Claims

~~[Claim 1]~~

1. A method for producing a glycoprotein having uniform amino acid sequence, sugar chain structure, and higher order structure, comprising the following steps (a) to (c):

(a) folding a glycoprotein having uniform amino acid sequence and sugar chain to generate folded glycoproteins having plural kinds of higher order structures;

(b) fractionating the folded glycoproteins by column chromatography to obtain plural fractions containing said folded glycoproteins; and

(c) collecting a fraction having a predetermined activity from the fractions obtained by the step (b).

~~[Claim 2]~~

2. The method according to Claim 1, further comprising, after the step (c), the steps of:

(d) unfolding a glycoprotein contained in a fraction not collected in the step (c);

(e) refolding the unfolded glycoprotein;

(f) fractionating the refolded glycoprotein by column chromatography and collecting a fraction having a predetermined activity; and

(g) repeating the steps (d) to (f) as needed.

~~[Claim 3]~~

3. A method for screening for a glycoprotein having a predetermined physiological activity, comprising the following steps (i) to (iii):

(i) folding a glycoprotein having uniform amino acid sequence and sugar chain to generate folded glycoproteins having plural kinds of higher order structures;

(ii) fractionating the folded glycoproteins by column chromatography to obtain plural fractions containing said folded glycoproteins; and

(iii) measuring an activity of each of the fractions obtained by the step (ii) to determine whether or not it has a predetermined activity.

~~[Claim 4]~~

4. A method for obtaining a glycoprotein mixture having a desired physiological activity, comprising the following steps (A) to (D):

(A) folding a glycoprotein having uniform amino acid sequence and sugar chain to generate folded glycoproteins having plural kinds of higher order structures;

(B) fractionating the folded glycoproteins by column chromatography;

(C) measuring an activity of each of the fractions obtained by the step (B); and

(D) determining a mixing ratio of the fractions to obtain a desired activity and mixing the fractions according to the ratio thus obtained.

~~[Claim 5]~~

5. The method according to any one of Claims 1 to 4, wherein at least a part of the glycoprotein having uniform amino acid

sequence and sugar chain are produced by a method comprising the following steps (1) to (6):

(1) esterifying a hydroxyl group of a resin having a hydroxyl group and a carboxyl group of an amino acid having an amino group protected with a fat-soluble protecting group or a carboxyl group of a glycosylated amino acid having an amino group protected with a fat-soluble protecting group;

(2) removing the fat-soluble protecting group to generate a free amino group;

(3) amidating the free amino group and a carboxyl group of an amino acid having an amino group protected with a fat-soluble protecting group or a carboxyl group of a glycosylated amino acid having an amino group protected with a fat-soluble protecting group;

(4) after the step (3), removing the fat-soluble protecting group to generate a free amino group;

(5) repeating the steps (3) and (4) once or more; and

(6) cleaving an ester bond formed in the step (1) by an acid.

~~[Claim 6]~~

6. The method according to Claim 5, wherein a part of the glycoprotein having uniform amino acid sequence and sugar chain are produced by the steps (1) to (6), and wherein the glycoprotein is produced by a method further comprising the following step (7):

(7) linking a part of the glycoprotein obtained in the step (6) with other peptides or glycopeptides by a ligation method.