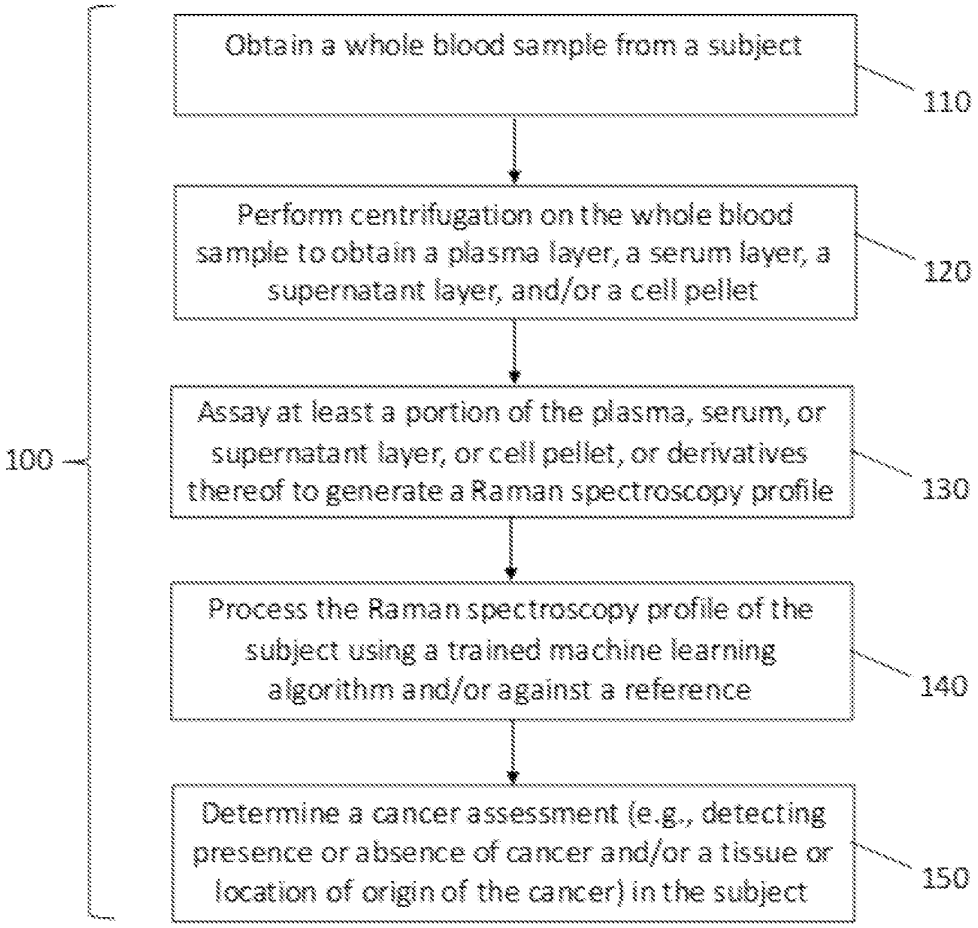

Obtain a whole blood sample from a subject
110
Perform centrifugation on the whole blood sample to obtain a plasma layer, a serum layer, a supernatant layer, and/or a cell pellet
120
Assay at least a portion of the plasma, serum, or supernatant layer, or cell pellet, or derivatives thereof to generate a Raman spectroscopy profile
130
Process the Raman spectroscopy profile of the subject using a trained machine learning algorithm and/or against a reference
140
Determine a cancer assessment (e.g., detecting presence or absence of cancer and/or a tissue or location of origin of the cancer) in the subject
150
100

FIG. 1

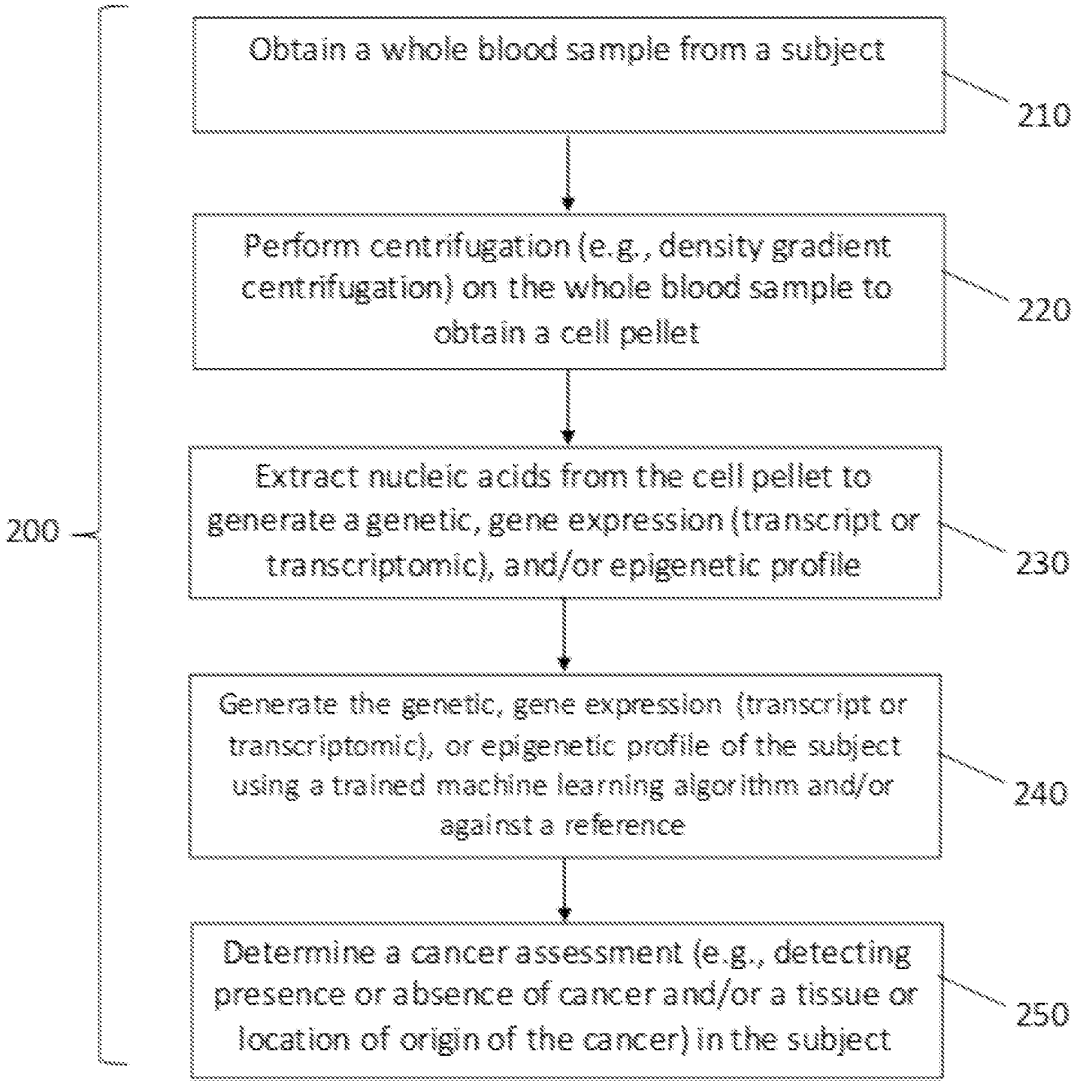

Obtain a whole blood sample from a subject
210
Perform centrifugation (e.g., density gradient centrifugation) on the whole blood sample to obtain a cell pellet
220
Extract nucleic acids from the cell pellet to generate a genetic, gene expression (transcript or transcriptomic), and/or epigenetic profile
230
Generate the genetic, gene expression (transcript or transcriptomic), or epigenetic profile of the subject using a trained machine learning algorithm and/or against a reference
240
Determine a cancer assessment (e.g., detecting presence or absence of cancer and/or a tissue or location of origin of the cancer) in the subject
250
200

FIG. 2

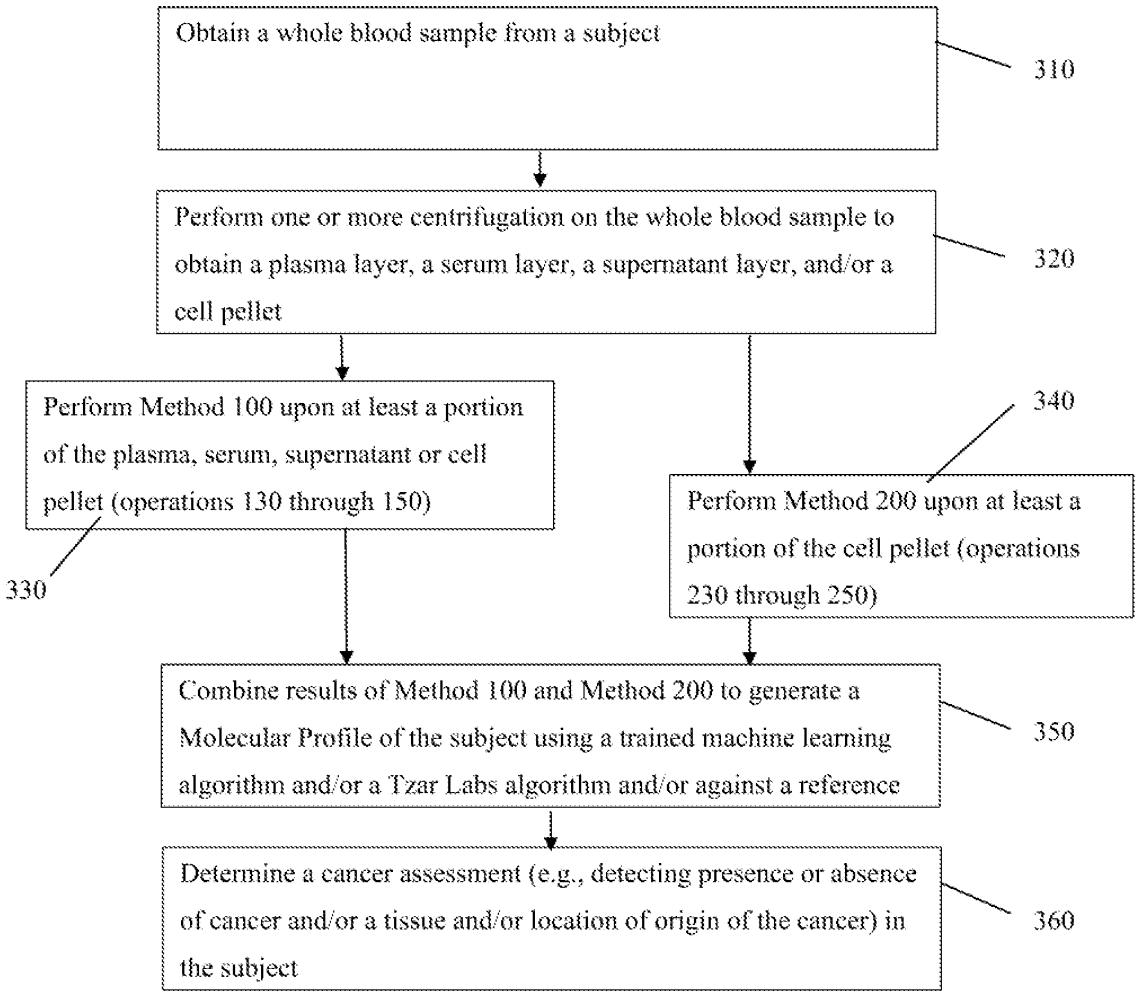

Obtain a whole blood sample from a subject
310
Perform one or more centrifugation on the whole blood sample to obtain a plasma layer, a serum layer, a supernatant layer, and/or a cell pellet
320
Perform Method 100 upon at least a portion of the plasma, serum, supernatant or cell pellet (operations 130 through 150)
330
340
Perform Method 200 upon at least a portion of the cell pellet (operations 230 through 250)
Combine results of Method 100 and Method 200 to generate a Molecular Profile of the subject using a trained machine learning algorithm and/or a Tzar Labs algorithm and/or against a reference
350
Determine a cancer assessment (e.g., detecting presence or absence of cancer and/or a tissue and/or location of origin of the cancer) in the subject
360

Fig. 3

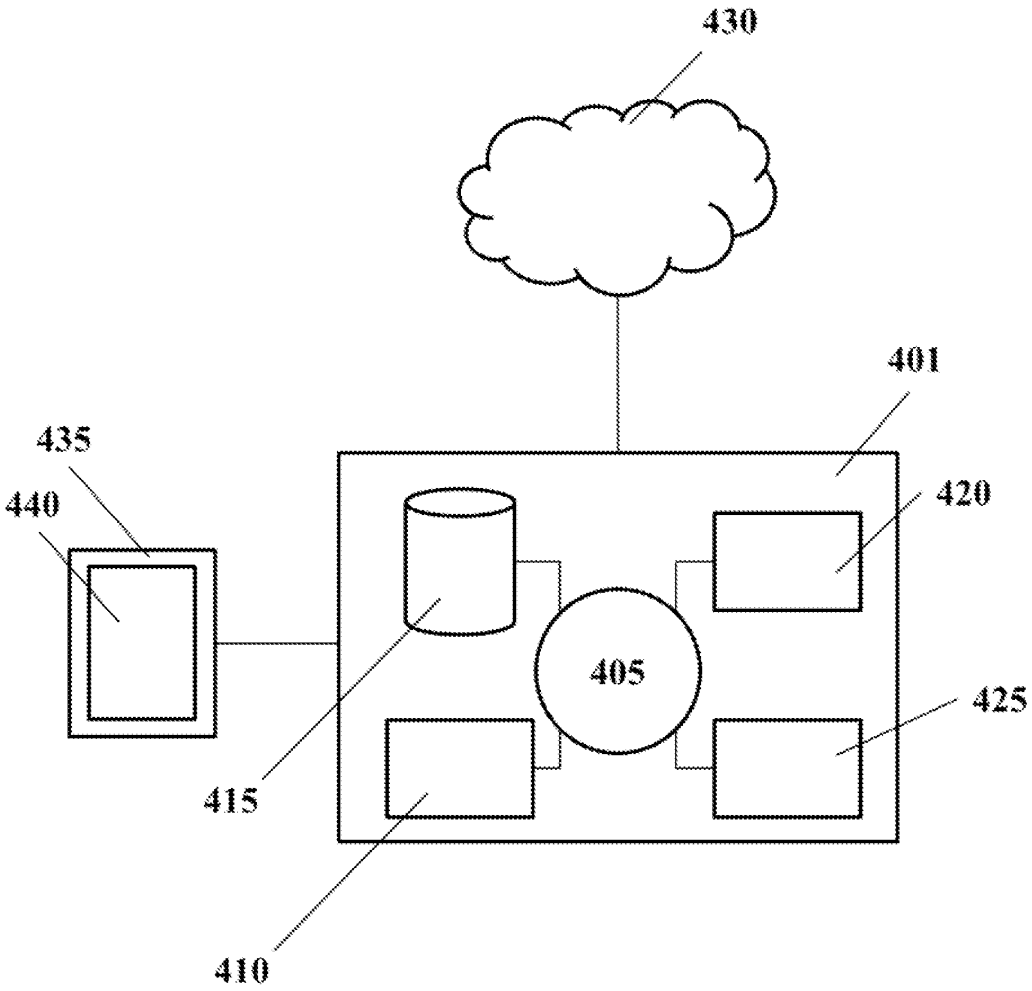


FIG. 4

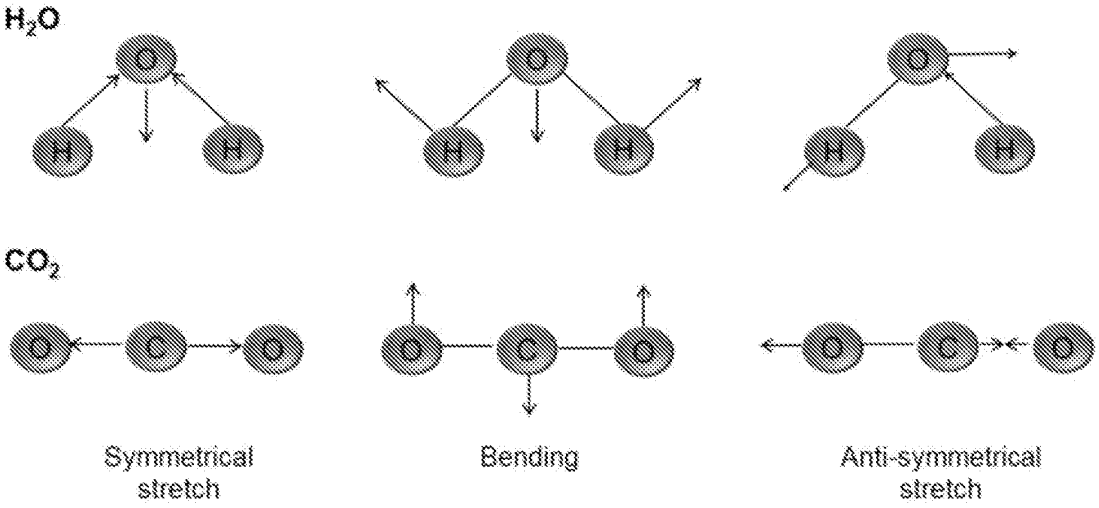

H2O
O
H
H
O
H
H
O
H
H
CO2
O
C
O
O
C
O
O
C
O
Symmetrical stretch
Bending
Anti-symmetrical stretch

FIG. 5

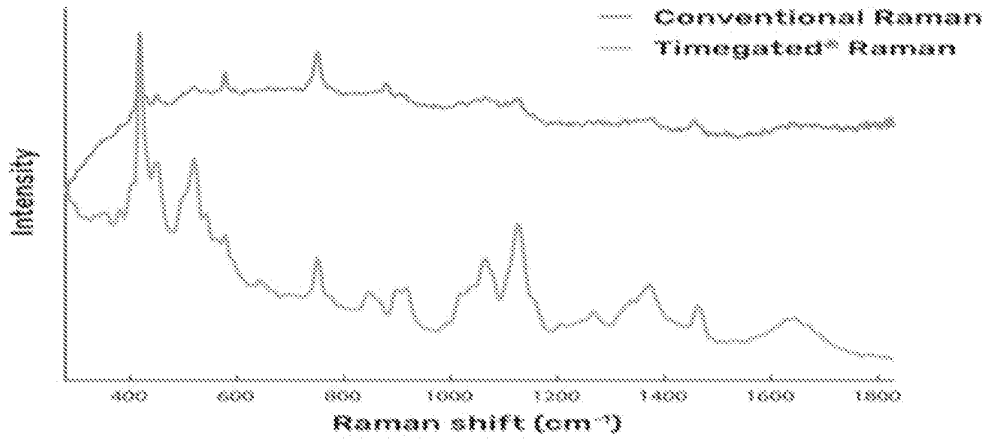

Conventional Raman
Timegated® Raman
Intensity
400
600
800
1000
1200
1400
1600
1800
Raman shift (cm⁻¹)

FIG. 6

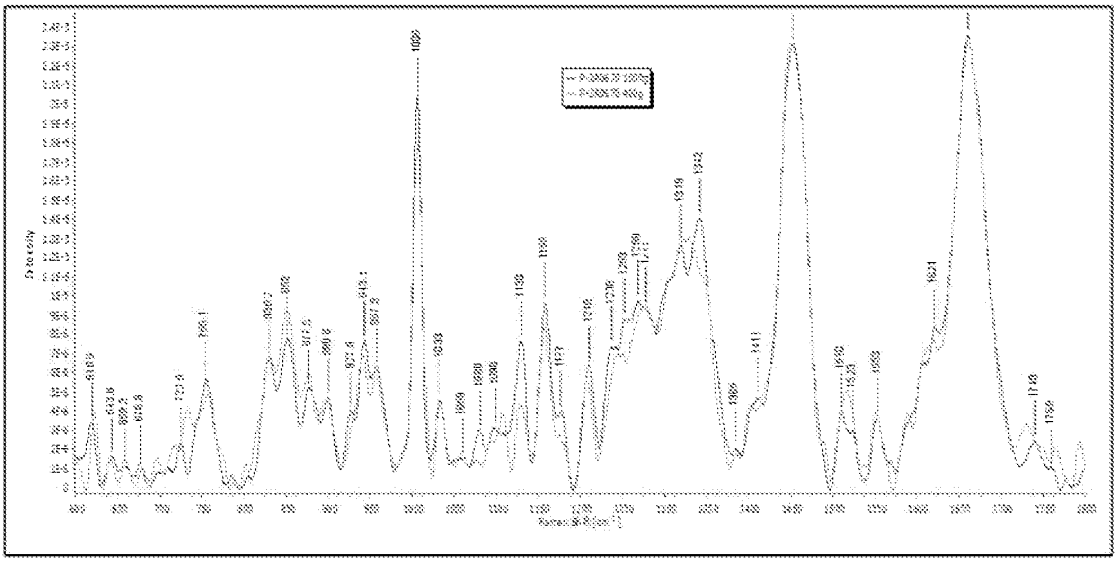


FIG. 7

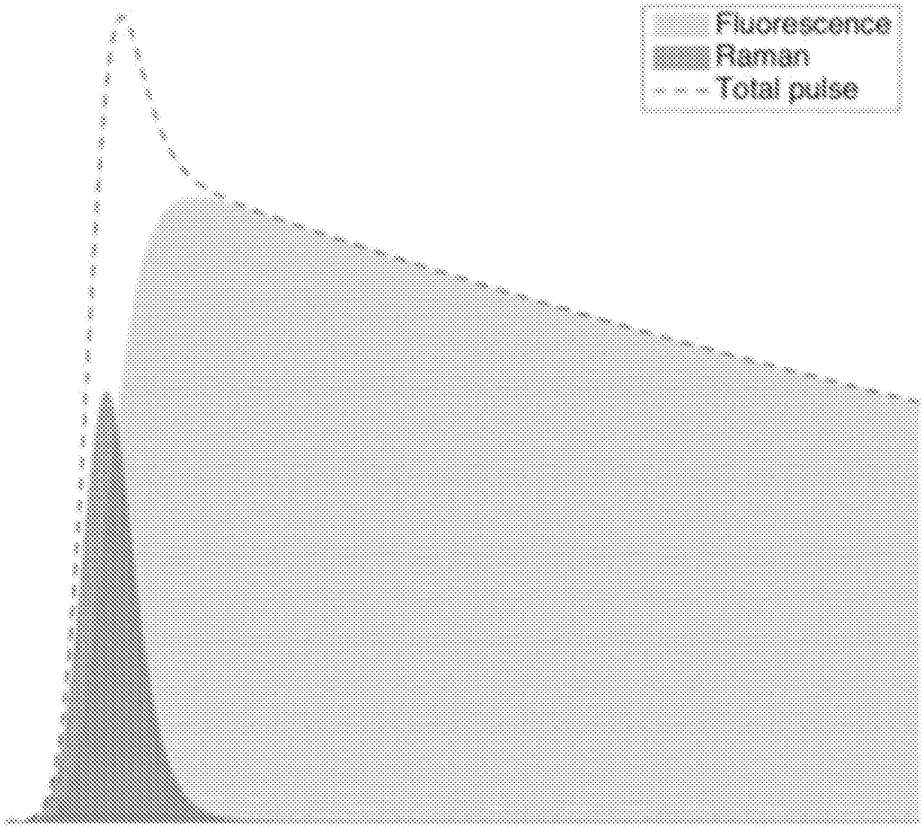


FIG. 8

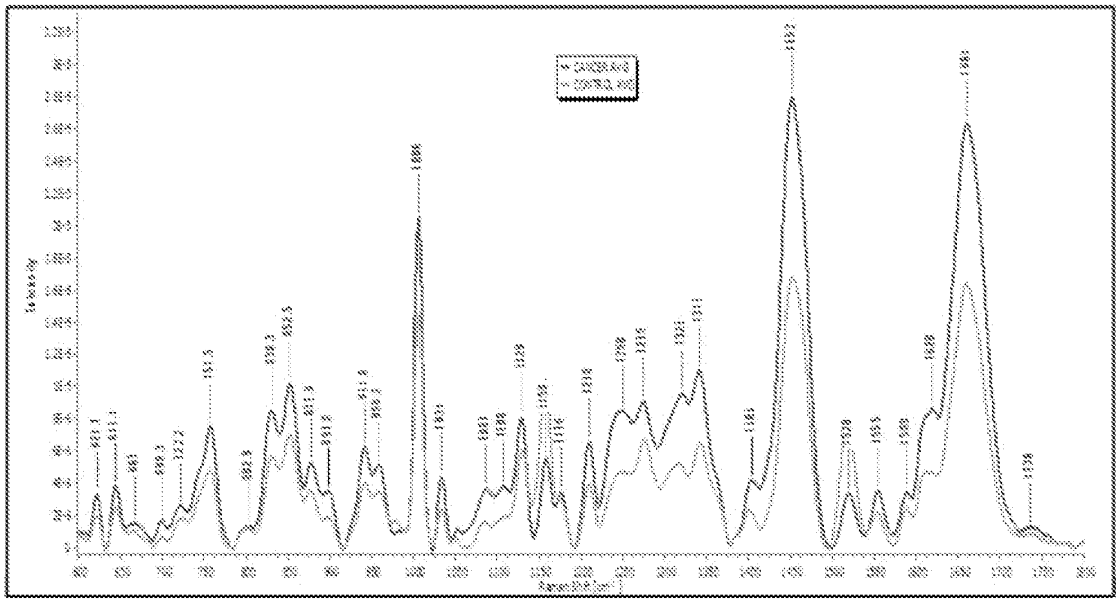


FIG. 9

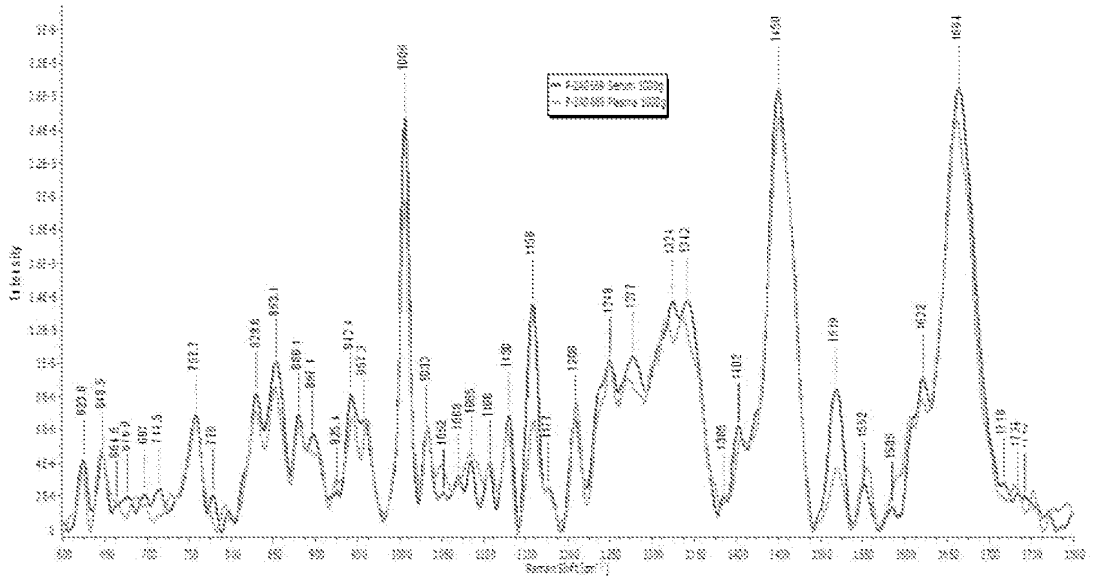


FIG. 10