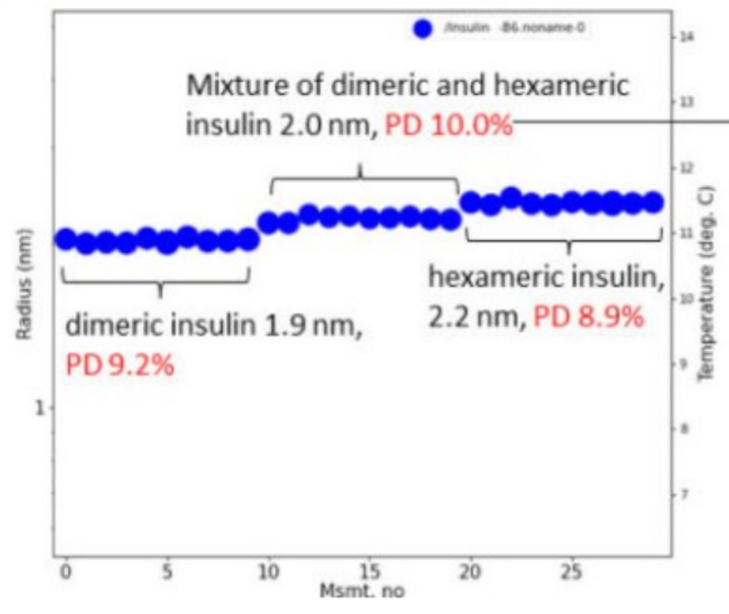




Mean hydrodynamic Radius from intermediate occuring Mixtures of Dimers and Hexamers

- A continuous transition from monomers to oligomers leads to intermediate mixtures
- The measured size of the dimer and hexamer mixture lays in between
- The polydispersity index (PD) indicates the presence of such mixtures

Hydrodynamic radius versus measurement number



The PD value is the most sensitive indicator for mixtures of different particle populations in solution.