

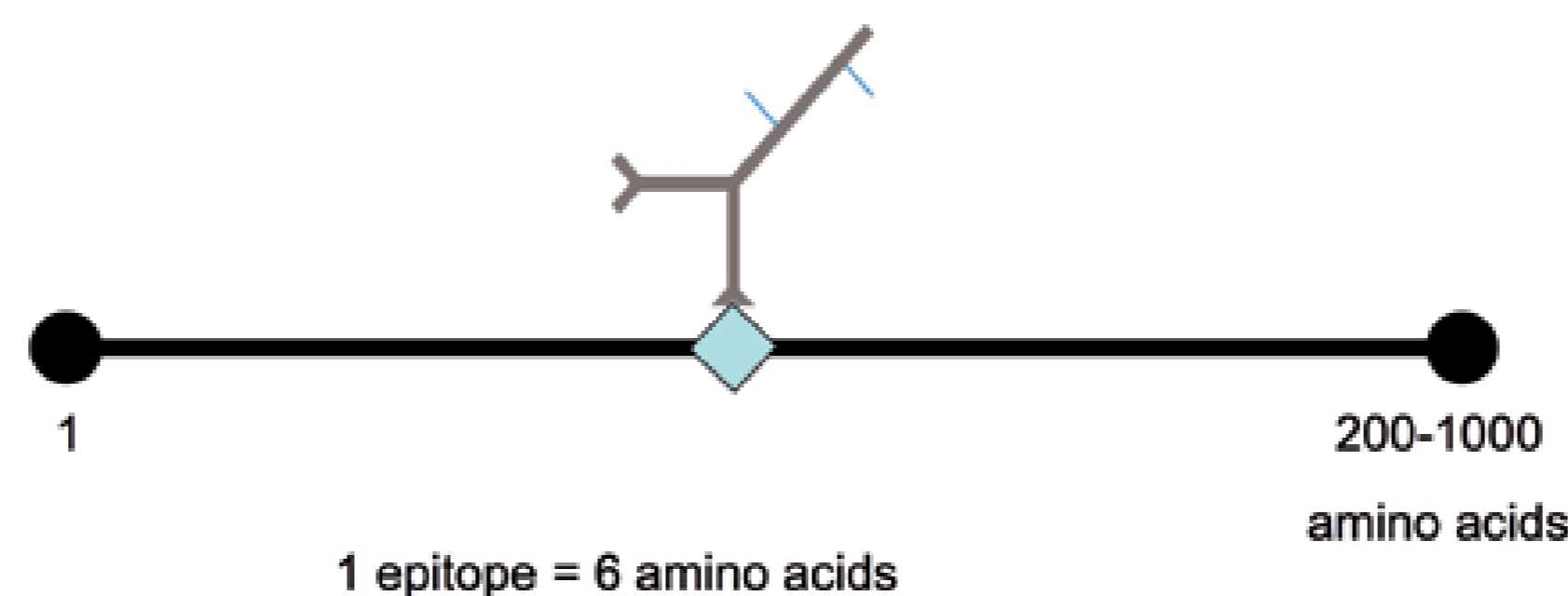
Novel Immunological Reagents for Research and Diagnostics

Lead Academic: Professor David Parkinson, Sheffield Hallam University

The Challenge

Antibodies are valuable reagents in healthcare diagnostics and life science research. The traditional method for generating antibodies is to purify the protein target to high levels of purity as the immunogen. This however requires a detailed knowledge of the properties of the protein target in order to design the purification scheme and an abundant source as the starting material. If successful, this approach often gives high affinity antibodies that can be used in highly sensitive analyses. The high sensitivity results from the presence of multiple antibodies that recognise different parts (epitopes) of the protein target.

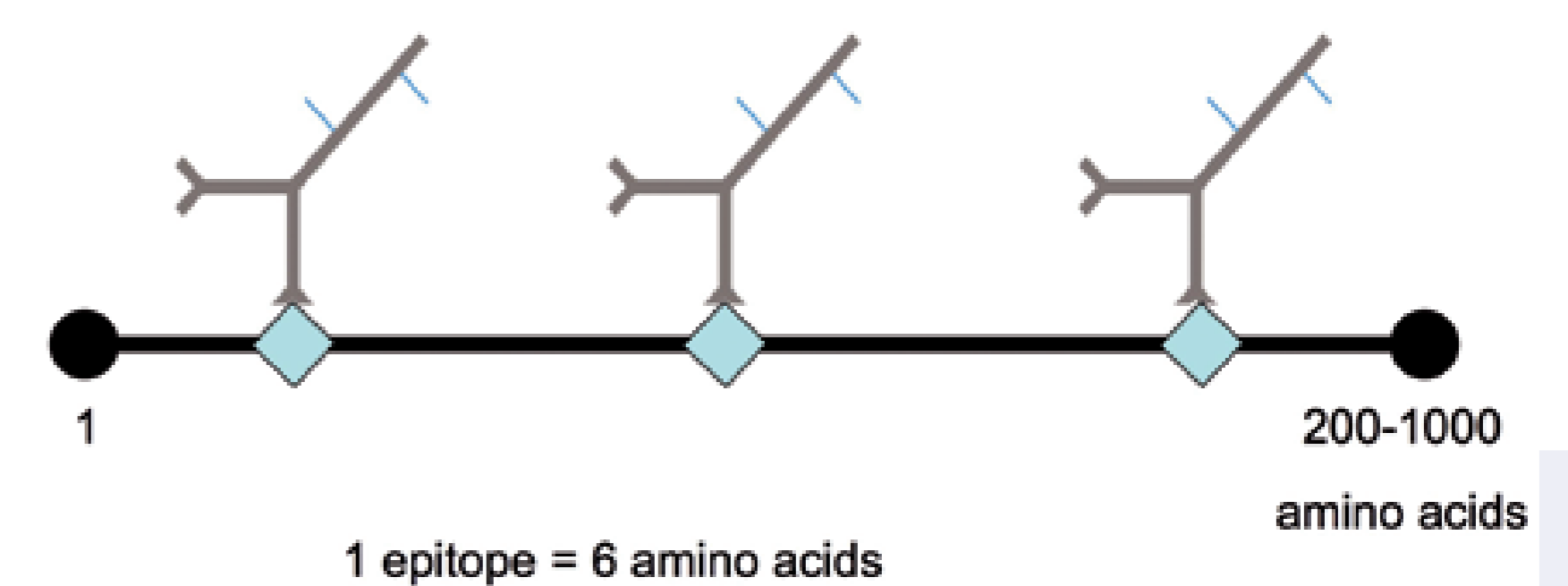
Some progress has been made in reducing the need for purified immunogen by the discovery that antibodies usually recognize an epitope consisting of a peptide of 5 or 6 contiguous amino acids. With the advent of synthetic methods to produce peptides, it became possible to generate antibodies to novel protein targets where the only information was its amino acid sequence. However, these antibodies recognise only one epitope and hence can have limited use where high sensitivity is needed such as in diagnostics.



Single epitope limits sensitivity

Proposition Position Today

A positive outcome from this project has contributed to the decision by Sheffield Hallam University to pass the IP to a spinout company, Sheaf Innovations Ltd, for commercialisation. The company has raised investment from South Yorkshire Investment Fund and is currently setting up a laboratory in the Sheffield Biocubator.



Increase sensitivity for direct labelling through interaction with multiple epitopes

Target and epitopes

The Innovation

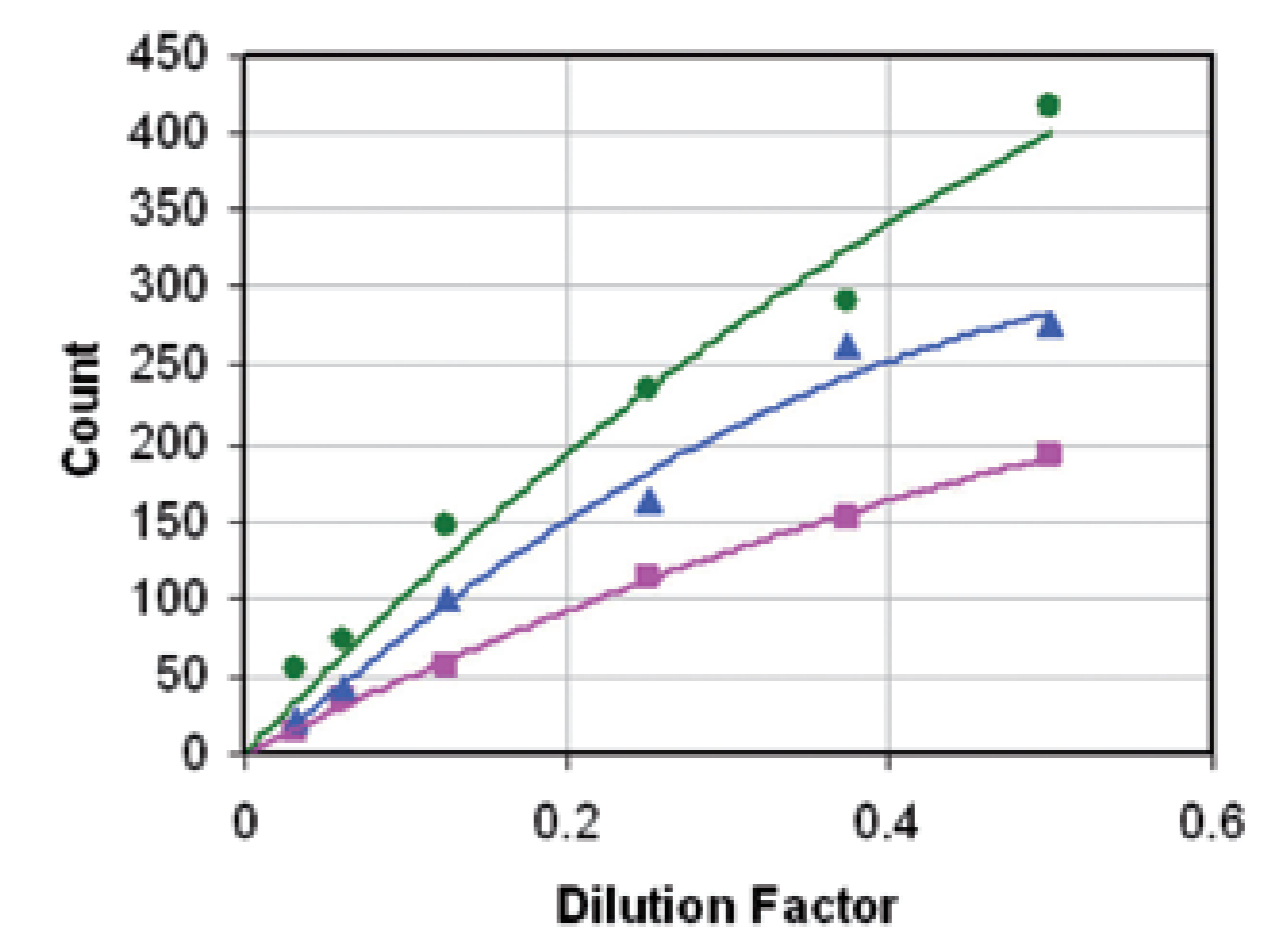
The aim of this project was to determine if multiple antibodies generated to different epitopes on the same protein target could be combined to generate increased detection sensitivity.

The Opportunity

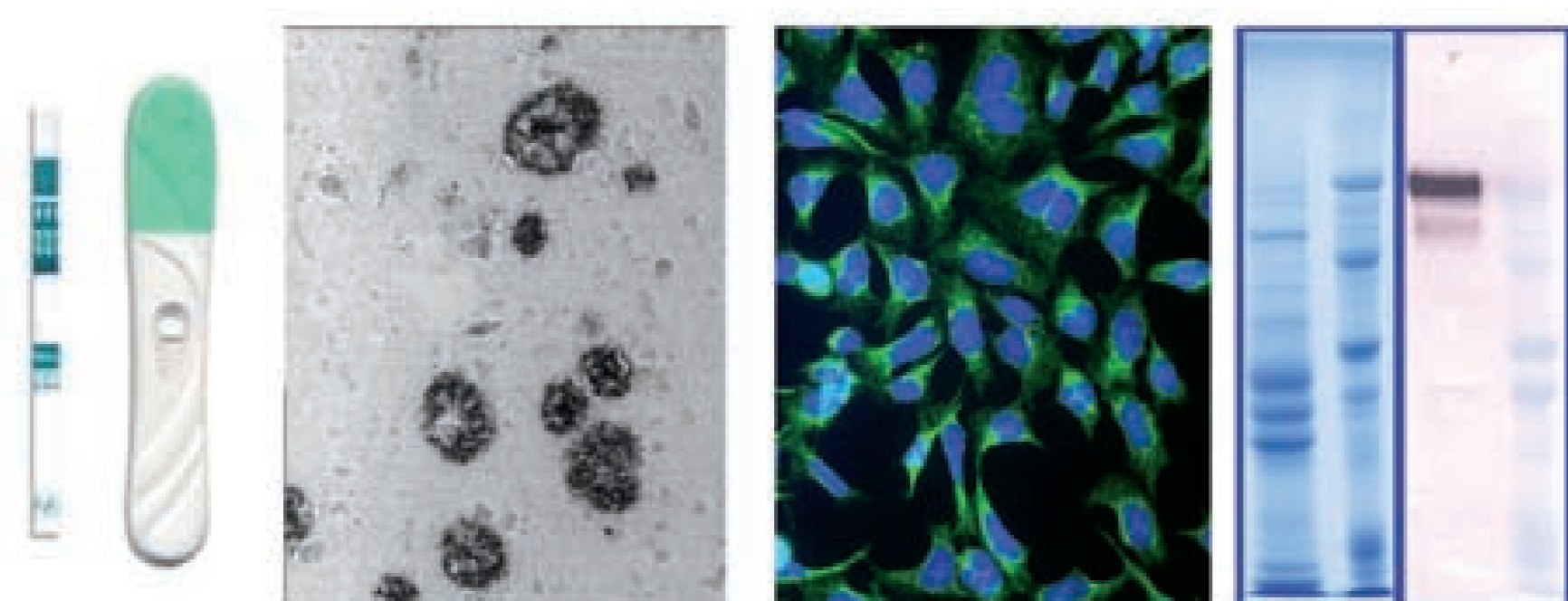
If successful this project would provide a path to reagents with high sensitivity, high specificity and short production timescales, to address unmet need for sensitive detection and analysis of novel gene products (i.e. proteins) involved in diseases such as cancer.

How has the Yorkshire Concept Fund Contributed?

Yorkshire Concept funding enabled testing of the multiple epitope concept on the Alzheimer amyloid precursor protein, a protein target that undergoes altered proteolysis in Alzheimer's disease, resulting in insoluble deposits in the brain that trigger neurodegeneration, leading to memory loss and dementia. Three peptide epitopes were selected from the sequence of APP, antibodies generated to these, and the resultant antibodies assessed for recognition of APP and sensitivity of detection.



Quantitation of APP labelling



healthcare

research

Some applications of antibodies

Fact Box

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Proof of Commercial Concept Fund