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The hybridoma story

Navodya Chathuki Wickramarathna

The introduction of monoclonal antibodies has transformed healthcare with their precise target and high sensitivity. They have become an important molecular tool in basic research, diagnostics and therapeutics because of their specificity and sufficiency. For the first time, Kohler and Milstein produced monoclonal antibodies with the hybridoma technique in 1975. The monoclonal antibodies can be produced by fusing B lymphocytes with myeloma cell lines. The myeloma cells lack antibody production ability but are capable of continuous cell division resulting in hybridised fusion cells called a hybridoma. Hybridomas inherit immortality from myeloma cells and the ability to produce antibodies from plasma cells. A population of B lymphocytes derived from a single ancestral B cell is cultured, allowing the harvest of a single kind of antibody, which is referred to as monoclonal antibody. For monoclonal antibody production, the first step involves the isolation of a B lymphocyte producing a certain antibody, which is attained by inducing the production of such B cell in an organism (e.g. mouse immunised with priming and booster dose for avian SERCA2 protein). Following the production of antibodies, the B cells are extracted from the spleen of the mouse and added to a culture of myeloma cells (cancer cells). The fusion of a B cell and a myeloma cell is performed by using polyethylene glycol, a virus or by electroporation to obtain the hybridoma. The hybridomas obtained are selected using HAT (hypoxanthine-aminopterin-thymine) medium and finally screening is performed. The screening helps in the identification and isolation of hybridoma cells producing antibodies specific to the antigen; this is achieved with the help of SDS-PAGE (sodium dodecyl sulphate - polyacrylamide gel electrophoresis) and western blots. Once desired hybridoma clone is obtained, it is multiplied either in vitro or in vivo to obtain antibodies. These monoclonal antibodies are used as antiserum therapy, for identifying protein structure, in the analysis of complex antigen mixture, in the production of vaccines, blood grouping, cancer therapy, etc. In addition to medical uses, these monoclonal antibodies render a variety of academic and commercial uses too.

Keywords: Monoclonal antibody, Hybridoma technology, Myeloma cells, B lymphocytes, HAT medium, B cells

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