Sialylation Engineering for Human Pharmaceutical Protein in Mammalian Cell System

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Glycosylation of glycoprotein can affect critical properties such as protein solubility, structural stability, biological activity, immunogenicity, and so on. Especially, terminal sialylation of *N*-glycans can provide longer circulatory half-life in the blood circulation by preventing recognition of *N*-terminal galactose by asialoglycoprotein receptor. Therefore, enhancement of sialylation contents on recombinant glycoprotein is a very important research subject in Chinese Hamster Ovary (CHO) cell system.In the present work, we attempted to employ co-expression strategy of CMP-sialic acid transporter (CMP-SAT) that is antiporter and transports cytosolic CMP-sialic acid into the Golgi lumen. Therefore, co-expression of CMP-SAT increases intra-lumenal CMP-sialic acid amounts and subsequently, could lead to utilize more CMP-sialic acids in the cells. As a model human glycoprotein, we employed human erythropoietin (hEPO) that has 3 *N*-glycosylation and 1 O-glycosylation. We found that co-expression of CMP-SAT improved (~27.5%)sialylation contents (actually, Neu5Ac form) of recombinant hEPO. Interestingly, this CMP-SAT co-expression also decreased (~40%) Neu5Gc contents.

References

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