

ers, cardiac markers (e.g., one or more of Troponin T, Troponin I, myoglobin, CKMB, etc.), markers associated with hemostasis (e.g., one or more of Fibrin monomer, D-dimer, thrombin-antithrombin complex, prothrombin fragments 1 & 2, anti-Factor Xa, etc.), markers of acute viral hepatitis infection (e.g., one or more of IgM antibody to hepatitis A virus, IgM antibody to hepatitis B core antigen, hepatitis B surface antigen, antibody to hepatitis C virus, etc.), markers of Alzheimers Disease (β -amyloid, tau-protein, etc.), markers of osteoporosis (e.g., one or more of cross-linked N or C-telopeptides, total deoxyypyridinoline, free deoxyypyridinoline, osteocalcin, alkaline phosphatase, C-terminal propeptide of type I collagen, bone-specific alkaline phosphatase, etc.), markers of fertility (e.g., one or more of Estradiol, progesterone, follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin, β -hCG, testosterone, etc.), markers of congestive heart failure (e.g., one or more of β -natriuretic protein (BNP), a-natriuretic protein (ANP), endothelin, aldosterone, etc.), markers of thyroid disorders (e.g., one or more of thyroid stimulating hormone (TSH), Total T3, Free T3, Total T4, Free T4, and reverse T3), and markers of prostate cancer (e.g., one or more of total PSA, free PSA, complexed PSA, prostatic acid phosphatase, creatine kinase, etc.), pathogens associated with upper respiratory infection (e.g., influenza A, influenza B, Respiratory Syncytial Virus, Streptococci species), pathogens found in food and water (e.g., salmonella, listeria, cryptosporidia, campylobacter, *E. Coli* 0157, etc.), sexually transmitted diseases (e.g., HIV, syphilis, herpes, gonorrhea, HPV, etc.), blood borne pathogens and potential bioterrorism agents (e.g., pathogens and toxins in the CDC lists of Select A, B and C agents such as *B. anthracis*, *Y. pestis*, small pox, *F. tularensis*, ricin, botulinum toxins, staph enterotoxins, etc.). Preferred panels also include nucleic acid arrays for measuring mRNA levels of mRNA coding for cytokines, growth factors, components of the apoptosis pathway, expression of the P450 enzymes, expression of tumor related genes, pathogens (e.g., the pathogens listed above), etc. Preferred panels also include nucleic acid arrays for genotyping individuals (e.g., SNP analysis), pathogens, tumor cells, etc. Preferred panels also include libraries of enzymes and/or enzyme substrates (e.g., substrates and/or enzymes associated with ubiquitination, protease activity, kinase activity, phosphatase activity, nucleic acid processing activity, GTPase activity, guanine nucleotide exchange activity, GTPase activating activity, etc.). Preferred panels also include libraries of receptors or ligands (e.g., panels of G-protein coupled receptors, tyrosine kinase receptors, nuclear hormone receptors, cell adhesion molecules (integrins, VCAM, CD4, CD8), major histocompatibility complex proteins, nicotinic receptors, etc.). Preferred panels also include libraries of cells, cell membranes, membrane fragments, reconstituted membranes, organelles, etc. from different sources (e.g., from different cell types, cell lines, tissues, organisms, activation states, etc.).

[0297] The present invention also includes kits. The kits may include disassembled components necessary to make an assay module of the invention. Alternatively, the kits may comprise, in one or more containers, an assay module of the invention and at least one additional assay reagent necessary to carry out an assay. The one or more assay reagents may include, but are not limited to, binding reagents (preferably, labeled binding reagents, more preferably binding reagents labeled with electrochemiluminescent labels) specific for an

analyte of interest, ECL coreactants, enzymes, enzyme substrates, extraction reagents, assay calibration standards or controls, wash solutions, diluents, buffers, labels (preferably, electrochemiluminescent labels), etc. Preferred kits of the invention include cartridges adapted for extracting samples (as described in detail above), preferably samples collected on applicator sticks. These kits preferably include applicator sticks (more preferably swabs) that have properties that are matched to the specific cartridge. Most preferably, the applicator sticks have weak points that are matched to the geometry of a sample introduction chamber in the cartridge such that i) the sticks may be inserted and cleaved in the cartridge to form a head segment and ii) the head segment can be sealed in the sample chamber. Such kits may also include extraction buffers for extracting the sample on the applicator stick. One embodiment of the invention is a kit for measuring upper respiratory pathogens or pathogens that may be found in mucus-containing samples. The kit includes an applicator stick (preferably, a swab) for collecting the sample (the stick preferably comprising a weak point) and a cartridge for measuring a panel of pathogens (e.g., a panel of upper respiratory pathogens, a panel of sexually transmitted diseases, a panel of pathogens that dwell in mucous membranes, etc.), the cartridge preferably comprising one or more binding domains containing binding reagents that bind markers of these pathogens. The kit may also contain (in the cartridge or as a separate component), one or more labeled binding reagents against markers of these pathogens.

[0298] The invention includes assay modules (preferably assay cartridges) and module readers (preferably cartridge readers) as described above. These may be supplied as separate components. The invention also includes assay systems that comprise an assay module (preferably a cartridge) and a module reader (preferably a cartridge reader).

[0299] The present invention is not to be limited in scope by the specific embodiments described herein. Indeed, various modifications of the invention in addition to those described herein will become apparent to those skilled in the art from the foregoing description and accompanying figures. Such modifications are intended to fall within the scope of the claims.

1. A method of performing a plurality of biochemical assays using a plurality of electrodes comprising the steps of:

applying electrical energy between first and second electrodes of said plurality of electrodes;

measuring an assay dependent signal at said second electrode;

applying electrical energy between said second electrode and a third electrode of said plurality of electrodes; and

measuring an assay dependent signal at said third electrode.

2. The method according to claim 1 wherein said assay dependent signal is selected from the group consisting of electrical current, electrical potential and electrode-induced luminescence.

3. The method according to claim 2 wherein said assay dependent signal is electrochemiluminescence.

4. The method according to claim 1, said second electrode having a second electrode assay reagent immobilized