

CLAIMS

1. A composition comprising an anti-IL-5 antibody, wherein the composition comprises:
 - a) an anti-IL-5 antibody comprising a heavy chain sequence as shown in SEQ ID NO: 1 and a light chain sequence as shown in SEQ ID NO: 2; and
 - b) 3.3% to 25% deamidated anti-IL-5 antibody variants at residue 31 of SEQ ID NO: 2, wherein the deamidated variant is aspartic acid or iso-aspartic acid; and
 - c) $\leq 55\%$ oxidised antibody variant at M64 of SEQ ID NO: 1; and $\leq 3\%$ oxidised antibody variant at W52 of SEQ ID NO: 1.
2. The composition according to claim 1, wherein the composition comprises $\leq 35\%$ deamidated anti-IL-5 antibody variants at residue 386 of SEQ ID NO: 1, wherein the deamidated variant is aspartic acid or iso-aspartic acid.
3. The composition according to claim 1, wherein the composition comprises oxidized anti-IL-5 antibody variants comprising 55% or less of SEQ ID NO: 1 oxidized at methionine 254, 55% or less of SEQ ID NO: 1 oxidized at methionine 360, and 55% or less of SEQ ID NO: 1 oxidized at methionine 430.
4. The composition according to claim 1, wherein the composition comprises
 - d) 35% or less deamidated anti-IL-5 antibody variants at residue 386 of SEQ ID NO: 1, wherein the deamidated variant is aspartic acid or iso-aspartic acid; and
 - e) oxidized anti-IL-5 antibody variants comprising 55% or less of SEQ ID NO: 1 oxidized at methionine 254, 55% or less of SEQ ID NO: 1 oxidized at methionine 360, and 55% or less of SEQ ID NO: 1 oxidized at methionine 430.
5. The composition according to any one of the preceding claims, wherein the composition comprises $\geq 50\%$ SEQ ID NO: 1 C-terminal lysine K449 deleted anti-IL-5 antibody variant.
6. The composition according to any one of the preceding claims, wherein the composition comprises $\geq 50\%$ SEQ ID NO: 1 pyro-glutamate N-terminal anti-IL-5 antibody variant.
7. The composition according to any one of the preceding claims, wherein the composition comprises $\leq 80\%$ acidic anti-IL-5 antibody variants.
8. The composition according to any one of the preceding claims, wherein the composition comprises $\leq 20\%$ aggregated anti-IL-5 antibody variants.
9. A composition comprising an anti-IL-5 antibody, wherein the composition comprises:
 - a) an anti-IL-5 antibody comprising a heavy chain variable region having the CDRH1 amino acid sequence shown in SEQ ID NO: 5, the CDRH2 amino acid sequence shown in SEQ ID NO: 6, and the CDRH3 amino acid sequence shown in SEQ ID NO: 7; and a light chain variable region having the CDRL1 amino acid sequence shown in SEQ ID NO: 8, the CDRL2 amino acid sequence shown in SEQ ID NO: 9, and the CDRL3 amino acid sequence shown in SEQ ID NO: 10; and

b) 3.3% to 25% deamidated anti-IL-5 antibody variants comprising the light chain CDRL1 amino acid residue deamidated at asparagine 31, wherein the deamidated variant is aspartic acid or iso-aspartic acid; and

c) oxidized anti-IL-5 antibody variants comprising 3% or less of the heavy chain CDRH2 amino acid residue oxidized at tryptophan 52 and 55% or less of the heavy chain CDRH2 amino acid residue oxidized at methionine 64.

10. A composition comprising an anti-IL-5 antibody, wherein the composition comprises:

a) an anti-IL-5 antibody comprising a heavy chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 3 and a light chain variable region sequence having the amino acid sequence shown in SEQ ID NO: 4; and

b) 3.3% to 25% of deamidated anti-IL-5 antibody variants comprising the light chain amino acid residue deamidated at asparagine 31, wherein the deamidated variant is aspartic acid or iso-aspartic acid; and

c) oxidized anti-IL-5 antibody variants comprising 3% or less of the heavy chain amino acid residue oxidized at tryptophan 52, and 55% or less of the heavy chain amino acid residue oxidized at methionine 64.

11. A composition comprising a population of anti-IL-5 antibodies comprising

a) an anti-IL-5 antibody comprising a heavy chain sequence having the amino acid sequence shown in SEQ ID NO: 1 and a light chain sequence having the amino acid sequence shown in SEQ ID NO: 2;

b) 35% or less of deamidated asparagine residue at position 386 of SEQ ID NO: 1; and

c) 3.3% to 25% of deamidated asparagine residue at amino acid residue 31 of SEQ ID NO: 2, wherein the deamidated asparagine residue of (b) and (c) is aspartic acid or iso-aspartic acid; and

d) 55% or less oxidized methionine at position 254, 55% or less oxidized methionine at position 360 and 55% or less oxidized methionine residue at position 430 of SEQ ID NO: 1.

12. The composition according to claim 11, wherein the composition comprises 3.3% to 6.6% deamidated asparagine at residue 31 of SEQ ID NO: 2, wherein the deamidated asparagine residue is aspartic acid or iso-aspartic acid.

13. The composition according to claim 11, wherein the composition comprises: $\geq 92\%$ amino terminal pyroglutamate at residue 1, $\geq 90\%$ carboxy terminal glycine at residue 448, $\leq 6\%$ deamidated asparagine at residue 386, $\leq 1\%$ oxidized tryptophan at residue 52, $\leq 1.5\%$ oxidized methionine at residue 64, $\leq 4.5\%$ oxidized methionine at residue 254, $\leq 0.8\%$ oxidized methionine at residue 430 of SEQ ID NO: 1, and 3.3% to 6.6% deamidated asparagine at residue 31 of SEQ ID NO: 2,

wherein the deamidated asparagine is aspartic acid or iso-aspartic acid.

14. A composition according to any one of the preceding Claims wherein the total amount of anti-IL-5 antibody is at a concentration of between 75 mg/ml to 100 mg/ml.

15. A composition according to any one of the preceding Claims wherein the composition further comprises one or a combination of:

(a) a buffering agent selected from the group consisting of sodium phosphate dibasic heptahydrate, phosphate, citrate, sodium phosphate, potassium phosphate, sodium citrate, and histidine, providing a pH of between 6.8 and 7.2; and/or

(b) a sugar; and/or

(c) polysorbate 80; and/or

(d) EDTA.

16. The composition according to any one of the preceding claims, wherein the composition comprises an aqueous liquid formulation comprising 100mg/ml anti-IL-5 antibody and:

(a) 15.5 mM sodium phosphate dibasic heptahydrate and 4.5 mM citric acid monohydrate at pH 6.3,

(b) 12% weight of sucrose to volume,

(c) 0.02% weight of polysorbate 80 to volume, and

(d) 0.05 mM EDTA.

17. The composition according to any one of claims 1 to 15, wherein the composition comprises a lyophilizate which may be reconstituted by the addition of water to produce a formulation comprising: 75 mg/mL anti-IL-5 antibody and:

(a) 20 mM sodium phosphate dibasic heptahydrate at pH 6.8 to 7.2,

(b) 12% weight of sucrose to volume, and

(c) 0.05% weight of polysorbate 80 to volume.

18. The composition according to any one of the preceding Claims wherein the composition has at least 0.70 IL-5 specific antigen binding activity; and/or at least 70% FcRn binding activity, compared with a reference standard composition comprising SEQ ID NO: 1 and SEQ ID NO:2.

19. A method of treating a disease in a subject comprising the steps of

a) identifying a subject with a disease selected from the group consisting of asthma, severe eosinophilic asthma, severe asthma, uncontrolled eosinophilic asthma, eosinophilic asthma, sub-eosinophilic asthma, chronic obstructive pulmonary disease, eosinophilic granulomatosis with polyangiitis, hypereosinophilic syndrome, nasal polyposis, bullous pemphigoid and eosinophilic esophagitis; and

b) administering a therapeutically effective amount of the composition according to any of the preceding Claims to the subject;

whereby the disease in the subject is treated.

20. The method of Claim 19 wherein the composition is administered at a dose of 100 mg once every 4 weeks.

21. The method of Claim 19 wherein the composition is administered at a dose of 300 mg once every 4 weeks.

22. A composition according to any of Claims 1- 18 for use in therapy

23. A pharmaceutical composition comprising a composition according to any of Claims 1-18 and a pharmaceutically acceptable carrier.

24. A composition according to any of Claims 1-18 for use in treating asthma, severe eosinophilic asthma, severe asthma, uncontrolled eosinophilic asthma, eosinophilic asthma, sub-eosinophilic asthma, chronic obstructive pulmonary disease, eosinophilic granulomatosis with polyangiitis, hypereosinophilic syndrome, nasal polyposis, bullous pemphigoid and eosinophilic esophagitis.