Antibody Therapy Befitting 21st Century Medicine: Development of New Antibody Drugs and Promising Prospects

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Murine monoclonal antibodies (MAbs) have been successfully utilized in the diagnostic and research reagent markets. However, therapeutic MAbs did not have the success that was expected, because, as proteins of rodent rather than human origin, they caused troublesome side effects if injected into the human body. Recent development of recombinant DNA technology has allowed us to manipulate antibody genes. As a result, a number of strategies have been developed to overcome problems with immune rejection. One excellent method is to express recombinant fully human MAbs *in vitro* using phage display technology. Among the human recombinant MAbs is a single-chain antibody (scFv), which is a variable domain (VHVL) dimer joined by a polypeptide linker. In this minisymposium, a novel method for generating a large repertoire scFv library in a short period of time using a combination of "CDR shuffling" and "VH-VL shuffling" will be presented. Further, it will focus on the effectiveness of *in vitro* immunization to construct a human scFv library and to select scFv against antigens such as various cytokines. Other speakers will discuss PEGylation of toxin-conjugated scFv which overcomes stability and toxicity issues of the immunotoxin and glycoengineered antibody with potent ADCC-dependent tumor killing activity. Other minisymposium topics are :1) present and future applications of therapeutic antibodies; 2) what will be resulted from the comprehensive approach to generate antibodies against functionally unidentified large proteins; and 3) reviewer's view on antibody drugs.