from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment, is indicative of the efficacy of, or in combination with one or more additional biomarkers of efficacy is indicative of the efficacy of, the antagonist for treatment of the gastrointestinal disorder in the patient, and wherein the biomarker is ~~integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or~~ the number of alphaE-positive cells in intestinal crypt epithelium.

[0018] Disclosed are methods of determining or monitoring the efficacy or of aiding in determining or monitoring the efficacy of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in a patient. In certain embodiments, the methods comprise comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a

embodiments, the gene expression level of the integrin receptor ligand, MadCAM-1, is measured. In some embodiments, the level of the integrin receptor ligand, E-Cadherin, is measured. In some embodiments, the level of gene expression of one or more lymphocyte genes selected from CD19, CD8, and CD3epsilon is measured. In some embodiments, the level of gene expression of one or more cytokines selected from IL-1β, IL-6, IL-12-p40, IL-17A, IL-17-F, IL-23A, IFNγ and TNFα is measured. In certain embodiments, the level of gene expression is measured in colonic biopsy tissue. In certain embodiments, the level of gene expression is measured by qPCR. In certain embodiments, the change in the biomarker is an increase or a decrease. In certain embodiments, the biomarker is measured within 100 days after receiving a first dose of the antagonist. In certain embodiments, the biomarker is measured at day 43 and at day 71 after receiving a first dose of the antagonist or the biomarker is measured at week 6 and at week 10 after receiving a first dose of the antagonist. In one embodiment, the gastrointestinal inflammatory disorder is an inflammatory bowel disease. Exemplary inflammatory bowel diseases include ulcerative colitis and Crohn's disease. In certain embodiments, the patient is human.

[0018a] In another aspect, there is provided a method of determining or monitoring the responsiveness of, or of aiding in determining or monitoring the responsiveness of, a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to the amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment is indicative of the responsiveness of, or in combination with one or more additional biomarkers of responsiveness is indicative of the responsiveness of, the patient to treatment with the antagonist, and wherein the biomarker is ~~integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or~~ the number of alphaE-positive cells in intestinal crypt epithelium.

[0019] Disclosed are methods of determining or monitoring the responsiveness or of aiding in determining or monitoring the responsiveness of a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist. In certain embodiments, the methods comprise comparing the amount of a

disease. Exemplary inflammatory bowel diseases include ulcerative colitis and Crohn's disease. In certain embodiments, the patient is human.

[0019a] In another aspect, there is provided method of determining or monitoring the efficacy of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in an antagonist-treated patient in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the efficacy of the antagonist for treatment of the gastrointestinal disorder in the antagonist-treated patient, and wherein the biomarker is ~~integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or~~ the number of alphaE-positive cells in intestinal crypt epithelium.

[0020] Disclosed are methods of determining or monitoring the efficacy of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in an antagonist-treated patient in a placebo-controlled clinical trial. In certain embodiments, the methods comprise comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, where a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the efficacy of the antagonist for treatment of the gastrointestinal disorder in the antagonist-treated patient, and where the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes. In certain embodiments, the biomarker is selected from gene expression levels of one or more integrin receptor ligands, gene expression levels of one or more lymphocyte genes, gene expression levels of one or more cytokines, and the number of alphaE-positive cells in intestinal crypt epithelium. In certain embodiments, the integrin beta7 subunit-containing receptor is $\alpha E\beta 7$ receptor or $\alpha 4\beta 7$ receptor. In one embodiment, the integrin beta7 subunit-containing receptor occupancy on colonic lymphocytes is determined by measuring integrin beta7 subunit-containing receptor occupancy on peripheral blood lymphocytes, where the integrin beta7 subunit-containing

genes selected from CD19, CD8, and CD3epsilon is measured. In some embodiments, the level of gene expression of one or more cytokines selected from IL-1β, IL-6, IL-12-p40, IL-17A, IL-17-F, IL-23A, IFNγ and TNFα is measured. In certain embodiments, the level of gene expression is measured in colonic biopsy tissue. In certain embodiments, the level of gene expression is measured by qPCR. In certain embodiments, the change in the biomarker is an increase or a decrease. In certain embodiments, the biomarker is measured within 100 days after receiving a first dose of the antagonist. In certain embodiments, the biomarker is measured at day 43 and at day 71 after receiving a first dose of the antagonist or the biomarker is measured at week 6 and at week 10 after receiving a first dose of the antagonist. In certain embodiments, combinations of the above biomarkers are assessed. In certain embodiments, the methods further comprise assessing one or more clinical biomarkers of efficacy selected from clinical remission at week 6, clinical remission at week 10, clinical response at week 6, clinical response at week 10, endoscopy score and rectal bleeding score of 0 at week 6, endoscopy and rectal bleeding score of 0 at week 10, and time to flare of UC after achieving response or remission. In one embodiment, the gastrointestinal inflammatory disorder is an inflammatory bowel disease. Exemplary inflammatory bowel diseases include ulcerative colitis and Crohn's disease. In certain embodiments, the patient is human.

[0020a] In another aspect, there is provided a method of determining or monitoring the responsiveness of a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, wherein the patient is in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the responsiveness of the patient to treatment with the antagonist, and wherein the biomarker is ~~integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or~~ the number of alphaE-positive cells in intestinal crypt epithelium.

[0021] Disclosed are methods of determining or monitoring the responsiveness of a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, where the patient is in a placebo-controlled clinical trial

WHAT IS CLAIMED IS

1. A method of determining the dosing regimen of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in a patient, the method comprising adjusting the dose regimen of the antagonist based on a comparison of the amount of a biomarker in a sample obtained from the patient after or during treatment with a dosing regimen of the antagonist, to an amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment, is indicative of the efficacy of or responsiveness to the dose or dosing regimen of the antagonist for treatment of the gastrointestinal disorder in the patient, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes.

2. A method of determining or monitoring the efficacy or, or of aiding in determining or monitoring the efficacy of, an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in a patient, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment, is indicative of the efficacy of, or in combination with one or more additional biomarkers of efficacy is indicative of the efficacy of, the antagonist for treatment of the gastrointestinal disorder in the patient, and wherein the biomarker is the number of alphaE-positive cells in intestinal crypt epithelium.

3. A method of determining or monitoring the responsiveness of, or of aiding in determining or monitoring the responsiveness of, a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to the amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment is indicative of the responsiveness of, or in combination with one or more additional biomarkers of responsiveness is indicative of the responsiveness of, the patient to treatment with the antagonist, and wherein the biomarker is the number of alphaE-positive cells in intestinal crypt epithelium.

4. A method of determining or monitoring the efficacy of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in an antagonist-treated patient in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the efficacy of the antagonist for treatment of the gastrointestinal disorder in the antagonist-treated patient, and wherein the biomarker is the number of alphaE-positive cells in intestinal crypt epithelium.

5. A method of determining or monitoring the responsiveness of a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, wherein the patient is in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the responsiveness of the patient to treatment with the antagonist, and wherein the biomarker is the number of alphaE-positive cells in intestinal crypt epithelium.

6. The method of claim 1, wherein the change in the occupancy is an increase or decrease.

7. The method of any one of claims 2-5, wherein the change in the number of alphaE-positive cells is a decrease.

8. The method of any one claims 1-7, wherein the biomarker is measured within 100 days after receiving a first dose of the antagonist.

9. The method of claim 8, wherein the biomarker is measured: (a) at day 43 and at day 71 or (b) at week 6 and at week 10.

10. The method of any one of claims 1-9, wherein the gastrointestinal inflammatory disorder is an inflammatory bowel disease.

11. The method of claim 10, wherein the inflammatory bowel disease is Crohn's disease (CD) or ulcerative colitis (UC).

12. The method of claim 11, wherein the patient is a human.

13. The method of any one of claims 1-12, wherein the integrin beta7 antagonist is an anti-beta7 antibody.

14. The method of claim 13, wherein the antibody is monoclonal.

15. The method of claim 14, wherein the antibody is a chimeric, human or humanized antibody.

16. The method of claim 15, wherein the antibody is an antibody fragment.

17. The method of claim 15, wherein the anti-beta7 antibody comprises six hypervariable regions (HVRs), wherein:

(i) HVR-L1 comprises amino acid sequence A1-A11, wherein A1-A11 is RASESVDTYLH (SEQ ID NO:1); RASESVDSLLH (SEQ ID NO:7), RASESVDTLLH (SEQ ID NO:8), or RASESVDDLLH (SEQ ID NO:9) or a variant of SEQ ID NOs:1, 7, 8 or 9 (SEQ ID NO:26) wherein amino acid A2 is selected from the group consisting of A, G, S, T, and V and/or amino acid A3 is selected from the group consisting of S, G, I, K, N, P, Q, R, and T, and/or A4 is selected from the group consisting of E, V, Q, A, D, G, H, I, K, L, N, and R, and/or amino acid A5 is selected from the group consisting of S, Y, A, D, G, H, I, K, N, P, R, T, and V, and/or amino acid A6 is selected from the group consisting of V, R, I, A, G, K, L, M, and Q, and/or amino acid A7 is selected from the group consisting of D, V, S, A, E, G, H, I, K, L, N, P, S, and T, and/or amino acid A8 is selected from the group consisting of D, G, N, E, T, P and S, and/or amino acid A9 is selected from the group consisting of L, Y, I and M, and/or amino acid A10 is selected from the group consisting of L, A, I, M, and V and/or amino acid A11 is selected from the group consisting of H, Y, F, and S;

(ii) HVR-L2 comprises amino acid sequence B1-B8, wherein B1-B8 is KYASQSIS (SEQ ID NO:2), RYASQSIS (SEQ ID NO:20), or XaaYASQSIS (SEQ ID NO:21, where Xaa represents any amino acid) or a variant of SEQ ID NOs:2, 20 or 21 (SEQ ID NO:27) wherein amino acid B1 is selected from the group consisting of K, R, N, V, A, F, Q, H, P, I, L, Y and Xaa (where Xaa represents any amino acid), and/or amino acid B4 is selected from the group consisting of S and D, and/or amino acid B5 is selected from the

group consisting of Q and S, and/or amino acid B6 is selected from the group consisting of S, D, L, and R, and/or amino acid B7 is selected from the group consisting of I, V, E, and K;

(iii) HVR-L3 comprises amino acid sequence C1-C9, wherein C1-C9 is QQGNSLPNT (SEQ ID NO:3) or a variant of SEQ ID NO:3 (SEQ ID NO:28) wherein amino acid C8 is selected from the group consisting of N, V, W, Y, R, S, T, A, F, H, I L, and M;

(iv) HVR-H1 comprises amino acid sequence D1-D10 wherein D1-D10 is GFFITNNYWG (SEQ ID NO:4);

(v) HVR-H2 comprises amino acid sequence E1-E17 wherein E1-E17 is GYISYSGSTSYNPSLKS (SEQ ID NO:5), or a variant of SEQ ID NO:5 (SEQ ID NO:29) wherein amino acid E2 is selected from the group consisting of Y, F, V, and D, and/or amino acid E6 is selected from the group consisting of S and G, and/or amino acid E10 is selected from the group consisting of S and Y, and/or amino acid E12 is selected from the group consisting of N, T, A, and D, and/or amino acid 13 is selected from the group consisting of P, H, D, and A, and/or amino acid E15 is selected from the group consisting of L and V, and/or amino acid E17 is selected from the group consisting of S and G; and

(vi) HVR-H3 comprises amino acid sequence F2-F11 wherein F2 -F11 is MTGSSGYFDF (SEQ ID NO:6) or RTGSSGYFDF (SEQ ID NO:19); or comprises amino acid sequence F1-F11, wherein F1-F11 is AMTGSSGYFDF (SEQ ID NO:16), ARTGSSGYFDF (SEQ ID NO:17), or AQTGSSGYFDF (SEQ ID NO:18), or a variant of SEQ ID NOs:6, 16, 17, 18, or 19 (SEQ ID NO:30) wherein amino acid F2 is R, M, A, E, G, Q, S, and/or amino acid F11 is selected from the group consisting of F and Y.

18. The method of claim 17, wherein the anti-beta7 antibody comprises three heavy chain hypervariable region (HVR-H1-H3) sequences and three light chain hypervariable region (HVR-L1-L3) sequences, wherein:

(i) HVR-L1 comprises SEQ ID NO:7, SEQ ID NO:8 or SEQ ID NO:9;

(ii) HVR-L2 comprises SEQ ID NO:2;

(iii) HVR-L3 comprises SEQ ID NO:3;

(iv) HVR-H1 comprises SEQ ID NO:4;

(v) HVR-H2 comprises SEQ ID NO:5; and

(vi) HVR-H3 comprises SEQ ID NO:6 or SEQ ID NO:16 or SEQ ID NO:17 or SEQ ID NO:19.

19. The method of claim 18, wherein the anti-beta7 antibody comprises a variable light chain comprising the amino acid sequence of SEQ ID NO:31 and a variable heavy chain comprising the amino acid sequence of SEQ ID NO:32.

20. The method of any one of claims 13-19, wherein the anti-beta7 antibody is etrolizumab.

21. The method of claim 1, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of a first loading dose of 420 mg anti-beta7 antibody followed two weeks later by subcutaneous administration of a first maintenance dose of 315 mg anti-beta7 antibody followed by subcutaneous administration of one or more subsequent maintenance doses of 315 mg anti-beta7 antibody, wherein each subsequent maintenance dose is administered four weeks after the prior maintenance dose.

22. The method of claim 1, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of 105 mg anti-beta7 antibody every four weeks.

23. The method of claim 1, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of 50 mg anti-beta7 antibody every two weeks.

24. The method of any one of claims 21-23, wherein the anti-beta7 antibody is etrolizumab.

25. The method of claim 2 or claim 4, further comprising one or more clinical biomarkers of efficacy selected from clinical remission at week 6, clinical remission at week 10, clinical response at week 6, clinical response at week 10, endoscopy score and rectal bleeding score of 0 at week 6, endoscopy and rectal bleeding score of 0 at week 10, and time to flare of UC after achieving response or remission.

26. The method of claim 3 or claim 5, further comprising one or more clinical biomarkers of responsiveness selected from clinical remission at week 6, clinical remission at

week 10, clinical response at week 6, clinical response at week 10, endoscopy score and rectal bleeding score of 0 at week 6, endoscopy and rectal bleeding score of 0 at week 10, and time to flare of UC after achieving response or remission.

WHAT IS CLAIMED IS

1. A method of determining or monitoring the efficacy or, or of aiding in determining or monitoring the efficacy of, an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in a patient, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment, is indicative of the efficacy of, or in combination with one or more additional biomarkers of efficacy is indicative of the efficacy of, the antagonist for treatment of the gastrointestinal disorder in the patient, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or the number of alphaE-positive cells in intestinal crypt epithelium.

2. A method of determining or monitoring the responsiveness of, or of aiding in determining or monitoring the responsiveness of, a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to the amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment is indicative of the responsiveness of, or in combination with one or more additional biomarkers of responsiveness is indicative of the responsiveness of, the patient to treatment with the antagonist, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or the number of alphaE-positive cells in intestinal crypt epithelium.

3. A method of determining or monitoring the efficacy of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in an antagonist-treated patient in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the

antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the efficacy of the antagonist for treatment of the gastrointestinal disorder in the antagonist-treated patient, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or the number of alphaE-positive cells in intestinal crypt epithelium.

4. A method of determining or monitoring the responsiveness of a patient having a gastrointestinal inflammatory disorder to treatment with an integrin beta7 antagonist, wherein the patient is in a placebo-controlled clinical trial, the method comprising comparing the amount of a biomarker in a sample obtained from the patient after or during treatment with the antagonist, to an amount of the biomarker in a sample obtained from a placebo-treated patient, wherein a change in the amount of the biomarker in the antagonist-treated patient after or during treatment, as compared to the amount of the biomarker in the placebo-treated patient, is indicative of the responsiveness of the patient to treatment with the antagonist, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes, or gene expression levels of one or more integrin receptor ligands, or gene expression levels of one or more lymphocyte genes, or gene expression levels of one or more cytokines, or the number of alphaE-positive cells in intestinal crypt epithelium.

5. A method of determining the dosing regimen of an integrin beta7 antagonist for treatment of a gastrointestinal inflammatory disorder in a patient, the method comprising adjusting the dose regimen of the antagonist based on a comparison of the amount of a biomarker in a sample obtained from the patient after or during treatment with a dosing regimen of the antagonist, to an amount of the biomarker in a sample obtained from the patient before the treatment, wherein a change in the amount of the biomarker after or during the treatment, as compared to before the treatment, is indicative of the efficacy of or responsiveness to the dose or dosing regimen of the antagonist for treatment of the gastrointestinal disorder in the patient, and wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes.

6. The method of any one of claims 1-5, wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes and the integrin beta7 subunit-containing receptor is αEβ7 receptor.

7. The method of any one of claims 1-5, wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes and the integrin beta7 subunit-containing receptor is α4β7 receptor.

8. The method of any one of claims 1-7, wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes and the integrin beta7 subunit-containing receptor occupancy on colonic lymphocytes is determined by measuring integrin beta7 subunit-containing receptor occupancy on peripheral blood lymphocytes, wherein the integrin beta7 subunit-containing receptor occupancy on peripheral blood lymphocytes was previously determined to be essentially the same as the integrin beta7 subunit-containing receptor occupancy on colonic lymphocytes.

9. The method of any one of claims 1-8, wherein the biomarker is integrin beta7 subunit-containing receptor occupancy by the antagonist on colonic lymphocytes and the occupancy of the integrin beta7 subunit-containing receptor is determined by a method comprising incubating the lymphocytes with labeled anti-beta7 antibody, wherein the labeled anti-beta7 antibody binds to the same epitope as the integrin beta7 antagonist, washing the lymphocytes, and measuring the percentage of labeled lymphocytes by flow cytometry.

10. The method of claim 9, wherein the label is selected from fluorescein isothiocyanate (FITC), rhodamine, phycoerythrin (PE), allophycocyanin (APC), peridinin chlorophyll protein (PerCP), PE-Cy7, APC-Cy7 and APC-H7.

11. The method of claim 9, wherein the integrin beta7 antagonist is etrolizumab and the labeled anti-beta7 antibody is etrolizumab or FIB504.

12. The method of any one of claims 1-9, wherein the change in the occupancy is an increase or decrease.

13. The method of any one of claims 1-4, wherein the biomarker is gene expression levels of one or more integrin receptor ligands and the integrin receptor ligand is MadCAM-1.

14. The method of claim 13, wherein the change in gene expression is a decrease.

15. The method of any one of claims 1-4, wherein the biomarker is gene expression levels of one or more integrin receptor ligands and the integrin receptor ligand is E-Cadherin.

16. The method of claim 15, wherein the change in gene expression is an increase.

17. The method of any one of claims 1-4, wherein the biomarker is gene expression levels of one or more lymphocyte genes and the one or more lymphocyte genes are selected from CD19, CD8, and CD3epsilon.

18. The method of claim 17, wherein the change in gene expression is a decrease.

19. The method of any one of claims 1-4, wherein the biomarker is gene expression levels of one or more cytokines and the one or more cytokines is selected from IL-1β, IL-6, IL-12-p40, IL-17A, IL-17-F, IL-23A, IFNγ and TNFα.

20. The method of claim 19, wherein the change in gene expression is a decrease.

21. The method of any one of claims 13-20, wherein the gene expression level is measured in colonic biopsy tissue.

22. The method of claim 21, wherein the gene expression level is measured by qPCR.

23. The method of any one of claims 1-4, wherein the biomarker is the number of alphaE-positive cells in the intestinal crypt epithelium and wherein the change in the number of alphaE-positive cells is a decrease.

24. The method of any one claims 1-23, wherein the biomarker is measured within 100 days after receiving a first dose of the antagonist.

25. The method of claim 24, wherein the biomarker is measured: (a) at day 43 and at day 71 or (b) at week 6 and at week 10.

26. The method of any one of claims 1-25, wherein the gastrointestinal inflammatory disorder is an inflammatory bowel disease.

27. The method of claim 26, wherein the inflammatory bowel disease is Crohn's disease (CD) or ulcerative colitis (UC).

28. The method of claim 27, wherein the patient is a human.

29. The method of any one of claims 1-10 or 12-28, wherein the integrin beta7 antagonist is an anti-beta7 antibody.

30. The method of claim 29, wherein the antibody is monoclonal.

31. The method of claim 30, wherein the antibody is a chimeric, human or humanized antibody.

32. The method of claim 31, wherein the antibody is an antibody fragment.

33. The method of claim 31, wherein the anti-beta7 antibody comprises six hypervariable regions (HVRs), wherein:

(i) HVR-L1 comprises amino acid sequence A1-A11, wherein A1-A11 is RASESVDTYLH (SEQ ID NO:1); RASESVDSLLH (SEQ ID NO:7), RASESVDTLLH (SEQ ID NO:8), or RASESVDDLLH (SEQ ID NO:9) or a variant of SEQ ID NOs:1, 7, 8 or 9 (SEQ ID NO:26) wherein amino acid A2 is selected from the group consisting of A, G, S, T, and V and/or amino acid A3 is selected from the group consisting of S, G, I, K, N, P, Q, R, and T, and/or A4 is selected from the group consisting of E, V, Q, A, D, G, H, I, K, L, N, and R, and/or amino acid A5 is selected from the group consisting of S, Y, A, D, G, H, I, K, N, P, R, T, and V, and/or amino acid A6 is selected from the group consisting of V, R, I, A, G, K, L, M, and Q, and/or amino acid A7 is selected from the group consisting of D, V, S, A, E, G, H, I, K, L, N, P, S, and T, and/or amino acid A8 is selected from the group consisting of D, G, N, E, T, P and S, and/or amino acid A9 is selected from the group consisting of L, Y, I and M, and/or amino acid A10 is selected from the group consisting of L, A, I, M, and V and/or amino acid A11 is selected from the group consisting of H, Y, F, and S;

(ii) HVR-L2 comprises amino acid sequence B1-B8, wherein B1-B8 is KYASQSIS (SEQ ID NO:2), RYASQSIS (SEQ ID NO:20), or XaaYASQSIS (SEQ ID NO:21, where Xaa represents any amino acid) or a variant of SEQ ID NOs:2, 20 or 21 (SEQ ID NO:27) wherein amino acid B1 is selected from the group consisting of K, R, N, V, A, F, Q, H, P, I, L, Y and Xaa (where Xaa represents any amino acid), and/or amino acid B4 is selected from the group consisting of S and D, and/or amino acid B5 is selected from the

group consisting of Q and S, and/or amino acid B6 is selected from the group consisting of S, D, L, and R, and/or amino acid B7 is selected from the group consisting of I, V, E, and K;

(iii) HVR-L3 comprises amino acid sequence C1-C9, wherein C1-C9 is QQGNSLPNT (SEQ ID NO:3) or a variant of SEQ ID NO:3 (SEQ ID NO:28) wherein amino acid C8 is selected from the group consisting of N, V, W, Y, R, S, T, A, F, H, I L, and M;

(iv) HVR-H1 comprises amino acid sequence D1-D10 wherein D1-D10 is GFFITNNYWG (SEQ ID NO:4);

(v) HVR-H2 comprises amino acid sequence E1-E17 wherein E1-E17 is GYISYSGSTSYNPSLKS (SEQ ID NO:5), or a variant of SEQ ID NO:5 (SEQ ID NO:29) wherein amino acid E2 is selected from the group consisting of Y, F, V, and D, and/or amino acid E6 is selected from the group consisting of S and G, and/or amino acid E10 is selected from the group consisting of S and Y, and/or amino acid E12 is selected from the group consisting of N, T, A, and D, and/or amino acid 13 is selected from the group consisting of P, H, D, and A, and/or amino acid E15 is selected from the group consisting of L and V, and/or amino acid E17 is selected from the group consisting of S and G; and

(vi) HVR-H3 comprises amino acid sequence F2-F11 wherein F2 -F11 is MTGSSGYFDF (SEQ ID NO:6) or RTGSSGYFDF (SEQ ID NO:19); or comprises amino acid sequence F1-F11, wherein F1-F11 is AMTGSSGYFDF (SEQ ID NO:16), ARTGSSGYFDF (SEQ ID NO:17), or AQTGSSGYFDF (SEQ ID NO:18), or a variant of SEQ ID NOs:6, 16, 17, 18, or 19 (SEQ ID NO:30) wherein amino acid F2 is R, M, A, E, G, Q, S, and/or amino acid F11 is selected from the group consisting of F and Y.

34. The method of claim 33, wherein the anti-beta7 antibody comprises three heavy chain hypervariable region (HVR-H1-H3) sequences and three light chain hypervariable region (HVR-L1-L3) sequences, wherein:

(i) HVR-L1 comprises SEQ ID NO:7, SEQ ID NO:8 or SEQ ID NO:9;

(ii) HVR-L2 comprises SEQ ID NO:2;

(iii) HVR-L3 comprises SEQ ID NO:3;

(iv) HVR-H1 comprises SEQ ID NO:4;

(v) HVR-H2 comprises SEQ ID NO:5; and

(vi) HVR-H3 comprises SEQ ID NO:6 or SEQ ID NO:16 or SEQ ID NO:17 or SEQ ID NO:19.

35. The method of claim 34, wherein the anti-beta7 antibody comprises a variable light chain comprising the amino acid sequence of SEQ ID NO:31 and a variable heavy chain comprising the amino acid sequence of SEQ ID NO:32.

36. The method of any one of claims 29-35, wherein the anti-beta7 antibody is etrolizumab.

37. The method of claim 5, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of a first loading dose of 420 mg anti-beta7 antibody followed two weeks later by subcutaneous administration of a first maintenance dose of 315 mg anti-beta7 antibody followed by subcutaneous administration of one or more subsequent maintenance doses of 315 mg anti-beta7 antibody, wherein each subsequent maintenance dose is administered four weeks after the prior maintenance dose.

38. The method of claim 5, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of 105 mg anti-beta7 antibody every four weeks.

39. The method of claim 5, wherein the antagonist is an anti-beta7 antibody and the dosing regimen determined as indicative of the efficacy of or responsiveness to the dose or dosing regimen comprises subcutaneous administration of 50 mg anti-beta7 antibody every two weeks.

40. The method of any one of claims 37-39, wherein the anti-beta7 antibody is etrolizumab.

41. The method of claim 1 or claim 3, further comprising one or more clinical biomarkers of efficacy selected from clinical remission at week 6, clinical remission at week 10, clinical response at week 6, clinical response at week 10, endoscopy score and rectal bleeding score of 0 at week 6, endoscopy and rectal bleeding score of 0 at week 10, and time to flare of UC after achieving response or remission.

42. The method of claim 2 or claim 4, further comprising one or more clinical biomarkers of responsiveness selected from clinical remission at week 6, clinical remission at

week 10, clinical response at week 6, clinical response at week 10, endoscopy score and rectal bleeding score of 0 at week 6, endoscopy and rectal bleeding score of 0 at week 10, and time to flare of UC after achieving response or remission.