



Atomic structure of Affibody® molecules determined using synchrotron X-rays

To optimise their drug protein design, biotech company Affibody AB wanted to assess the atomic structure-function relationship of Affibody® molecules. With synchrotron radiation at MAX IV Laboratory, the team was able to get high-resolution atomic structural information in a few seconds, and data that will guide further development of the next-gen biopharmaceuticals.

Fast results with a large-scale facility

The development of biopharmaceuticals is driven by speed to market needs. Affibody AB needed a time-efficient procedure to study atomic structure and get information on the drug in complex with its antigen.

With laboratory-based X-ray sources, the procedure would have taken several hours and generated standard-level data. Using synchrotron radiation with higher intensity X-ray beams at MAX IV Laboratory, the data took just a few seconds to acquire and was of better quality, which is crucial for the company's computer-aided rational protein design.

In the procedure, three Affibody® molecules and two antigens were produced. Antigen binding kinetic analyses were performed by surface plasmon resonance measurements.

Then, antigen-Affibody® complexes were formed and purified by size-exclusion chromatography. Molecules were analysed by differential scanning fluorimetry.

The final step was to perform crystallization experiments using a nanoliter pipetting robot. The resulting crystals were analysed at the BioMAX beamline at MAX IV in Lund and at station I04 at Diamond Light Source in the UK, all performed remotely.

Affibody AB: “We are excited”

In the end, well-diffracting crystals were obtained for one antigen and one Affibody® molecule, which enabled structure determination of these molecules – the latter was solved and refined to 1.45 Å resolution with an R value of 0.177 and R_{free} of 0.208.

drugs through rational protein design, and take their biopharmaceutical products to the next level.

- We are excited about further enhancing our molecular platform by using rational design at atomic resolution, with data from MAX IV and Diamond Light Source in collaboration with SARomics, says Fredrik Frejd, CSO at Affibody AB.

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