

WHAT IS CLAIMED IS:

1. A method for diagnosing inflammatory bowel disease (IBD) and/or a clinical subtype thereof in an individual, said method comprising:

(a) analyzing a sample obtained from said individual to determine the presence, level or genotype of one or more markers selected from the group consisting of a serological marker, a genetic marker, an inflammation marker, and a combination thereof in said sample to obtain a marker profile;

(b) applying a first random forest statistical analysis to said marker profile to obtain a decision whether said ~~marker profile~~sample is an IBD sample or a non-IBD sample;

(c) ~~optionally~~ applying a decision tree or set of rules to said sample designated as an IBD sample to determine if said IBD sample is categorized as an inconclusive sample; and

(d) ~~optionally if said IBD sample is not an inconclusive sample, then~~ applying a second random forest statistical analysis to said IBD sample to determine a clinical subtype of IBD.

2. The method of claim 1, wherein said inflammation marker is selected from the group consisting of an acute phase protein, an apolipoprotein, a growth factor, a cellular adhesion molecule, and a combination thereof.

3. The method of claim 1, wherein said serological marker is selected from the group consisting of an anti-neutrophil antibody, an anti-*Saccharomyces cerevisiae* antibody, an antimicrobial antibody, and a combination thereof.

4. The method of claim 1, wherein said genetic marker is selected from the group consisting of ATG16L1, ECM1, NKX2-3, STAT3, and a combination thereof.

5. The method of claim 2, wherein said anti-neutrophil antibody is selected from the group consisting of an anti-neutrophil cytoplasmic antibody (ANCA), perinuclear anti-neutrophil cytoplasmic antibody (pANCA), pANCA2 and a combination thereof.

6. The method of claim 2, wherein said anti-*Saccharomyces cerevisiae* antibody is selected from the group consisting of anti-*Saccharomyces cerevisiae* immunoglobulin A (ASCA-IgA), anti-*Saccharomyces cerevisiae* immunoglobulin G (ASCA-IgG), and a combination thereof.

iii. designating the sample as being inconsistent with IBD if ANCA ELISA is greater than or equal to 20 and less than or equal to 27.4 EU/mL and the CD count value is zero; or

iv. designating the sample as being consistent with IBD but inconclusive for Crohn's disease or ulcerative colitis if ANCA ELISA is greater than or equal to 20 and less than or equal to 27.4 EU/mL and the CD count value is one.

48. The method of claim 39, wherein when pANCA is one, further comprising:

- i. designating the sample as being inconsistent with IBD if ANCA ELISA is less than 13.7 EU/mL; or
- ii. designating that the sample as being consistent with ulcerative colitis if ANCA ELISA is greater than or equal to 13.7 EU/mL.

49. A method for diagnosing inflammatory bowel disease (IBD) and/or a clinical subtype thereof in an individual, said method comprising:

- (a) analyzing a sample obtained from said individual to determine the presence, level or genotype of one or more markers selected from the group consisting of a serological marker, a genetic marker, an inflammation marker, and a combination thereof in said sample to obtain a marker profile;
- (b) applying a first random forest statistical analysis to said marker profile to obtain a decision whether said ~~marker profile~~sample is an IBD sample or a non-IBD sample with a sensitivity of at least 70%;
- (c) applying a decision tree or set of rules to said sample designated as an IBD sample to determine if said IBD sample is an inconclusive sample; and
- (d) if the sample is not an inconclusive sample, but is an IBD sample, applying a second random forest statistical analysis to said IBD sample to determine a clinical subtype of IBD with a sensitivity of at least 85% for Crohn's disease (CD) and a sensitivity of at least 95% for ulcerative colitis (UC).

50. The method of claim 49, wherein the markers for the first random forest algorithm are selected from the group consisting of ANCA, ASCA-A, ASCA-G, pANCA, pANCA2, anti-FlaX antibody, SAA, anti-Fla2 antibody, ICAM, anti-OmpC antibody, anti-CBir1 antibody, VCAM, CRP, NKX2-3, ATG16L1, STAT3, ECM1, VEGF and a combination thereof.

51. The method of claim **49**, wherein after the first random forest algorithm the sample is designated as an IBD sample, further determining using the decision tree or set of rules whether the sample has an ANCA level $\geq$ Q3, is pANCA2 positive, and