16. Application of endoglycosidases to glycotechnology

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Endoglycosidases which release sugar chains from various glycoconjugates are becoming indispensable tools for elucidating the functions and structures of sugar chains in glycoconjugates. Endo-β-*N*-acetylglucosaminidase (Endo-β-GlcNAc-ase) is a unique endoglycosidase that hydrolyzes *N*, *N*'-diacetylchitobiosyl linkages in oligosaccharides bound to asparaginyl residues of various glycoproteins, and leaves one *N*-acetylglucosamine (GlcNAc) residue on the protein. A novel Endo-β-GlcNAc-ase of *Mucor hiemalis* , named as Endo-M, could cleave the complex type of oligosaccharide, unlike other microbial Endo-β-GlcNAc-ases. This enzyme showed transglycosylation activity and could transfer the oligosaccharides from glycoprotein to an acceptors with a GlcNAc residue. We developed a procedure for the synthesis of glycopeptides combining chemical and enzymatic methods using transglycosylation activity of Endo-M and chemo-enzymatically synthesized various bioactive glycopeptides such as glycosylated Peptide T and calcitonin. We could also add sialooligosaccharide to the glutamine residues of Substance P neuropeptide and yeast α-mating factor using the transglycosylation activity of Endo-M. The conversion of high-mannose type of oligosaccharide in bovine RNase B to complex type of oligosaccharide was successfully completed and sialoglycopolymer with a chitosan backbone as a potent inhibitor of human influenza virus hemagglutination was also prepared by use of Endo-M. Other endoglycosidases from various sources will be discussed.