WHAT IS CLAIMED IS:

1. A method of protecting a human subject from a pathological condition characterized by the release of a protease, wherein the method comprises administering a peptide immunogen, wherein the peptide is capable of generating antibodies reactive with a proteolytic cleavage site on IgG.
2. The method of claim 1, wherein the pathological condition is a disease selected from an arthritic disease, a malignant disease, the presence of an infectious agent or a parasite, and a vascular disease.
3. The method of claim 2, wherein the disease is rheumatoid arthritis.
4. The method of claim 2, wherein the disease is a Stapholycoccus spp. Infection.
5. The method of claim 2, wherein the disease is breast cancer.
6. The method of claim 2, wherein the subject has been diagnosed or suspected of having had a myocardial infarction or is suffering from congestive heart failure.
7. The method of claim 1, wherein the peptide represents a protease specific cleavage site in human IgG produced by a protease selected from the group consisting of a MMP-3, MMP-7, MMP-12, HNE, plasmin, cathepsin G, pepsin, IdeS, or glutamyl endopeptidase I from *Staph. aureus*.
8. The method of claim 7, wherein the protease specific cleavage site in a human IgG has been detected in a sample from the patient using an antibody having specificity for the protease specific cleavage site.
9. A method of treating a patient, wherein the patient is being treated with a specific antibody-containing composition, wherein antibody is susceptible to cleavage by one or more proteases associated with the specific disease being treated, the method including the step of administering to the patient a peptide immunogen wherein the peptide is a peptide fragment or analogue representative of a proteolytic cleavage site on IgG produced by the one or more proteases

associated with the specific disease being treated by antibody therapy.

10. The method of claim 9, wherein the pathological condition is a disease selected from an arthritic disease, a malignant disease, the presence of an infectious agent or a parasite, and a vascular disease.

11. The method of claim 10, wherein the disease is rheumatoid arthritis.

12. The method of claim 10, wherein the disease is a Stapholycoccus spp. Infection.

13. The method of claim 10, wherein the disease is breast cancer.

14. The method of claim 10, wherein the subject has been diagnosed or suspected of having had a myocardial infarction or is suffering from congestive heart failure.

15. The method of claim 9, wherein the peptide represents a protease specific cleavage site in human IgG1 produced by a protease selected from the group consisting of a MMP-3, MMP-7, MMP-12, HNE, plasmin, cathepsin G, pepsin, IdeS, or glutamyl endopeptidase I from *Staph. aureus*.

16. The method of claim 9, wherein the protease specific cleavage site in a human IgG has been detected in a sample from the patient using an antibody having specificity for the protease specific cleavage site.

17. The method of claim 9, wherein the administration of the peptide immunogen is capable of restoring, enhancing or maintaining effector function of the antibody containing composition.

18. The method of claim 1 or 9, wherein the cleavage product analogue peptide immunogen is prepared by:

    a. identifying the residue of a pair of residues of a heavy chain of an antibody cleaved by a protease most proximal to the N-terminus of the heavy chain;

    b. identifying a peptide sequence comprising at least 5 contiguous amino acid residues which are upstream from the protease cleavage

site where the residue of the protease cleavage site that is most proximal to the N-terminus of the polypeptide will become the C-terminus of the defined sequence; and

c. creating a solution of the peptide or peptide homolog or chemical homolog in sufficient amounts for the immunization.

19. The method of claim 1 or 9, wherein the peptide immunogen comprises at least 5 contiguous amino acids selected from the human IgG hinge region sequences of SEQ ID NO: 1, 2, 3, or 4 that are upstream from the amino terminal side of a protease cleavage site or a species homolog or chemical analogue.

20. The method of claim 1 or 9, wherein the peptide immunogen comprises at least the hinge core of IgG1, defined as the residues –T-C-P-P-C- (residues 7-11 of SEQ ID NO: 1) or a species homolog or chemical analogue.

21. The method of claim 1 or 9, wherein the peptide immunogen comprises a 12-mer peptide analogue of the human IgG1 lower hinge and adjoining CH2 domain having the sequence TCPPCPAPELLG (residues 7–18 of SEQ ID NO: 1).

22. The method of claim 1 or 9, wherein the peptide immunogen comprises a peptide having an amino acid sequence selected from SEQ ID NO: 5-11 and N-terminal truncations thereof, comprising at least 5 amino acids and containing amino acid sequences that are upstream of the N-terminal side of an IgG protease cleavage site.

23. The method of claim 1 or 9, wherein the peptide immunogen comprises an amino acid sequence selected from (a) the sequence of amino acids on the amino terminal side of an IgG1 MMP-3 cleavage site (TCPPCPAP, residues 7-14 of SEQ ID NO: 1), (b) the glutamyl endopeptidase IgG1 cleavage site (TCPPCPAPE, residues 7-15 of SEQ ID NO: 1); and (c) a peptide comprising the IdeS IgG1 cleavage site (TCPPCPAPELLG, residues 7-18 of SEQ ID NO: 1).

24. The method of claim 19, wherein the peptide is a chemical homolog, wherein the cysteine residues are replaced with serine residues.

25. The method of claim 19 wherein the peptide is conjugated to a carrier protein in a manner such that the C-terminus of the peptide is chemically bound to another moiety.

26. The method of claim 25, wherein the carrier protein is selected from the group consisting of keyhole limpet hemocyanin (KLH) or serum albumin.

27. The method of claim 19, wherein the peptide is selected from those of SEQ ID NOS 5-16.

28. A vaccine composition comprising a peptide comprising at least 5 contiguous amino acids selected from the human IgG hinge region sequences of SEQ ID NO: 1, 2, 3, or 4 that are upstream from the amino terminal side of a protease cleavage site or a species homolog or chemical analogue thereof in a pharmaceutically acceptable carrier compatible with administration to a patient by a specified route of administration.

29. A vaccine preparation of claim 28, wherein the peptide is administered in conjunction with an adjuvant for the purpose of enhancing the humoral response to the peptide.

30. The vaccine preparation of claim 29, wherein the adjuvant is selected from the group consisting of CD40 agonists, alum, polymeric microparticles, an oil-in-water emulsion, MF59, CpG, GM-CSF, IL-12 and IL-2.

31. The vaccine composition of claims 28, 29 or 30 wherein the peptide is selected from those of SEQ ID NOS. 5-16.

32. A method for enhancing or maintaining effector function of an antibody administered to a patient for the treatment of a pathological condition, wherein the antibody is subject to cleavage by one or more proteases in the patient, which method comprises vaccinating the patient before, after or concurrently with the

antibody treatment, with a human IgG protease cleavage site peptide capable of generating antibodies that bind to the treatment antibody and can restore effector function thereto.

33. The method of claim 32 wherein the human IgG protease cleavage site peptide used for vaccinating the patient is a peptide selected from those of SEQ ID. NOS: 5-16.

WHAT IS CLAIMED IS:

1. A peptide immunogen for use in a method of protecting a human subject from a pathological condition characterized by the release of a protease, wherein the peptide is capable of generating antibodies reactive with a proteolytic cleavage site on IgG.

2. The method ofclaim 1, wherein the pathological condition is a disease selected from an arthritic disease, a malignant disease, the presence of an infectious agent or a parasite, and a vascular disease.

3. The method ofclaim 2, wherein the disease is rheumatoid arthritis.

4. The method of claim 2, wherein the disease is Stapholycoccus spp. Infection.

5. The method ofclaim 2, wherein the disease is breast cancer.

6. The method ofclaim 2, wherein the subject has been diagnosed or suspected of having had a myocardial infarction or is suffering from a congestive heart failure.

7. The method ofclaim 1, wherein the peptide represents a protease specific cleavage site in human IgG produced by a protease selected from the group consisting of a MMP-3, MMP-7, MMp-12, HNE, plasmin, cathepsin G, pepsin, IdeS, or glutamylendopeptidase I from *Staph. Aureus*.

8. The method ofclaim 7, wherein the protease specific cleavage site in a human IgG has been detected in a sample from the patient using an antibody having specificity for the protease specific cleavage site.

9. A peptide immunogen for use in a method of treating a patient, wherein the patient is being treated with a specific antibody-containing composition, wherein antibody is susceptible to cleavage by one or more proteases associated with the specific diseases being treated, wherein the peptide is a peptide fragment or analogue representative of a proteolytic cleavage site on IgG produced by the one or more proteases associated with the specific disease being treated by antibody therapy.

10. The method of claim 9, wherein thepathological condition is a disease selected from an arthritic disease, a malignant disease, the presence of an infectious agent or a parasite, and a vascular disease.

11. The method ofclaim 10, wherein the disease is rheumatoid arthritis.

12. The method ofclaim 10, wherein the disease is a Stapholycoccus spp. Infection.

13. The method ofclaim 10, wherein the disease is breast cancer.

14. The method ofclaim 10, wherein the subject has been diagnosed or suspected of having had a myocardial infarction or is suffering from congestive heart failure.

15. The method ofclaim 9, wherein the peptide represents a protease specific cleavage site in human IgG1 produced by a protease selected from the group consisting of a MMp-3, MMP-7, MMP-12, HNE, plasmin, cathepsin G, pepsin, IdeS, or glutamylendopeptidase I from *Staph. Aureus*.

16. The method ofclaim 9, wherein the protease specific cleavage site in a human IgG has been detected in a sample from the patient using an antibody having specificity for the protease specific cleavage site.

17. The method ofclaim 9, wherein the peptide immunogen is capable of restoring, enhancing or maintaining effector function of the antibody containing composition.

18. The method of claim 1 or 9, wherein the cleavage product analogue peptide immunogen is prepared by:

    a. Identifying the residue of a pair of residues of a heavy chain of an antibody cleaved by a protease most proximal to the N-terminus of the heavy chain;

    b. Identifying a peptide sequence comprising at least 5 contiguous amino acid residues which are upstream from the protease cleavage site where the residue of the protease cleavage site that is most proximal to the N-terminus of the polypeptide will become the C-terminus of the defined sequence; and

    c. Creating a solution of the peptide or peptide homolog or chemical homolog in sufficient amounts for the immunization.

19. The method ofclaim 1 or 9, wherein the peptide immunogen comprises at least 5 contiguous amino acids selected from the human IgG hinge region sequences of SEQ ID NO: 1, 2, 3, or 4 that are upstream from the amino terminal side of a protease cleavage site or a species homolog or chemical analogue.

20. The method ofclaim 1 or 9, wherein the peptide immunogen comprises at least the hinge core of IgG1, defined as the residues –T-C-P-P-C- (residues 7-11 of SEQ ID NO: 1) or a species homolog or chemical analogue.

21. The method ofclaim 1 or 9, wherein the peptide immunogen comprises a 12-mer peptide analogue of the human IgG1 lower hinge and adjoining CH2 domain having the sequence TCPPCPAPELLG (residues 7–18 of SEQ ID NO: 1).

22. The method ofclaim 1 or 9, wherein the peptide immunogen comprises a peptide having an amino acid sequence selected from SEQ ID NO: 5-11 and N-terminal truncations thereof, comprising at least 5 amino acids and containing amino acid sequences that are upstream of the N-terminal side of an IgG protease cleavage site.

23. The method ofclaim 1 or 9, wherein the peptide immunogen comprises an amino acid sequence selected from (a) the sequence of amino acids on the amino terminal side of an IgG1 MMP-3 cleavage site (TCPPCPAP, residues 7-14 of SEQ ID NO: 1), (b) the glutamylendopeptidase IgG1 cleavage site (TCPPCPAPE, residues 7-15 of SEQ ID NO: 1); and (c) a peptide comprising the IdeS IgG1 cleavage site (TCPPCPAPELLG, residues 7-18 of SEQ ID NO: 1).

24. The method ofclaim 19, wherein the peptide is a chemical homolog, wherein the cysteine residues are replaced with serine residues.

25. The method ofclaim 19 wherein the peptide is conjugated to a carrier protein in a manner such that the C-terminus of the peptide is chemically bound to another moiety.

26. The method ofclaim 25, wherein the carrier protein is selected from the group consisting of keyhole limpet hemocyanin (KLH) or serum albumin.

27. The method ofclaim 19, wherein the peptide is selected from those of SEQ ID NOS 5-16.

28. A vaccine composition comprising a peptide comprising at least 5 contiguous amino acids selected from the human IgG hinge region sequences of SEQ ID NO: 1, 2, 3, or 4 that are upstream from the amino terminal side of a protease cleavage site or a species homolog or chemical analogue thereof in a pharmaceutically acceptable carrier compatible with administration to a patient by a specified route of

administration.

29. A vaccine preparation of claim 28, wherein the peptide is administered in conjunction with an adjuvant for the purpose of enhancing the humoral response to the peptide.

30. The vaccine preparation of claim 29, wherein the adjuvant is selected from the group consisting of CD40 agonists, alum, polymeric microparticles, an oil-in-water emulsion, MF59, CpG, GM-CSF, IL-12 and IL-2.

31. The vaccine composition of claims 28, 29 or 30 wherein the peptide is selected from those of SEQ ID NOS. 5-16.