A Method For Predicting Glycosylation On Secreted Proteins

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BACKGROUND

Glycosylation is a key post-translational modification that can affect critical properties of proteins produced in biopharmaceutical manufacturing, such as stability, therapeutic efficacy, or immunogenicity. However, unlike a protein's amino acid sequence, glycosylation is hard to engineer since it does not follow any direct equivalent of a genetic code. Despite various attempts to computationally model the process of glycosylation, industrial glycoengineering is still largely carried out using costly and time-consuming trial-and-error strategies and could greatly benefit from computational models that would better meet the requirements for industrial utilization.

TECHNOLOGY DESCRIPTION

Scientists at the University of California have discovered a method that can potentially reduce the high cost of glycoengineering. They developed an algorithm to quantitatively predict glycosylation in mutant cell lines. In particular, their approach predicts how the spectrum of glycans (the glyocoprofile) on a secreted protein changes upon knock-down or overexpression of certain glycosyltransferases, thus aiding in cell line engineering. The approach describes protein glycosylation as a stochastic process (a Markov chain) as opposed to the prior art, which uses kinetic models. The method systematically derives all unknown parameters (transition probabilities) from fitting the model to a glycoprofile under standard conditions. Therefore, the user does not need to have specific kinetic and other parameters at hand (which are often hard to obtain) in order to run the model. The approach is geared to predicting glycosylation for any given application and provides precise predictions.

APPLICATIONS

Altering a host cell wherein the protein is expressed is valuable for increasing the safety, biological activity, and affordability of recombinant protein drugs and enzymes. Thus, the model has the potential to provide a fast and low-cost guidance tool to help find host conditions that can yield a desired glycoprofile, thus providing an important step towards the process of effective glycoengineering on biosimilars and novel biopharmaceuticals.

PATENT STATUS

Country	Type	Number	Dated	Case
United States Of America	Published Application	20180101643	04/12/2018	2015-266

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OTHER INFORMATION

KEYWORDS

glycosylation, protein, therapeutic, cost-effective, engineering

CATEGORIZED AS

- Biotechnology
  - Other
  - Proteomics
- Research Tools
  - Protein Synthesis

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