

(infrared) spectroscopy, X-ray photoelectron spectroscopy (XPS), atomic force microscopy (AFM), electron microscopy (EM), dynamic light scattering (DLS), quartz crystal microbalance (QCM), surface acoustic wave (SAW), other detection process, or any combination thereof. The sample can be blood, urine, saliva, cerebrospinal fluid, feces, sputum, bronchoalveolar lavages, vaginal lavages, anal lavages, hair, skin, tumor, cells or other matter. The analyte can be nucleic acids (including but not limited to DNA and RNA), proteins, metabolites, carbohydrates, lipids, chemicals, normal eukaryotic cells (including but not limited to lymphocytes, erythrocytes, epithelial cells, endothelial cells, and neural cells), diseased eukaryotic cells (including but not limited to lymphocytes, erythrocytes, epithelial cells, endothelial cells, and neural cells), tissue (including but not limited to fingernails, toenails, platelets, and tumors), bacteria, fungi, viruses or other biological, chemical or physical substance.

[0029] The one or more processors 136 receive a test selection from the user interface 128, determine whether a test cartridge 104 connected to the test cartridge interface 132 matches the test selection, receive the test results data from the one or more detectors or sensors 134, generate a report based on an analysis of the test results data, and provide the report to the user interface 128. The test results data evaluate the sample or analyte. One or more tests can be performed on the sample or the analyte using one or more testing or analysis components disposed within the test cartridge 104, the test cartridge interface 132 or the housing 122. The one or more processors 136 control the test cartridge 104 via the test cartridge interface 132 to load the sample or the analyte within the test cartridge 132 into the one or more testing or analysis components such that the one or more testing or analysis components perform the one or more tests on the sample or the analyte. The one or more testing or analysis components can incubate the sample or analyte, heat the sample or analyte, cool the sample or analyte, separate the sample or analyte, distribute the sample or analyte, illuminate the sample or analyte, pressurize the sample or analyte, perform any other process, or any combination thereof. In addition, the one or more testing or analysis components may use one or more techniques, including but not limited to microarrays or micro-versions of polymerase chain reaction (PCR), sequencing, ligand binding assays, Luminex, microscopy, imaging, flow cytometry, or mass spectrometry.

[0030] The test cartridge 104, the test cartridge interface 132 or the housing 122 may also include one or more reservoirs, compartments, wells, channels, tubes, microfluidic pumps, nonfluidic pumps, pillars, inlets valves or outlet valves for storing, moving, processing, testing or disposing of the sample, the analyte, one or more reagents, one or more immobilized capture molecules, one or more chemicals, one or more cleaning fluids, one or more waste materials or a combination thereof. The test cartridges 104 are typically configured to perform one or more tests on the sample or the analyte. For example, test cartridge 104A is configured to perform a first test, test cartridge 104B is configured to perform a second test, and test cartridge 104N is configured to perform a set of other tests. So, the test cartridge 104 can be configured for a single specific test, a selected test from a set of available tests, or multiple tests (serial or parallel). The sample or analyte is deposited within the test cartridge 104 by any suitable means. The test cartridge 104 can be inserted into the test cartridge interface 132 before or after the deposit of the sample or analyte depending of the test to be performed,

the configuration of the test cartridge 104 and the method of obtaining the sample or analyte from the patient. The test cartridge 104 is preferably disposable; but in certain configurations and under suitable circumstances, the test cartridge 104 can be reused. Note that DNA samples from blood, saliva, etc., may need to be processed or extracted prior to running the test on the test cartridge 104. The analyte extraction process may be an integral part of the POC device 102 or may be made available as an external component that can be attached to the POC device 102, allowing for the fully automated introduction of the extracted sample to the test cartridge 104.

[0031] In one embodiment, the one or more processors 136 of the POC device 102 generate the report by transmitting the test results data to a remote device (e.g., the server computer 106) via network 108 and the one or more communication interfaces 130. The server computer 106 generates the report based on the analysis of the test results data, and transmits the report to the POC device 102. The report may include a gene-based predicted outcome, a possible effect on a patient, a genotype result for the patient, a genotype interpretation summary, a potentially harmful drug interaction report, a substance potential interaction report, a gene mutation report, a clinical background data, or a combination thereof. The report may also be based on the database(s) 120, which may contain one or more tables of genes, gene variants, drugs, gene-drug interaction scores, drug-drug interaction scores, RNA transcript-drug interaction scores, protein-drug interaction scores, metabolite-drug interaction scores, carbohydrate-drug interaction scores, lipid-drug interaction scores interaction scores, chemical-drug interaction scores, cell-drug interaction scores, tissue-drug interaction scores interaction scores, bacterium-drug interaction scores, fungus-drug interaction scores, virus-drug interaction scores, or other information. Alternatively, the POC device 102 can access or download at least a portion of the database(s) 120 via the remote server computer 106 and network 108 to generate the report based on the analysis of the test results data and at least the portion of the accessed or downloaded database(s) 120. In this case, the accessed or downloaded information is preferably encrypted and copy protected. The POC device 102 may also include one or more security measures, including but not limited to, user and password authentication, biometric identification (e.g., fingerprint, voice print, retina scan, etc.), or other suitable authentication process.

[0032] Referring now to FIG. 2, a block diagram of an apparatus 102 for evaluating samples or analytes in accordance with another embodiment of the present invention is shown. The POC device 102 includes a housing 122, a power supply 124 disposed within the housing 122, a memory 126 disposed within the housing 122, a user interface 128 attached to or integrated into the housing 122, one or more communication interfaces 130 disposed within, attached to or integrated into the housing 122, a test cartridge interface 132 disposed within, attached to or integrated into the housing 122, one or more detectors or sensors 134 disposed within the test cartridge interface 132 or the housing 122, a data storage 200, a sample port 202 connected to the test cartridge interface 132, one or more processors 136 disposed within the housing 122 and communicably coupled to the memory 126, the user interface 128, the one or more communication interfaces 130, the test cartridge interface 132, the one or more detectors or sensors 134, and the data storage 200. The housing 122 includes an opening, a hinge, a door, a lid or a panel 208 that provides access to the test cartridge interface 132.