

[0068] Although the present invention has been described with reference to preferred embodiments, workers skilled in the art will recognize that changes may be made in form and detail without departing from the spirit and scope of the invention.

[0069] The complete disclosures of the patents, patent documents and publications cited herein are incorporated by reference in their entirety as if each were individually incorporated. Various modifications and alterations to this invention will become apparent to those skilled in the art without departing from the scope and spirit of this invention. It should be understood that this invention is not intended to be unduly limited by the illustrative embodiments and examples set forth herein and that such examples and embodiments are presented by way of example only with the scope of the invention intended to be limited only by the claims set forth herein as follows.

1. An apparatus for processing a sample of biological material, wherein the apparatus comprises:

- a central housing segment comprising a capture medium adapted to isolate an analyte from the sample of biological material;
- a first housing segment configured to receive a sample collection assembly having a first fluid reservoir and the apparatus including a flow path from the first housing segment to the central housing segment;
- a second housing segment comprising a testing device and the apparatus including a flow path between the central housing segment and the second housing segment;
- a third housing segment configured to retain at least a portion of the first fluid after it is released from the first fluid reservoir and the apparatus including a flow path between the central housing segment and third housing segment;
- a fourth housing segment comprising a second fluid reservoir and the apparatus including a flow path between the fourth housing segment and the central housing segment; and a valve assembly configured to regulate flow in at least one of the flow paths between the first second, third and fourth housing segments and the central housing segment.

2. The apparatus of claim 1, wherein the second housing segment includes:

- a fluid reservoir;
- the testing device; and
- a channel that connects the fluid reservoir and the testing device.

3. The apparatus of claim 1, wherein the testing device is a calorimetric sensor.

4. The apparatus of claim 3, wherein the calorimetric sensor comprises a polydicytylene material.

5. The apparatus of claim 2 wherein the channel comprises a plurality of microfluidic channels.

6. The apparatus of claim 1, wherein the valve assembly comprises a rotary valve.

7. The apparatus of claim 1, wherein the capture medium is selected from a group consisting of beads, a porous membrane, a foam, a frit, a screen, and combinations thereof.

8. The apparatus of claim 1 wherein the capture medium is coated with a ligand specific to the analyte.

9. The apparatus of claim 1, wherein the first fluid reservoir is a deformable squeeze cap.

10. The apparatus of claim 1 wherein the second fluid reservoir comprises an outlet port, and wherein the outlet port comprises a dehydrated reagent coated on at least a part of an interior of the outlet port.

11. The apparatus of claim 1 wherein the valve assembly is configured to regulate flow in a plurality of the flow paths between the first, second, third and fourth housing segments and the central housing segment.

12. The apparatus of claim 1, in combination with the sample collection assembly including a swab.

13. The apparatus of claim 1, wherein the third housing segment comprises an absorbent material.

14. The apparatus of claim 1, wherein the first, second, third, and fourth housing segments each comprise a generally flexible wall attached to a generally rigid frame.

15. The apparatus of claim 1, wherein the central housing segment further comprises a reagent material adapted to react with the analyte.

16. The apparatus of claim 1 wherein the fourth housing segment includes an outlet port disposed between the second fluid reservoir and the central housing segment, wherein the outlet port comprises a dehydrated reagent.

17. The apparatus of claim 1, wherein the central housing segment comprises a deformable blister, and wherein the valve comprises a seal selector that is configured to seal off the blister in various configurations, thereby adjusting a flow path of fluid the central housing segment.

18. The apparatus of claim 1 wherein the valve assembly includes a plurality of positions and in a first position, the valve assembly restricts flow in the flow path between the central housing segment and the second housing segment and in a second position, the valve assembly restricts flow in the flow path between the central housing segment and the third housing segment.

19. A method of processing a sample of biological material, the method comprising:

- eluting a sample of biological material from a sample collection device into a first housing segment using a first fluid;
- directing the first fluid along a first flow path from the first housing segment to a central housing segment to capture analyte in a central cavity;
- collecting the first fluid from the central cavity in a third housing segment;
- actuating a valve to close a flow path from the central housing segment to the third housing segment and open a flow path from the central cavity to a second housing segment
- introducing a second fluid from a fourth housing segment into the central housing segment to release the analyte from a capture medium, and provide fluid flow from the central housing segment into the second housing segment for testing.

20. The method of claim 19, and further comprising: obtaining a sample of biological material with the sample collection device.

21. The method of claim 19 wherein the valve is actuated manually or using an automated device.

22. The method of claim 19 and further comprising the step of:

- mixing the second fluid with a reagent prior to introducing the second fluid into the central housing segment.