said subject's dietary consumption, exercise, health condition and/or metal condition.

[00218] Optionally, one may use paper-based system that becomes colored (blot reaction down) and does a colorimetric assay on the paper, measuring reflectance, instead of a system that uses transmission through a sample.

[00219] Other detection methods may include detecting agglutination where the system uses imaging from imaging device(s) in the system. Turbidimetric measurement techniques can use the spectrophotometer as the detector.

[00220] Optionally, the system may run or measure a coagulation assay on a nucleic acid assay station and there may be non-cytometry assay run or measured in the cytometer module.

[00221] Optionally, the system may measure lead or other metals that complex with porphyrins and result in a wavelength shift. In the event of a wavelength shift when a metal complexes with porphyrin, this may be detectable by spectrophotometery or other techniques for detecting the wavelength shift.

[00222] Optionally, the system may have a detector that measures heat in the sample.

[00223] Optionally, chromatographic techniques may be used to detect general chemistry assays. HPLC may be used. The sample may be processed so that its analyte levels are measured by UV or fluorescence. Some embodiments may use a filter that facilitates chromatography as the system does separations on the sample, such as in a tip.

[00224] Optionally, general chemistry assays may be characterized as an assay on a non-phase separated sample, wherein there is no washing or removal step to removal sample. The assays may occur in the homogenous phase versus the heterogeneous phase. The samples may be processed in additive, non-separating type of manner. Separating steps for assays not in the general chemistry group of assays may involve washing of beads, removing reaction medium to add new medium. In one non-limiting example, the assays in the general chemistry group are primarily not binder or antibody based. Typically, the assays in this group do not involve amplification of nucleic acids, imaging cells on a microscopy stage, or the determination of analyte level(s) in solution based on a labeled antibody or binder.

[00225] In ~~some embodiments~~an aspect, provided herein is a biological sample processing device comprising: a housing, and comprising within said housing: a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; b) a detection station; c) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~ d) an assay station configured to support

multiple components comprising i) a biological sample and ii) at least a first, a second, and a third fluidically isolated assay unit, and e) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; wherein the sample handling system is configured to i) transfer at least a portion of the biological sample to the first assay unit, the second assay unit, and the third assay unit; ii) transfer the first and second assay units containing biological sample to the detection station; and iii) transfer the third assay unit

containing biological sample to the cytometry station.

[00226] In some embodiments, provided herein is a biological sample processing device comprising: a) a sample handling system; b) a detection station; c) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; and d) an assay station configured to support multiple components comprising i) a biological sample, ii) at least a first, a second, and a third fluidically isolated assay unit, and iii) reagents to perform A) at least one immunoassay; B) at least one general chemistry assay; and C) at least one cytometry assay, and wherein the sample handling system is configured to i) transfer at least a portion of the biological sample to the first assay unit, the second assay unit, and the third assay unit; ii) transfer the first and second assay units containing biological sample to the detection station; and iii) transfer the third assay unit containing biological sample to the cytometry station.

[00227] In ~~some embodiments~~another aspect, provided herein is a biological sample processing device comprising: a housing, and comprising within said housing: a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; b) a first detection station comprising an optical sensor; c) a second detection station comprising a light source and an optical sensor; d) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~ e) an assay station configured to support i) a biological sample, ii) at least a first, a second, and a third fluidically isolated assay unit, and iii) reagents to perform A) at least one luminescence assay; B) at least one absorbance, turbimetric, or colorimetric assay; and C) at least one cytometry assay; and f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; wherein the first assay unit is configured to perform a luminescence assay, the second assay unit is configured to perform an absorbance, turbidimetric, or colorimetric assay, the third assay unit is configured to perform a cytometry assay, and the sample handling system is configured to i) transfer at least a portion of the biological sample to the first, second, and third assay units; ii) transfer the first assay unit containing biological sample to the first detection station; iii) transfer the second assay unit containing biological sample to the second detection station; and iv) transfer the third assay unit containing biological sample to the stage of the cytometry station.

[00228] In ~~some embodiments~~another aspect, provided herein is biological sample processing device, comprising: a housing, and comprising within said housing: a) a sample

handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; b) a detection station comprising an optical sensor; c) a fluidically isolated sample collection unit configured to retain a biological sample; d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises an antibody, the second unit comprises an oligonucleotide, and the third unit comprises a chromogen; and e) a controller, wherein the controller is operatively coupled to the sample handling system, wherein the sample handling system is configured to transfer a portion of the biological sample from the sample collection unit to each of the first assay unit, the second assay unit, and the third assay unit, and the device is configured to

perform an immunoassay, a nucleic acid assay, and a general chemistry assay comprising a chromogen; and f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00229] In ~~some embodiments~~another aspect, provide herein is a biological sample processing device, comprising a housing containing therein: a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; b) a detection station comprising an optical sensor; c) a fluidically isolated sample collection unit configured to retain a biological sample; d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises a first reagent, the second unit comprises a second reagent, and the third unit comprises a third reagent; ~~and~~ e) a controller, wherein the controller comprises a local memory and is operatively coupled to the sample handling system and the detection station; and f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; wherein the device is configured to perform assays with any one or more of the first, second, and third assay units; wherein the local memory of the controller comprises a protocol comprising instructions for: i) directing the sample handling system to transfer a portion of the biological sample to the first assay unit, the second assay unit and the third assay unit; and ii) directing the sample handling system to transfer the first unit, the second unit, and the third assay unit to the detection station.

[00230] In ~~some embodiments~~another aspect, provided herein is a method of performing at least 4 different assays selected from immunoassays, cytometric assays, and general chemistry assays on a biological sample, the method comprising: a) introducing a biological sample having a volume of no greater than 500 microliters into a sample processing device, wherein the device comprises: a housing, and comprising within said housing: i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second

location in the device; ii) a detection station; iii) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~ iv) an assay station comprising at least a first, a second, a third, and a fourth independently movable assay unit; and v) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; b) with the aid of the sample handling system, transferring a portion of the biological sample to each of the first, second, third, and fourth assay units, wherein a different assay is performed in each of the first, second, third, and fourth assay units; c) with the aid of the sample handling system, transferring the first, second, third, and fourth assay units to the detection station or cytometry station, wherein assay units comprising immunoassays or general chemistry assays are transferred to the detection station and assay units comprising cytometric assays are transferred to the cytometry station; d) with the aid of the detection station or cytometry station, obtaining data measurements of the assay performed in each of the first, second, third, and fourth assay units; e) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device. In some embodiments, the above method may apply to a method of performing 2, 3, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 20, 25, 30, 35, 40, 50, 60, 70, 80, 90, 100, 150, 200, or more different assays.

[00231] In ~~some embodiments~~another aspect, provided herein is a method of processing a biological sample,

comprising: a) introducing a sample having a volume of 500 microliters or less into a sample processing device comprising: a housing, and comprising within said housing: i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; ii) at least a first and a second fluidically isolated vessel; ~~and~~ iii) a diluent, wherein the sample comprises bodily fluid at a first concentration; and iv) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; b) with the aid of the sample handling system, mixing at least a portion of the sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half or less of the first concentration of bodily fluid; ~~and,~~ c) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels; and d) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00232] In ~~some embodiments~~another aspect, provided herein is a method of processing a biological sample, comprising: a) introducing a sample having a volume of 500 microliters or less into a sample processing device comprising: a housing, and comprising within said housing: i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; ii) at least a first and a second fluidically isolated vessel; iii) a diluent; ~~and~~ iv) a centrifuge, wherein the sample comprises bodily fluid at a first concentration; and v) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; b) with the aid of the sample handling system, introducing at least a portion of the sample into the centrifuge; c) centrifuging the sample, to generate a centrifuged sample; d) with the aid of the sample handling system, removing at least a portion of the centrifuged sample from the

centrifuge; and e) with the aid of the sample handling system, mixing at least a portion of the centrifuged sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half or less of the first concentration of bodily fluid; ~~and,~~ f) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels; and g) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00233] In ~~some embodiments~~another aspect, provided herein is a method of preparing a biological sample, comprising: a) introducing a biological sample and at least one isolated vessel into a sample processing device comprising a centrifuge and a sample handling system, wherein the sample processing device comprises: a housing and comprising within said housing: a fluid handling apparatus with a pipette head comprising a pipette nozzle and comprising at least a portion of a fluid path; a sample processing component comprising a pipette tip; and an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; b) with the aid of the sample handling system, introducing at least a portion of the biological sample into the centrifuge, wherein the centrifuge comprises one or more cavities and wherein the one or more cavities are configured to receive a total of no more than 500 microliters between all of the one or more cavities; c) centrifuging the sample, to generate a centrifuged sample; d) with the aid of the sample handling system, removing at

least a portion of the centrifuged sample from the centrifuge; ~~and~~ e) with the aid of the sample handling system, transferring centrifuged sample removed from the centrifuge from step d) into the fluidically isolated vessel.

[00233a] According to an aspect, provided herein is a sample processing device comprising: a housing and comprising within said housing: a fluid handling apparatus comprising a first pipette head and a second pipette head, the first pipette head comprising a first pipette nozzle and the second pipette head comprising a second pipette nozzle, wherein at least the first pipette nozzle comprises at least a portion of a fluid path; ~~and~~ a sample processing component comprising a pipette tip, a first interface feature and a second interface feature, the first and second interface features each being configured to engage with a nozzle of the fluid handling apparatus; and an imaging device within said housing and configured to obtain an image of said first pipette nozzle and said second pipette nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; wherein the fluid handling apparatus is operable to engage simultaneously the first interface feature of the sample processing component with the first pipette nozzle and the second interface feature of the sample processing component with the second pipette nozzle and to transport the sample processing component from a first location to a second location in the device.

[00233b] According to an aspect, herein provided is a method for transporting a sample processing component in a sample processing device, the method comprising: engaging the sample processing component with at least a first nozzle and a second nozzle of a fluid handling apparatus, the fluid handling apparatus comprising at least a first pipette head and a second pipette head, the first pipette head comprising the first nozzle and the second pipette head comprising the second nozzle, and wherein the sample processing component comprises a pipette tip and is at a first location in the device when engaged by the first and second nozzle, and wherein the sample processing device comprises: a housing and comprising within said housing: an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; obtaining an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; and transporting by the fluid handling apparatus the engaged sample processing component to a second location in the device.

[00233c] According to an aspect, herein provided is a sample processing device comprising: a housing, and comprising within said housing: a cuvette comprising a first pick-up interface and a

second pick-up interface, each interface being configured to engage with a nozzle of a fluid handling apparatus and a first cavity and a second cavity, each of the first and second cavity being configured to accept a fluid; a pipette tip; and a fluid handling apparatus comprising a first nozzle and a second nozzle, wherein the fluid handling apparatus is operable to: engage simultaneously the first pick-up interface of the cuvette with the first nozzle and the second pick-up interface of the cuvette with the second nozzle, transport the cuvette from a first location in the device to a second location in the device when the first pick-up interface is engaged with the first nozzle and the second pick-up interface is engaged with the second nozzle, engage the pipette tip with the first nozzle, and aspirate fluid into and or dispense fluid out of the pipette tip when the pipette tip is engaged by the first nozzle; and an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device.

[00233d] According to an aspect, provided herein is a method of handling components in a sample processing device comprising a fluid handling apparatus, the method comprising: engaging a pipette tip with a first nozzle of the fluid handling apparatus, the fluid handling apparatus comprising at least the first nozzle and a second nozzle and wherein the sample processing device comprises: a housing and comprising within said housing: an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; obtaining an image of said first nozzle and said second nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; disengaging the pipette tip from the first nozzle; engaging simultaneously a first pick-up interface of a cuvette with the first nozzle and a second pick-up interface of the cuvette with the second nozzle, wherein the cuvette comprises the first pick-up interface and the second pick-up interface, each interface being configured to engage a nozzle of the fluid handling apparatus, and at least a first cavity and a second cavity, each cavity being configured to accept a fluid; and disengaging the cuvette from the first and second nozzle.

[00233e] According to an aspect, provided herein is a method of processing a biological sample, comprising: introducing a sample having a volume of 500 microliters or less into a sample processing device wherein the sample processing device comprises: a housing and comprising within said housing: a fluid handling apparatus with a pipette head comprising a pipette nozzle and comprising at least a portion of a fluid path; a sample processing component comprising a pipette tip; and an imaging device within said housing and configured to obtain an image of said

nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; and obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00233f] According to an aspect, provided herein is a biological sample processing system comprising: a sample processing device, the sample processing device further comprising: a housing, and comprising within said housing: a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; and an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00233g] According to an aspect, provided herein is a biological sample processing device comprising: a housing, and comprising within said housing: a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; b) a detection station; and c) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

[00234] In some embodiments, in an assay station described above or elsewhere herein, the assay station is configured to support multiple components. The components may comprise, for example, any one or more of: i) a biological sample; ii) any number of fluidically isolated assay units (for example, at least a first, a second, and a third fluidically isolated assay unit); iii) any number of fluidically isolated reagent units (its (for example, at least a first, a second, and a third fluidically isolated reagent unit); iv) reagents to support any number of immunoassays; v) reagents to support any number of general chemistry assays; vi) reagents to support any number of cytometry assays; vii) reagents to support any number of nucleic acid assays; viii) reagents to perform any number of

luminescent assays; ix) any number of absorbance, turbimetric, or colorimetric assays; x) any number of fluidically isolated vessels; or xi) two or more fluidically isolated vessels which are physically linked.

[00235] In some embodiments, an assay station described above or elsewhere herein that is configured to support multiple components may contain the components.

[00236] In some embodiments, a sample processing device described above or elsewhere herein that contains an assay station receiving location may also contain an assay station. In some embodiments, in a sample processing device described above or elsewhere herein that contains an assay station, the assay station may be located in an assay station receiving location. In some embodiments, a sample processing device described above or elsewhere herein that is configured to receive an assay station may contain an assay station.

[00237] In some embodiments, an assay station or cartridge described above or elsewhere herein may be configured to support a biological sample of no greater than 100 ml, 50 ml, 30 ml, 20 ml, 10 ml, 5 ml, 2 ml, 1.5 ml, 1 ml, 750 microliters, 500 microliters, 400 microliters, 300 microliters, 200 microliters, 100 microliters 75 microliters, 50 microliters, 40 microliters, 30 microliters, 20 microliters, 10 microliters, 5 microliters, 3 microliters, or 1 microliter.

[00238] In some embodiments, an assay station or cartridge described above or elsewhere herein may be configured to support a sample collection unit.

[00239] In some embodiments, a sample handling system described above or elsewhere herein may be configured to any one or more of: i) transfer at least a portion of a biological sample to or between one or more assay units, cuvettes, tips, or other vessels; ii) transfer any one or more assay units, cuvettes, tips, or other vessels between (to or from) an assay station and a detection station; iii) transfer any one or more assay units, cuvettes, tips, or other vessels between (to or from) an assay station and a cytometry station; iv) transfer any one or more assay units,

CLAIMS

WHAT IS CLAIMED IS:

1. A biological sample processing device comprising:

a housing, and comprising within said housing:

a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

b) a detection station;

c) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~

d) an assay station configured to support multiple components comprising i) a biological sample and ii) at least a first, a second, and a third fluidically isolated assay unit, and

e) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

wherein the sample handling system is configured to i) transfer at least a portion of the biological sample to the first assay unit, the second assay unit, and the third assay unit; ii) transfer the first and second assay units containing biological sample to the detection station; and iii) transfer the third assay unit containing biological sample to the cytometry station.

2. A biological sample processing device comprising:

a housing, and comprising within said housing:

a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a

pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus;

wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

b) a first detection station comprising an optical sensor;

c) a second detection station comprising a light source and an optical sensor;

d) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~

e) an assay station configured to support i) a biological sample, ii) at least a first, a second, and a third fluidically isolated assay unit, and iii) reagents to perform A) at least one luminescence assay; B) at least one absorbance, turbimetric, or colorimetric assay; and C) at least one cytometry assay; and

f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

wherein the first assay unit is configured to perform a luminescence assay, the second assay unit is configured to perform an absorbance, turbidimetric, or colorimetric assay, the third assay unit is configured to perform a cytometry assay, and the sample handling system is configured to i) transfer at least a portion of the biological sample to the first, second, and third assay units; ii) transfer the first assay unit containing biological sample to the first detection station; iii) transfer the second assay unit containing biological sample to the second detection station; and iv) transfer the third assay unit containing biological sample to the stage of the cytometry station.

3. A biological sample processing device, comprising:

a housing, and comprising within said housing:

a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

b) a detection station comprising an optical sensor;

c) a fluidically isolated sample collection unit configured to retain a biological sample;

d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises an antibody, the second unit comprises an oligonucleotide, and the third unit comprises a chromogen; ~~and~~

e) a controller, wherein the controller is operatively coupled to the sample handling system, wherein the sample handling system is configured to transfer a portion of the biological sample from the sample collection unit to each of the first assay unit, the second assay unit, and the third assay unit, and the device is configured to perform an immunoassay, a nucleic acid assay, and a general chemistry assay comprising a chromogen; and

f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

4. A biological sample processing device, comprising a housing containing therein:

a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

b) a detection station comprising an optical sensor;

c) a fluidically isolated sample collection unit configured to retain a biological sample;

d) an assay station comprising at least a first, second, and third fluidically isolated assay unit, wherein the first unit comprises a first reagent, the second unit comprises a second reagent, and the third unit comprises a third reagent; ~~and~~

e) a controller, wherein the controller comprises a local memory and is operatively coupled to the sample handling system and the detection station; and

f) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

wherein the device is configured to perform assays with any one or more of the first, second, and third assay units; wherein the local memory of the controller comprises a protocol comprising instructions for: i) directing the sample handling system to transfer a portion of the biological sample to the first assay unit, the second assay unit and the third assay unit; and ii) directing the sample handling system to transfer the first unit, the second unit, and the third assay unit to the detection station.

5. A method of performing at least 4 different assays selected from immunoassays, cytometric assays, and general chemistry assays on a biological sample, the method comprising:

a) introducing a biological sample having a volume of no greater than 500 microliters into a sample processing device, wherein the device comprises:

a housing, and comprising within said housing:

i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus;

wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

ii) a detection station;

iii) a cytometry station comprising an imaging device and a stage for receiving a microscopy cuvette; ~~and~~

iv) an assay station comprising at least a first, a second, a third, and a fourth independently movable assay unit; and

v) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

b) with the aid of the sample handling system, transferring a portion of the biological sample to each of the first, second, third, and fourth assay units, wherein a different assay is performed in each of the first, second, third, and fourth assay units;

c) with the aid of the sample handling system, transferring the first, second, third, and fourth assay units to the detection station or cytometry station, wherein assay units comprising immunoassays or general chemistry assays are transferred to the detection station and assay units comprising cytometric assays are transferred to the cytometry station;

d) with the aid of the detection station or cytometry station, obtaining data measurements of the assay performed in each of the first, second, third, and fourth assay units;

e) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

6. A method of processing a biological sample, comprising:

a) introducing a sample having a volume of 500 microliters or less into a sample processing device comprising:

a housing, and comprising within said housing:

i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus;

wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

ii) at least a first and a second fluidically isolated vessel; ~~and~~

iii) a diluent, wherein the sample comprises bodily fluid at a first concentration; and

iv) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

b) with the aid of the sample handling system, mixing at least a portion of the sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half or less of the first concentration of bodily fluid; ~~and,~~

c) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels; and

d) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

7. A method of processing a biological sample, comprising:

a) introducing a sample having a volume of 500 microliters or less into a sample processing device comprising:

a housing, and comprising within said housing:

i) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus;
wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device;

ii) at least a first and a second fluidically isolated vessel;

iii) a diluent; ~~and~~

iv) a centrifuge, wherein the sample comprises bodily fluid at a first concentration; and

v) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

b) with the aid of the sample handling system, introducing at least a portion of the sample into the centrifuge;

c) centrifuging the sample, to generate a centrifuged sample;

d) with the aid of the sample handling system, removing at least a portion of the centrifuged sample from the centrifuge; and

e) with the aid of the sample handling system, mixing at least a portion of the centrifuged sample with the diluent to generate a diluted sample, wherein the diluted sample comprises bodily fluid at a second concentration, and the second concentration of bodily fluid is one-half or less of the first concentration of bodily fluid; ~~and,~~

f) with the aid of the sample handling system, transferring at least a portion of the diluted sample to the first and the second fluidically isolated vessels; and

g) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

8. A method of preparing a biological sample, comprising:

a) introducing a biological sample and at least one isolated vessel into a sample processing device comprising a centrifuge and a sample handling system,

wherein the sample processing device comprises:

a housing and comprising within said housing:

a fluid handling apparatus with a pipette head comprising a pipette nozzle and comprising at least a portion of a fluid path;

a sample processing component comprising a pipette tip; and

an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device;

b) with the aid of the sample handling system, introducing at least a portion of the biological sample into the centrifuge, wherein the centrifuge comprises one or more cavities and

wherein the one or more cavities are configured to receive a total of no more than 500 microliters between all of the one or more cavities;

c) centrifuging the sample, to generate a centrifuged sample;

d) with the aid of the sample handling system, removing at least a portion of the centrifuged sample from the centrifuge; ~~and~~

e) with the aid of the sample handling system, transferring centrifuged sample removed from the centrifuge from step d) into the fluidically isolated vessel; and

f) with the aid of the imaging device, obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

9. A sample processing device comprising:

a housing and comprising within said housing:

a fluid handling apparatus comprising a first pipette head and a second pipette head, the first pipette head comprising a first pipette nozzle and the second pipette head comprising a second pipette nozzle, wherein at least the first pipette nozzle comprises at least a portion of a fluid path; ~~and~~

a sample processing component comprising a pipette tip, a first interface feature and a second interface feature, the first and second interface features each being configured to engage with a nozzle of the fluid handling apparatus; and

an imaging device within said housing and configured to obtain an image of said first pipette nozzle and said second pipette nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device;

comprises a base operatively connected to the first and second pipette heads, and wherein at least the first and second pipette nozzles are vertically movable relative to the base.

19. A method for transporting a sample processing component in a sample processing device, the method comprising:

engaging the sample processing component with at least a first nozzle and a second nozzle of a fluid handling apparatus, the fluid handling apparatus comprising at least a first pipette head and a second pipette head, the first pipette head comprising the first nozzle and the second pipette head comprising the second nozzle, and wherein the sample processing component comprises a pipette tip and is at a first location in the device when engaged by the first and second nozzle, and wherein the sample processing device comprises:

a housing and comprising within said housing:

an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device;

obtaining an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device; and

transporting by the fluid handling apparatus the engaged sample processing component to a second location in the device.

20. The method of claim 19, wherein the fluid handling apparatus further comprises a third pipette head, the third pipette head comprising a third nozzle, and wherein the sample processing component is not engaged with the third nozzle when the sample processing component is transported by the fluid handling apparatus.

21. The method of claim 20, wherein the first, second, and third pipette heads are arranged in a configuration, and wherein the first and second pipette heads are separated from each other in the configuration by at least the third pipette head.

22. The method of claim 19, further comprising: disengaging the sample processing component at the second location in the device.

23. The method of claim 22, further comprising: engaging a pipette tip with the first nozzle of the fluid handling apparatus; and

aspirating a liquid into or dispensing a liquid from the pipette tip.

24. A sample processing device comprising:

a housing, and comprising within said housing:

a cuvette comprising i) a first pick-up interface and a second pick-up interface, each interface being configured to engage with a nozzle of a fluid handling apparatus and ii) a first cavity and a second cavity, each of the first and second cavity being configured to accept a fluid;

a pipette tip; ~~and~~

a fluid handling apparatus comprising a first nozzle and a second nozzle, wherein the fluid handling apparatus is operable to: i) engage simultaneously the first pick-up interface of the

cuvette with the first nozzle and the second pick-up interface of the cuvette with the second nozzle, ii) transport the cuvette from a first location in the device to a second location in the device when the first pick-up interface is engaged with the first nozzle and the second pick-up interface is engaged with the second nozzle, iii) engage the pipette tip with the first nozzle, and iv) aspirate fluid into and or dispense fluid out of the pipette tip when the pipette tip is engaged by the first nozzle; and

an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device.

25. The sample processing device of claim 24, wherein the first cavity and second cavity of the cuvette are fluidically linked.

26. The sample processing device of claim 24, wherein the first cavity and second cavity of the cuvette are fluidically isolated.

27. The sample processing device of claim 24, wherein the first pick-up interface is at least a portion of the first cavity.

28. The sample processing device of claim 27, wherein the at least a portion of the first cavity comprises a tapered region.

29. The sample processing device of claim 24, wherein the first pick-up interface is separate from both the first cavity and second cavity.

30. The sample processing device of claim 24, wherein the fluid handling apparatus further comprises a third nozzle, wherein the first, second, and third nozzles are arranged in a configuration, and wherein the first and second nozzles are separated from each other in the configuration by at least the third nozzle.

31. A method of handling components in a sample processing device comprising a fluid handling apparatus, the method comprising:

engaging a pipette tip with a first nozzle of the fluid handling apparatus, the fluid handling apparatus comprising at least the first nozzle and a second nozzle and wherein the sample processing device comprises:

a housing and comprising within said housing:

an imaging device within said housing and configured to obtain an image of said first nozzle and said second nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device;

obtaining an image of said first nozzle and said second nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the respective nozzle within the sample processing device;

disengaging the pipette tip from the first nozzle;

engaging simultaneously a first pick-up interface of a cuvette with the first nozzle and a second pick-up interface of the cuvette with the second nozzle, wherein the cuvette comprises i) the first pick-up interface and the second pick-up interface, each interface being configured to engage a nozzle of the fluid handling apparatus, and ii) at least a first cavity and a second cavity, each cavity being configured to accept a fluid; and

disengaging the cuvette from the first and second nozzle.

32. The method of claim 31, further comprising, after engaging and before disengaging the pipette tip from the first nozzle, aspirating a liquid into or dispensing a liquid from the pipette tip.

33. The method of claim 31, wherein, when engaged, the cuvette is in a first location in the device, and when disengaged, the cuvette is in a second location in the device.

34. The method of claim 33, wherein the second location is a spectrophotometer.

35. The method of claim 31, wherein, when engaged, the pipette tip is in a cartridge in the sample processing device, the cartridge being insertable into the sample processing device, and when disengaged, the pipette tip is in the same cartridge.

36. The method of claim 31, wherein the fluid handling apparatus further comprises a third nozzle, and wherein the cuvette is not engaged with the third nozzle when the first pick-up interface of the cuvette is engaged by the first nozzle and the second pick-up interface of the cuvette is engaged by the second nozzle.

37. The method of claim 31, wherein the first pick-up interface is at least a portion of the first cavity of the cuvette.

38. The method of claim 31, wherein the first pick-up interface is separate from both the first cavity and second cavity of the cuvette.

39. A biological sample processing device comprising:

a housing, and comprising within said housing:

a) a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; ~~and~~

b) a detection station; and

c) an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle

within the sample processing device.

40. A method of processing a biological sample, comprising: introducing a sample having a volume of 500 microliters or less into a sample processing device, wherein the sample processing device comprises:

a housing and comprising within said housing:

a fluid handling apparatus with a pipette head comprising a pipette nozzle and comprising at least a portion of a fluid path;

a sample processing component comprising a pipette tip; and

an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device,

effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device; and

obtaining an image of the nozzle and the pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.

41. A biological sample processing system comprising: a sample processing device, the sample processing device further comprising:

a housing, and comprising within said housing:

a sample handling system comprising a fluid handling apparatus comprising a pipette head, the pipette head comprising a pipette nozzle, wherein said pipette nozzle comprises at least a portion of a fluid path; and a sample processing component comprising a pipette tip, said pipette tip being configured to engage with the nozzle of the fluid handling apparatus; wherein the fluid handling apparatus is operable to engage said pipette tip with the pipette nozzle and to transport the sample processing component from a first location to a second location in the device; and

an imaging device within said housing and configured to obtain an image of said nozzle and said pipette tip within the housing of the sample processing device, effective to provide information regarding whether or not the pipette tip is properly seated on the nozzle within the sample processing device.