Potelligent antibody as next generation of therapeutic antibody

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More than 20 therapeutic antibodies have been approved in US since the late 1990s, and these agents represent a major new class of drugs. However, there still remains room for improvement in the clinical effect and cost of therapeutic antibodies licensed on the market.

Antibody-dependent cellular cytotoxicity (ADCC), a lytic attack on antibody-targeted cells, is triggered upon binding of lymphocyte receptors (Fc γ Rs) to the antibody constant region. ADCC is considered to be a major therapeutic function of antibodies. ADCC requires the presence of oligosaccharides in the Fc region and is sensitive to change in the oligosaccharide structure. We have demonstrated that fucose is the most critical IgG1 oligosaccharide component, and the removal of fucose from IgG1 oligosaccharides results in a very significant enhancement of ADCC. Many therapeutic antibodies approved or clinical development are produced using CHO cells that express high level of α1,6-fucosyltransferase and consequently produce highly fucosylated antibodies. Potelligent technology allows the stable production of fucose-free antibodies by a fucosyltransferase-knockout CHO cells. Fucose-free antibodies show dramatically enhanced ADCC *in vitro* and *ex vivo*, and improved *in vivo* activity with unchanged basic properties of antibodies. We will introduce the recent study on the mechanism of enhanced ADCC of fucose-free antibodies.

Thus, the application of fucose-free antibodies is expected to be a promising approach as next-generation therapeutic antibodies with improved efficacy, even when administered at low doses in humans *in vivo*.