CLAIMS

WHAT IS CLAIMED IS:

1. A method for identifying a biomarker as associated with a disease state, the method comprising:
(a) isolating a first plurality of analytes in a first biological sample of an individual known to have the disease state using an electrode array configured to generate an AC dielectrophoretic field;
(b) isolating a second plurality of analytes in a second biological sample of healthy individual using an electrode array configured to generate an AC dielectrophoretic field; and
(c) identifying a subset of the first plurality of analytes, wherein the subset is quantitatively different in the first biological sample compared with the second biological sample,
wherein the subset is identified as associated with the disease state.

2. The method of claim 1, wherein isolating comprises using electrodes configured to generate a dielectrophoretic low field region and a dielectrophoretic high field region.

3. The method of claim 1, wherein isolating comprises capturing the first plurality of analytes or the second plurality of analytes on one or more electrode.

4. The method of claim 1, wherein identifying the subset comprises mass spectrometry analysis of the first plurality of analytes and the second plurality of analytes.

5. The method of claim 1, wherein identifying the subset comprises quantifying each of the first plurality of analytes and the second plurality of analytes.

6. The method of claim 1, wherein the analyte comprises a protein, a polypeptide, a nucleic acid, an exosome, or a combination thereof.

7. The method of claim 1, wherein (c) comprises subjecting the first plurality of analytes and the second plurality of analytes to mass spectroscopy.

8. The method of claim 1, wherein the disease state is a cancer, a neurological disease, an infection, or an inflammatory disease.

9. The method of claim 9, wherein the cancer is a pancreatic cancer, an ovarian cancer, a bladder cancer, a colorectal cancer, a lung cancer, a brain cancer, a prostate cancer, a breast cancer, a skin cancer, a lymphoma, a tongue cancer, a mouth cancer, a pharynx cancer, an oral cavity cancer, an esophagus cancer, a stomach cancer, a small intestine cancer, a colon cancer, a rectum

cancer, an anal cancer, an anorectum cancer, a liver cancer, an intrahepatic bile duct cancer, a gallbladder cancer, a biliary cancer, a digestive organ cancer, a larynx cancer, a bronchus cancer, a respiratory organ cancer, a bone cancer, a joint cancer, a soft tissue cancer, a heart cancer, a melanoma, a nonepithelial skin cancer, a uterine cancer, a cervical cancer, a vulva cancer, a vagina cancer, a penis cancer, a genital cancer, a testis cancer, a kidney cancer, a renal pelvis cancer, a ureter cancer, a urinary organ cancer, an eye cancer, an orbit cancer, a nervous system cancer, an endocrine cancer, a thyroid cancer, a Hodgkin lymphoma, a non-Hodgkin lymphoma, a myeloma, an acute lymphocytic leukemia, a chronic lymphocytic leukemia, an acute myeloid leukemia, a chronic myeloid leukemia, or a leukemia.

10. A method of analysis comprising:
(a) measuring an amount of an analyte in a biological sample from an individual; and
(b) identifying the individual as being at risk of developing a disease when the amount of the analyte is greater than or less than the amount observed in a control sample.

11. The method of claim 10, wherein the analyte comprises one or more biomarker identified in any of the method of claims 1 to 9.

12. The method of claim 10, wherein the analyte comprises one or more proteins provided in Table 5 selected from Tenascin C, sAXL, sE-selectin, sHGFR/c-Met, sHer2, sHer3, sIL-6Ra, sNeuropilin-1, sPECAM-1, sVEGFR1, sVEGFR3, sc-kit/SCFR, CA 125, CA 15-3, CA 19-9, CEA, FGF2, HE4, HGF, IL-6, IL-8, Leptin, MIF, OPN, Prolactin, SCF, TNFa, TRAIL, Total PSA, VEGF, b-HCG, sFAS, Cathepsin D, FAP alpha, Ferritin, Galectin-3, IGFBP3, MIA, MPO, SHBG, TIMP1, or TIMP2.

13. The method of claim 10, wherein the analyte comprises one or more proteins selected from CA 19-9, Cathepsin D, Ferritin, IGFBP3, MIA, MPO, scKit/SCFR, sE-selectin, sFAS, sHER2, sNeurolipin-1, sVEGFR1, or TIMP1.

14. The method of any one of claims 10 to 12, wherein measuring comprises isolating the analytes in the biological sample using an electrode array configured to generate an AC dielectrophoretic field.

15. The method of claim 14, wherein isolating comprises using electrodes configured to generate a dielectrophoretic low field region and a dielectrophoretic high field region or wherein isolating comprises capturing the first plurality of analytes or the second plurality of analytes on one or more electrode.

16. The method of any one of claims 10 to 12, wherein measuring comprises mass spectrometry analysis of the analyte.

17. The method of any one of claims 10 to 12, wherein the analyte comprises a protein, a polypeptide, a nucleic acid, an exosome, or a combination thereof.

18. The method of any one of claims 10 to 12, wherein the disease is a cancer, a neurological disease, an infection, or an inflammatory disease.

19. The method of claim 18, wherein the cancer is a pancreatic cancer, an ovarian cancer, a bladder cancer, a colorectal cancer, a lung cancer, a brain cancer, a prostate cancer, a breast cancer, a skin cancer, a lymphoma, a tongue cancer, a mouth cancer, a pharynx cancer, an oral cavity cancer, an esophagus cancer, a stomach cancer, a small intestine cancer, a colon cancer, a rectum cancer, an anal cancer, an anorectum cancer, a liver cancer, an intrahepatic bile duct cancer, a gallbladder cancer, a biliary cancer, a digestive organ cancer, a larynx cancer, a bronchus cancer, a respiratory organ cancer, a bone cancer, a joint cancer, a soft tissue cancer, a heart cancer, a melanoma, a nonepithelial skin cancer, a uterine cancer, a cervical cancer, a vulva cancer, a vagina cancer, a penis cancer, a genital cancer, a testis cancer, a kidney cancer, a renal pelvis cancer, a ureter cancer, a urinary organ cancer, an eye cancer, an orbit cancer, a nervous system cancer, an endocrine cancer, a thyroid cancer, a Hodgkin lymphoma, a non-Hodgkin lymphoma, a myeloma, an acute lymphocytic leukemia, a chronic lymphocytic leukemia, an acute myeloid leukemia, a chronic myeloid leukemia, or a leukemia.

20. A method of identifying a therapeutic target, the method comprising:
(a) isolating a first plurality of analytes in a first biological sample of an individual known to have the disease state using an electrode array configured to generate an AC dielectrophoretic field;
(b) isolating a second plurality of analytes in a second biological sample of healthy individual using an electrode configured to generate an AC dielectrophoretic field; and
(c) identifying a subset of the first plurality of analytes, wherein the subset is quantitatively different in the first biological sample compared with the second biological sample,
wherein the subset is identified as the therapeutic target.

21. The method of claim 20, wherein (c) comprises mass spectroscopy of the first and second plurality of analytes.