Claims

1. The use of a polymer-based hydrogel consisting of at least one water-soluble polymer in a sensor for enriching a dissolved glucose-binding protein, wherein the at least one polymer is capable of interacting with the glucose-binding protein and wherein the glucose-binding protein is present in a complex with a ligand, wherein the dissolved glucose-binding protein is present at an at least 5-fold, at least 10-fold, at least 15-fold or at least 20-fold elevated concentration compared to an aqueous solution.

2. The use as claimed in claim 1, wherein the ligand of the glucose-binding protein is an oligosaccharide, a glycosylated macromolecule or a glycosylated nanoparticle.

3. The use as claimed in claim 1 or claim 2, wherein the at least one polymer is selected from the group consisting of: alginates, sepharose, hyaluronic acid, chitosan and caragenans.

4. The use as claimed in one of claims 1 to 3, wherein the polymer-based hydrogel comprises a first hydrogel matrix made of alginate and a second hydrogel matrix which forms an interpenetrating network within the first hydrogel matrix.

5. The use as claimed in one of claims 1 to 4, wherein the glucose-binding protein is selected from the group consisting of: lectins, enzymes which bind glucose as substrate, antibodies which specifically recognize glucose, and aptamers which specifically recognize glucose.

6. The use as claimed in one of claims 1 to 5, wherein the glucose-binding protein is concanavalin A.

7. The use as claimed in claim 6, wherein the concanavalin A concentration is greater than 0.5 mg/(g polymer).

8. The use as claimed in claim 7, wherein the concanavalin A concentration lies between 2 and 60 mg/(g polymer).

9. The use as claimed in one of claims 6 to 8, wherein the concanavalin A exhibits increased water solubility compared to unmodified concanavalin A owing to chemical modification.

10. The use as claimed in claim 9, wherein the modification is selected from the group consisting of: pegylation, acetylation, succinylation and polyoxazolinylation.

11. The use as claimed in one of claims 2 to 10, wherein the glucose-binding protein is linked to an oxazine dye and the ligand of the glucose-binding protein is linked to a rhodamine dye.

12. The use as claimed in one of claims 1 to 11, wherein the sensor is used for determining the glucose content in a sample.

13. The use as claimed in one of claims 1 to 11, wherein the sensor is used for the diagnosis of impaired glucose metabolism.

14. The use as claimed in one of claims 1 to 11, wherein the sensor is used for determining the need for a therapeutic measure in a patient with impaired glucose metabolism.

Claims

1. The use of a polymer-based hydrogel in a sensor for enriching a dissolved glucose-binding protein in the polymer, wherein the polymer-based hydrogel consists of at least one water-soluble polymer which is capable of interacting with the glucose-binding protein and wherein the glucose-binding is present in a complex with a ligand, wherein the dissolved glucose-binding protein is present at an at least 5-fold, at least 10-fold, at least 15-fold or at least 20-fold elevated concentration compared to an aqueous solution.

2. The use as claimed in claim 1, wherein the ligand of the glucose-binding protein is an oligosaccharide, a glycosylated macromolecule or a glycosylated nanoparticle.

3. The use as claimed in claim 1 or claim 2, wherein the at least one polymer is selected from the group consisting of: alginates, sepharose, hyaluronic acid, chitosan and caragenans.

4. The use as claimed in one of claims 1 to 3, wherein the polymer-based hydrogel comprises a first hydrogel matrix made of alginate and a second hydrogel matrix which forms an interpenetrating network within the first hydrogel matrix.

5. The use as claimed in one of claims 1 to 4, wherein the glucose-binding protein is selected from the group consisting of: lectins, enzymes which bind glucose as substrate, antibodies which specifically recognize glucose, and aptamers which specifically recognize glucose.

6. The use as claimed in one of claims 1 to 5, wherein the glucose-binding protein is concanavalin A.

7. The use as claimed in claim 6, wherein the concanavalin A concentration is greater than 0.5 mg/(g polymer).

8. The use as claimed in claim 7, wherein the concanavalin A concentration lies between 2 and 60 mg/(g polymer).

9. The use as claimed in one of claims 6 to 8, wherein the concanavalin A exhibits increased water solubility compared to unmodified concanavalin A owing to chemical modification.

10. The use as claimed in claim 9, wherein the modification is selected from the group consisting of: pegylation, acetylation, succinylation and polyoxazolinylation.

11. The use as claimed in one of claims 2 to 10, wherein the glucose-binding protein is linked to an oxazine dye and the ligand of the glucose-binding protein is linked to a rhodamine dye.

12. The use as claimed in one of claims 1 to 11, wherein the sensor is used for determining the glucose content in a sample.

13. The use as claimed in one of claims 1 to 11, wherein the sensor is used for the diagnosis of impaired glucose metabolism.

14. The use as claimed in one of claims 1 to 11, wherein the sensor is used for determining the need for a therapeutic measure in a patient with impaired glucose metabolism.