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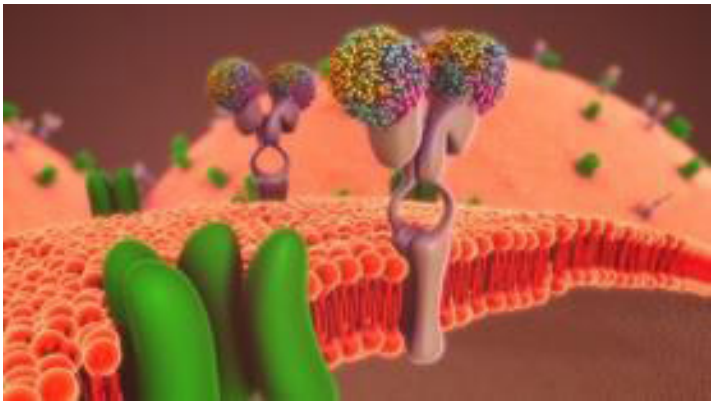
Method for Producing reduced Glycans and Glycan-arrays

TECHNOLOGY

Glycosylation is the most abundant post-translational protein modification, playing an important role in protein folding, stability and function. Current methods for glycosylation analysis do not allow for a simultaneous assessment of the protein and the glycan (sugar) portion of a glycosylated protein. This is a major drawback for the investigation of glycosylation and for engineering and quality control of therapeutic proteins.
The invention presented here provides an improved method for the preparation of multiple types of glycans and their usage for scientific and medical applications. This new method of reductive alkaline hydrolysis provides simultaneous access to reduced glycitols, glycosylamines, reducing N-glycans and reduced 1-amino-glycitols. The core-process is the reaction of the glycoprotein starting material with borohydride in the presence of a base at 50 °C or higher. By use of this process glycoproteins resp. glycopeptides can be completely deglycosylated. If used in a preparative manner, the glycans provided by the process can be used for manufacturing glycan-arrays or glycan affinity matrices for scientific or medical use.



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SCOPE OF APPLICATION

The pool of glycans accessible herewith can well be used for manufacturing glycan arrays which may then be used for scientific or medical purposes, e.g. for testing the suitability of donor and recipient for organ transplantation. They may also be used as diagnostic tools for numerous other diseases and disorders, even cancer. Glycan arrays are also a powerful tool for the high-throughput elucidation of interactions of carbohydrate structures with biological targets including antibodies, proteins, viruses and cells. This technique is especially suitable for glycomics studies, for these arrays present carbohydrate ligands in a manner that mimics interactions at cell-cell interfaces.
Glycan affinity matrices may be used for the isolation of specific carbohydrate proteins or the fractionation of cells depending on their reportoire of glycan binding surface proteins.
Besides for the production of glycan arrays, the method can also be directly used for structure determination, for it provides stable sub-structures of the protein starting material which can then easily be separated and analyzed, e.g. via HPLC, MALDI-TOF etc.

AVAILABLE FOR:

- License Agreement
- Cooperation

ADVANTAGES:

- The product ratio between unreduced sugars and reduced sugars can be easily varied by temperature and/or concentration of alkali resp. borohydride.
- Avoidance of using hydrazine or enzymes (expensive) for the isolation of glycans.

KEYWORDS:

N-glycans, reduced glycitols, glycosyl-amines, 1-amino-glycitols, glycomics

DEVELOPMENT STATUS:

Proven on laboratory scale
Next steps: Screening for further glycans and implementing on production scale

IPR:

EP-Priority application filed on Jun. 21st, 2017.

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