

Claims

1. A method for obtaining soluble calprotectin, the method comprising expressing calprotectin from a vector comprising a first chain comprising a nucleotide sequence having at least 80% sequence homology to SEQ ID NO: 11, a second chain
5 comprising a nucleotide sequence having at least 80% sequence homology to SEQ ID NO: 12 and a linker linking the first and second chain.
2. The method according to claim 1, wherein the soluble calprotectin is capable of binding monoclonal antibody mAb27E10.
3. The method according to claim 1 or 2, wherein the method does not comprise a step
10 of extracellular refolding of the calprotectin.
4. The method according to any of claims 1 to 3, wherein the linker has a length between 18 and 180 nucleotides, preferably between 21 and 30 nucleotides.
5. The method according to any of claims 1 to 4, wherein the linker comprises a nucleotide sequence encoding a protease recognition sequence, in particular a
15 Rhinovirus 3C Protease recognition sequence, a TEV protease recognition sequence, a thrombin recognition sequence, a factor Xa recognition sequence or an enteropeptidase recognition sequence.
6. A polypeptide comprising
 - a) a first chain comprising an amino acid sequence having at least 80% sequence
20 identity to SEQ ID NO:1;
 - b) a second chain comprising an amino acid sequence having at least 80% sequence identity to SEQ ID NO:2 ; and
 - c) a linker linking the first and second chain,wherein the linker is a peptide linker comprising a protease recognition sequence.
- 25 7. The polypeptide according to claim 4, wherein the protease recognition sequence is a Rhinovirus 3C Protease recognition sequence, a TEV protease recognition

sequence, a thrombin recognition sequence, a factor Xa recognition sequence or an enteropeptidase recognition sequence.

8. The polypeptide according to claim 4 or 5, wherein the polypeptide is capable of oligomerizing in the presence of metal ions.
- 5 9. The polypeptide according to claim 6, wherein the polypeptide is capable of forming a dimer in the presence of divalent metal ions, preferably Ca^{2+} ions.
10. The polypeptide according to any of claims 4 to 7, wherein the polypeptide is capable of forming a structure that is recognized by a binding reagent recognizing the S100A8 monomer, S100A9 monomer, S100A8/S100A9 dimer and/or oligomers thereof.
- 10 11. The polypeptide according to claim 4 comprising an amino acid sequence having at least 80% sequence identity to the polypeptide of SEQ ID NO:3.
12. The polypeptide according to claim 4 comprising an amino acid sequence having at least 80% sequence identity to the polypeptide of SEQ ID NO:4, 7 to 10, 18 or 19.
- 15 13. A polypeptide oligomer comprising two or more polypeptides according to any of claims 6 to 12.
14. Use of a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 for the immunization of an animal.
- 20 15. Use of a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 as an epitope for the *in vitro* selection of a binding reagent recognizing the S100A8 monomer, S100A9 monomer, S100A8/S100A9 dimer and/or oligomers thereof.
- 25 16. Use of a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 for the affinity purification of a binding reagent recognizing the S100A8 monomer, S100A9 monomer, S100A8/S100A9 dimer and/or oligomers thereof.

17. A polypeptide according to claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 for use as a medicament.
18. Use of a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 as a calibration reference substance.
19. Method for measuring S100A8, S100A9, S100A8/A9 dimers or oligomers thereof in a sample using a polypeptide according to any of the preceding claims in an analytical assay, comprising the steps of:
- a) measuring different amounts of said polypeptide using the analytical assay;
- b) establishing a calibration curve using the analytical results obtained in step a);
- c) measuring a sample using the analytical assay;
- d) comparing the analytical result of the sample with the calibration curve of step b); and
- e) quantifying the concentration of S100A8, S100A9, S100A8/A9 dimers or oligomers thereof in the sample.
20. Method according to claim 19, wherein the sample is blood, serum, plasma, synovial fluid, saliva, urine, tears, sweat, gingival crevicular fluid, feces, gastrointestinal lavage, bronchial lavage, cell culture supernatant or tissue extract.
21. Method according to claims 19 or 20, wherein the analytical assay is an immunoassay, a biochemical assay, a biophysical assay or a physical assay.
22. Method according to any of claims 19 to 21, wherein the analytical result of the sample is based on an optical readout, absorption, UV/VIS spectroscopy, turbidimetry, nephelometry, light scattering, reflectometry, fluorescence, luminescence, chemiluminescence, surface plasmon resonance, amperometry, magnetometry, voltammetry, potentiometry, conductometry, coulometry, polarography, gravimetry or cantilevers.

23. A polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 for use in a method of diagnosing an acute or chronic inflammatory disease in a subject, comprising
- 5 a) providing a biological sample from the subject;
- b) quantifying the amount of S100A8, S100A9, S100A8/A9 dimers or oligomers thereof in the biological sample of step a) by using a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13 as calibration reference substance; and
- 10 c) comparing the amount of S100A8, S100A9, S100A8/A9 dimers or oligomers thereof as determined in step b) to reference data from subjects known to suffer from an acute or chronic inflammatory disease.
24. Kit comprising
- 15 a) a polypeptide according to any of claims 6 to 12 or obtained by the method according to any of claims 1 to 5 or a polypeptide oligomer according to claim 13
- b) a test containment;
- 20 c) a buffer solution; and
- d) a first binding reagent, specific for S100A8, S100A9, S100A8/A9 dimers or oligomers thereof.
- 25 25. Kit according to claim 24, wherein the first binding reagent is labeled with a substance or bound to a material allowing a quantitative determination of said polypeptides and S100A8, S100A9, S100A8/A9 dimers or oligomers thereof.
26. Kit according to claim 25, additionally comprising a second binding reagent specific for S100A8, S100A9, S100A8/A9 dimers or oligomers thereof, wherein the first
- 30 binding reagent is immobilized on a solid support and the second binding reagent is

labeled with a substance or bound to a material allowing a quantitative determination of said polypeptides and S100A8, S100A9, S100A8/A9 dimers or oligomers thereof.