Improved antibody selection with assisting plasmid

When the human body is invaded by foreign molecules, the immune system will be activated to fight against these intruders. This is done with the help of antibodies which act as the defence force of our body. Antibodies are remarkable proteins in the body that is very specific in targeting foreign molecules in our body. Therefore, antibodies have been widely used as treatments for various diseases. The constant development in DNA technology has allowed antibodies to be customized for specific functions in treatments.

Phage display technology is still the gold standard for producing antibodies whereby antibody molecules are displayed on a phage particle for selection. Due to the nature of a bacteriophage, the preferred antibodies used are often smaller versions of the fulll molecule, such as the Fab (Fragment antigen binding) fragment that consists of both the heavy chain and light chain. However, the presentation complexity of Fab on phage has always been a hassle for many researchers. During Fab presentation, only the heavy chain will be physically attached to the phage particle leaving the light chain to be expressed independently. Thus, the light chain needs to find the heavy chain to form a disulfide link between them for a successful Fab formation. Such a process makes the complete Fab difficult to be displayed on phage.

Traditionally, antibody production processes using phage display with Fab molecules suffers from the low presentation efficiency. The presentation efficiency is dependent on the ability of both the heavy and light chain to form a disulfide link between them. We found that the Fab presentation on phage was improved using an assisting plasmid in the packaging process. This assisting plasmid functions to provide proteins that improves the formation of the disulfide link between the two chains. Therefore, we incorporated this assisting plasmid in the phage display panning protocol. Phage display panning is a selection and enrichment of antibodies from an antibody phage library against certain antigen after several rounds. In a nutshell, the assisting plasmid was incorporated into the conventional selection process during phage packaging. The idea was to involve the production of the assiting proteins from the plasmid to help in the Fab formation during phage packaging. The method was able to improve the packaging of Fab molecules in comparison to the conventional method.

In conclusion, by incorporating the assiting plasmid in our modified phage display panning protocol, the presentation of Fab antibody on phage was improved. It is hoped that this can help to improve the efficiency of antibody production using Fab antibodies.

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Improved Fab presentation on phage surface with the use of molecular chaperone coplasmid system.
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