In vitro analysis of PARP11 suggests functional relevance of dimerization

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The poly (ADP-ribose) polymerase family member 11 has been shown to be involved in virus defense and tumor immune response as a regulatory component (B*asavarja et.al., 2024*). However, there is no experimentally determined crystal structure of the protein to date which represents a gap in understanding how its function correlates with its structural properties.

Using the AlphaFold 3 server we predicted the structure of a PARP11 construct and observed a strong indication of a homodimer forming. This raised questions regarding the functional relevance of dimerization, as well as the challenges associated with the protein's expression and purification that prevented previous research from obtaining sufficient quantities of stable protein for crystallisation.

To address these questions, we expressed several PARP11 constructs using *E.coli,* followed by size exclusion and affinity chromatography. We assessed the protein's activity through Western blots. We were able to produce a batch of the ADP-ribosyltransferase (ART) domain of PARP11 and confirmed its activity. Furthermore, SEC and mass photometer analysis indicated clearly that the ART domain dimerises.

Our findings suggest that the dimerization of PARP11 may play a role in regulating its activity and therefore provide a potential basis for further investigation into its function.