

(viv) a panel of biomarkers comprising serotonin (5HT), N.acetylputrescine, leucylleucine, propionylglycine (C3), cholate, glycocholenate.sulfate, asparagine and 3.ethylphenylsulfate;

(x) a panel of biomarkers comprising acisoga, mannose, valerylcarnitine (C5), 1.linoleoyl.GPE (18.2), glycooursodeoxycholate, threonate, 2.hydroxyhippurate (salicylurate) and salicylate;

(xi) a panel of biomarkers comprising N.acetylglycine, threonate, 2.hydroxyhippurate (salicylurate), 3.ethylphenylsulfate and salicylate;

(xii) a panel of biomarkers comprising asparagine, taurine, acisoga, 1.oleoylglycerol (18:1), cholesterol and 2.hydroxyhippurate (salicylurate), 6.oxopiperidine.2.carboxylic.acid and propionylglycine (C3), wherein the levels, including relative levels, or the occurrences of the plurality of analyte biomarkers are indicative of having ASCAD and/or for the presence of a coronary atherosclerotic plaque.

In one aspect, there is provided a method for evaluating a human subject for having atherosclerotic coronary artery disease (ASCAD) or as having a coronary atherosclerotic plaque, the method comprising:

measuring the levels of each analyte within a panel of analyte biomarkers in a blood sample, a serum sample or a plasma sample that has been obtained from the subject, wherein the panel of analyte biomarkers comprises

valylleucine, glutamate, acisoga, urate, glucuronate, fucose, butyrylcarnitine (C4) and mannose;

comparing the measured levels of the analytes in the biological sample with one or more reference samples, wherein the references are representative of matched human subjects; and

identifying the subject as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque if measured levels of the analytes in the biological sample are increased or decreased relative to the amounts of the analytes in the reference samples.

Any of the panels above may further include the analysis of age and gender.

In another embodiment, the disclosure provides a method comprising measuring by mass spectrometry the levels of each of a plurality of metabolites in a blood sample obtained from a human subject, wherein the plurality of metabolites is selected from the group consisting of (i) valylleucine, glutamate, acisoga, urate, glucuronate, fucose, butyrylcarnitine (C4) and mannose; (ii) cisoga, o.cresol.sulfate, threonate and cysteine.glutathione.disulfide; (iii) N.acetylphenylalanine, N.acetylleucine, valylleucine, xylitol, 2.hydroxyhippurate (salicylurate), glycylphenylalanine, serylleucine and fucose; (iv) glutamate, acisoga, valylleucine, mannose, glucuronate, urate, valerylcarnitine (C5) and 12.HETE; m(v) o.cresol.sulfate, acisoga, cysteine.glutathione.disulfide, glucose, 1.nonadecanoylglycerophosphocholine (19:0) and threonate; (vi) N.acetylphenylalanine, N.acetylleucine, glycylphenylalanine, valylleucine, xylitol, 12.HETE and 2.hydroxyhippurate (salicylurate); (vii) N.acetylthreonine, tigloylglycine, glycerate, valerylcarnitine (C5), threonate, 2.hydroxyhippurate (salicylurate), salicylate and tartronate (hydroxymalonated); (viii) N.acetyl glycine and 3.ethylphenylsulfate; (viv) serotonin (5HT), N.acetylputrescine, leucylleucine, propionylglycine (C3), cholate, glycocholenate.sulfate, asparagine and 3.ethylphenylsulfate; (x) acisoga, mannose, valerylcarnitine (C5), 1.linoleoyl.GPE (18.2), glyoursodeoxycholate, threonate, 2.hydroxyhippurate (salicylurate) and salicylate; (xi) N.acetyl glycine, threonate, 2.hydroxyhippurate (salicylurate), 3.ethylphenylsulfate, salicylate; and(xii) asparagine, taurine, acisoga, 1.oleoylglycerol

reagents suitable for determining levels of a plurality of analytes in a test sample, wherein the plurality of analytes comprise:

a panel of biomarkers comprising valylleucine, glutamate, acisoga, urate, glucuronate, fucose, butyrylcarnitine (C4) and mannose;

optionally one or more control samples comprising predetermined levels of the same analytes, wherein comparison of the levels of the analytes in a test sample with levels in the control samples identifies a subject as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque; and

instructions for use of the kit in the method of the disclosure.

As used herein, the term “biological sample” or “sample” refers to a sample obtained or derived from a subject. By way of example, the sample may be selected from the group consisting of body fluids, blood, whole blood, plasma, serum, mucus secretions, urine or saliva. In some embodiments the sample is, or comprises a blood

What is claimed is:

1. A method for evaluating a human subject for having atherosclerotic coronary artery disease (ASCAD) or as having a coronary atherosclerotic plaque, the method comprising:

measuring the levels of each analyte within a panel of analyte biomarkers in a blood sample, a serum sample or a plasma sample that has been obtained from the subject, wherein the panel of analyte biomarkers comprises valylleucine, glutamate, acisoga, urate, glucuronate, fucose, butyrylcarnitine (C4) and mannose;

comparing the measured levels of the analytes in the biological sample with one or more reference samples, wherein the references are representative of matched human subjects; and

identifying the subject as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque if measured levels of the analytes in the biological sample are increased or decreased relative to the amounts of the analytes in the reference samples.

2. The method of claim 1, further comprising instructing a healthcare professional to complete a non-invasive cardiovascular evaluation on a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque to confirm the subject has or does not have atherosclerotic coronary artery disease or a coronary atherosclerotic plaque, optionally wherein performing a non-invasive cardiovascular evaluation comprises performing a procedure selected from the group consisting of cardiovascular computed tomography (CT) imaging, an exercise stress test, a pharmacologic stress test, myocardial perfusion imaging, stress echocardiography, and cardiovascular magnetic resonance imaging.

3. The method of claim 1, wherein a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque is to be subjected to a non-invasive cardiovascular evaluation to confirm the subject does or does not have atherosclerotic coronary artery disease or a coronary atherosclerotic plaque, optionally wherein the non-invasive cardiovascular evaluation comprises a procedure selected from the group consisting of cardiovascular computed

tomography (CT) imaging, an exercise stress test, a pharmacologic stress test, myocardial perfusion imaging, stress echocardiography, and cardiovascular magnetic resonance imaging.

4. The method of any one of claims 1 to 3, further comprising selecting a treatment plan for a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque to treat the subject, optionally wherein the treatment plan comprises selectively administering a composition comprising an effective amount of a therapeutic agent selected from the group consisting of a statin, cholesterol absorption inhibitors, niacin-derivatives, omega-3-fatty acid compounds, bile acid sequestrants, anti-platelet agents, aldosterone blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), beta blockers, diuretics, digitalis, hydralazine and nitrates, warfarin and aspirin, and optionally wherein the treatment plan comprises prescribing therapeutic lifestyle changes.

5. The method of any one of claims 1 to 4, wherein the levels are measured using mass spectrometry (MS) analysis, optionally wherein the MS analysis comprises liquid chromatography-tandem mass spectrometry (UPLC-MS/MS) or gas chromatography-mass spectrometry (GC-MS).

6. The method of any one of claims 1 to 5, wherein the subject has atherosclerosis, optionally wherein the subject presents with symptoms of atherosclerotic CAD comprising chest pain, angina, angina equivalent, dyspnea, or dyspnea on exertion, and optionally wherein the subject has no previous history of coronary artery disease.

7. The method of any one of claims 1 to 6, wherein the subject presents with risk factors associated with coronary artery disease selected from the group consisting of male gender, hypertension, dyslipidemia, diabetes, and a family history of coronary artery disease.

8. The method of any one of claims 1 to 7, wherein the reference sample is one that has been obtained from at least one individual not suffering from a

cardiovascular disease, or wherein the reference sample comprises predetermined, statistically significant reference analyte levels.

9. The method of any one of claims 1 to 8, further comprising modifying the subject's clinical record to identify the subject as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque, optionally wherein the clinical record is stored in a computer readable medium.

10. The method of any one of claims 1 to 9, further comprising selecting a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque for treatment, wherein the treatment comprises selectively administering a composition comprising an effective amount of a therapeutic agent selected from the group consisting of a statin, cholesterol absorption inhibitors, niacin-derivatives, omega-3-fatty acid compounds, bile acid sequestrants, anti-platelet agents, aldosterone blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), beta blockers, diuretics, digitalis, hydralazine and nitrates, warfarin and aspirin to a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque to treat the subject.

11. The method of any one of claims 1 to 9, further comprising selecting a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque for treatment, wherein the treatment comprises performing a non-invasive cardiovascular evaluation on a subject identified as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque to confirm the subject does or does not have atherosclerotic coronary artery disease or a coronary atherosclerotic plaque.

12. The method of claim 4, wherein the treatment plan comprises performing a non-invasive cardiovascular evaluation comprises performing a procedure selected from the group consisting of cardiovascular computed tomography (CT) imaging, an exercise stress test, a pharmacologic stress test, myocardial perfusion imaging, stress echocardiography, and cardiovascular magnetic resonance

imaging, optionally wherein the comparing step includes analysis of the subjects age and/or gender.

13. A kit for evaluating a human subject for having atherosclerotic coronary artery disease (ASCAD) or as having a coronary atherosclerotic plaque, the kit comprising:

reagents suitable for determining levels of a plurality of analytes in a test sample, wherein the plurality of analytes comprise:

a panel of biomarkers comprising valylleucine, glutamate, acisoga, urate, glucuronate, fucose, butyrylcarnitine (C4) and mannose;

optionally one or more control samples comprising predetermined levels of the same analytes, wherein comparison of the levels of the analytes in a test sample with levels in the control samples identifies a subject as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque; and

instructions for use of the kit in the method of any of claims 1 to 12.

14. Use of a composition comprising an effective amount of a therapeutic agent selected from the group consisting of a statin, cholesterol absorption inhibitors, niacin-derivatives, omega-3-fatty acid compounds, bile acid sequestrants, anti-platelet agents, aldosterone blockers, angiotensin-converting enzyme (ACE) inhibitors, angiotensin-receptor blockers (ARBs), beta blockers, diuretics, digitalis, hydralazine and nitrates, warfarin and aspirin in the manufacture of a medicament for treating atherosclerotic coronary artery disease or coronary atherosclerotic plaque in a subject that has been identified by the method of any one of claims 1-3 as having atherosclerotic coronary artery disease or as having a coronary atherosclerotic plaque.