NRC·CNRC

ENHANCED GLYCOSYLATION

Licensing opportunity L-12033, L-12101, L-12267

HIGHLIGHTS

Most biopharmaceuticals are produced in mammalian cells, mainly CHO but also BHK, SP2/0, NSO, and HEK293. A big challenge during biologics production is the unwanted removal of sialic acid from therapeutic glycoproteins; production typically takes 6-10 days using a fed batch process where significant cell lysis occurs at the end of the process, resulting in the release of harmful sialidases. The loss of sialylation significantly reduces the biological half-life and function of the glycoprotein product, thereby reducing the quality of the therapeutic. It also forces cell growth to be cut short, significantly reducing the quantity of the therapeutic produced per batch.

Although the 2-ene of sialic acid known as DANA is documented to protect biologic sialylation effectively during production, to date its widespread use in biologics production has been limited by its prohibitive cost of synthesis (approx. $4M to treat a 1000 L batch). To address this, the NRC has developed a simple method for preparing sialidase inhibitors, including DANA, at a very competitive cost ($20K per 1000 L batch).

TECHNOLOGY TRANSFER

- A commercial exploitation licence for the technology
- Development of this technology through a joint collaboration

MARKET APPLICATIONS

- Enhanced glycosylation for production of therapeutic proteins, which can be used to treat a wide range of diseases

HOW IT WORKS

Our chemi-enzymatic synthetic process is simple, involving a two-step preparation using just a single enzyme and one heating step, and provides an effective and affordable solution for improving sialylation during biologics production. For example, we have shown that the addition of DANA to CHO cell culture will improve secreted glycoprotein sialylation, converting non- or mono-sialylated glycoprofiles into di- and tri-sialylated profiles.

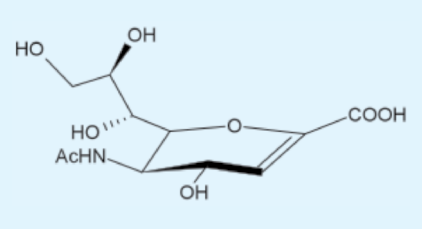

Figure 1: DANA (2-ene of sialic acid)

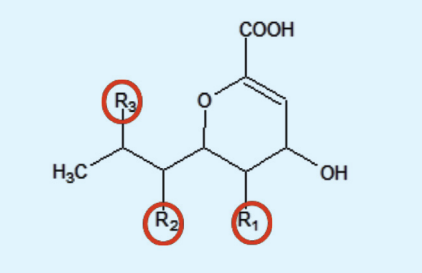

Figure 2: NRC family of inhibitors – potential for increased potency and further cost-savings

BENEFITS

- Demonstrated potency and utility for improving sialylation and obtaining consistent sialylation patterns
- Efficient and low-cost preparation of inhibitor compound
- Simplicity and flexibility of use, enhancing reliability of mammalian production systems
- Improves biological half-life and, possibly, function of product
- Does not alter the approved biopharmaceutical
- Additional family of inhibitors as a developmental platform

PATENTS

NRC file 12033 (Precursor Biosynthetic Process): Patents pending in Canada, the United States, and Europe

NRC file 12101 (Low-Cost Synthetic Process (i.e. DANA) and NRC Family of Compounds): Patents pending in Canada, the United States, Europe, and India

NRC file 12267 (Low Cost Precursor Production Method): Patents granted in the United States, pending in Canada and Europe

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