

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 and store the information in data storage 200. The one or more processors 136 then 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 (FIG. 1) stored in data storage 200. 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.

[0038] With respect to the POC device 102 of FIGS. 1 and 2, the elapsed time from receiving the test selection to providing the report is less than 30 minutes. In other embodiments, the elapse time is less than 60 minutes, 120 minutes or other desirable time frame. The POC device 102 may provide a user with a status or completion of the testing, test results data, data processing, report generation, communication signal levels, secure connection to remote devices, data transmission, or other information via the user interface 130. Device diagnostics, errors, warnings, help information, software update notification, prompts to insert or remove the test cartridge 104 or other messages can be provided to a user via the user interface 130. The POC device 102 may also include additional functionality and/or components. For example, the one or more processors 136 may check for software or database updates/updates/patches periodically or prior to performing the tests or generating the report. The one or more processors may receive the test selection from the user interface by receiving one or more parameters from the user interface 128 and determining the test selection based on the one or more parameters. Moreover, the appropriate test cartridge 104 can be determined based on the test selection or a decision tree process provided to the user interface 128 by the one or more processors 136. The one or more processors 136 may further identify the test cartridge 104 connected to the test cartridge interface 132 using a code printed on the test cartridge 104, a RFID tag, one or more electrical or physical contacts of the test cartridge 104, other suitable identification methods, or a combination thereof. Furthermore, the one or more processors 136 may transmit an identification signal to one or more remotely located test cartridges 104 that match the test selection such that the one or more remotely located test cartridges 104 provide a visual or audible signal to a user upon receipt of the identification signal.

[0039] The POC device 102 may also include a light source (e.g., laser, light emitting diode, light bulb, etc.) disposed within the test cartridge interface 132 or the housing 122. One or more filters may be operably connected to the light source to provide a light having one or more specified wavelengths.

Other components can be added to the POC device 102 to provide the desired testing, detection and analysis as will be appreciated by those skilled in the art. As shown in FIG. 1, the POC device 102 may also be connected to one or more external testing devices 116 via the one or more communication interfaces 130 to receive a test data or to control the external testing devices 116. In some embodiments, the POC device 102 may be controlled remotely by a communication device 114 (e.g., smartphone, computer, laptop, personal data assistant, tablet, etc.). Patient information or patient clinical information 118 can be received and used in the analysis process to generate the report. Moreover, a test cartridge identification information can be linked to the patient information or patient clinical information 118.

[0040] The POC device 102 can have the ability to heat to temperatures in excess of 100° C. and to cool to below 0° C. The sample may be analyzed or separated by shaking, piezoelectric vibrator, thermal shock, electroporation, chemicals, and/or sonication by the device. The sample may be separated into components by centrifugation or magnetic or other type of separation by the POC device 102. The sample can be moved (pumped) utilizing nanofluidic or microfluidic pumps that are either micromachined mechanical pumps or pumps that move liquid based on capillary action or wicking forces from the port on to the test cartridge 104 for analysis. The sample may be distributed on the test cartridge 104 using pressure gradients, shaking or vibrating. The test cartridge 104 can contain immobilized capture molecules (DNA or protein or other molecule) with a detection reagent or molecule (fluorescent dye, nanoparticle, FRET pair, etc.). The capture molecules can be adsorbed or covalently attached to the cartridge surface in discrete areas. The test cartridge 104 can also utilize microfluidic or nanofluidic channels or pillars for the movement and processing of fluid. The test cartridge 104 can have one or more pumps (utilizing nanofluidic or microfluidic pumps that are either micro-machined mechanical pumps or pumps that move liquid based on capillary action or wicking forces) and can have inlet and exit valves that can be control where and when reagents are delivered. There can be valves for mixing of reagents on the cartridge. Depending on the assay, a detection reagent may be added to the test cartridge 104. The detection reagent would be stored on the test cartridge 104 in a compartment or reservoir. The test cartridge 104 may have one or more capillary electrophoresis channels. The top and/or bottom side of the test cartridge 104 may contain sealed compartments with reagents necessary to run the test. These compartments can be opened as needed during the cycle of the POC device 102 and the reagents delivered to the test cartridge 104. There can be an empty compartment on the test cartridge 104 to which used reagents can be transferred. The sample can be incubated on the test cartridge 104. This may occur at room temperature, with heating, with cooling, or with some combination. The incubation may be for seconds, minutes, or hours depending on the assay.

[0041] The POC device 102 can be able to take readings from the test cartridge 104 (electrical, resistance, impedance, light transmission, fluorescence, light scattering, refractive index, resonance, etc.) as dictated by the assay. The POC device 102 can have a detector, which may be tunable to specific wavelengths (e.g., an interferometer). The discrete areas in which the biological molecules are contained can be able to be read by the combination of the light source and the detector.