

- a heating element in communication with the cartridge receiving element, configured to heat one or more regions of the cartridge; and
- control circuitry in communication with the heating element;
- wherein the insertable cartridge comprises:
- at least one microfluidic component that, in conjunction with the heating element and the control circuitry, is configured to accept the sample and one or more reagents, and to react the sample and the reagents, in order to produce a prepared sample suitable for analysis of the one or more polynucleotides.
2. The system of claim 1, wherein the insertable cartridge further comprises:
- a sample inlet for receiving the sample;
- a reagent inlet for accepting one or more reagents; and
- an outlet for directing prepared sample into a PCR tube.
3. The system of claim 2, wherein the microfluidic component comprises:
- one or more channels configured to transmit volumes of fluid in the range 0.1-50  $\mu$ l, wherein the one or more channels ensure passage of sample, reagents, and fluid between the sample inlet, the reagent inlet, and the outlet.
4. The system of claim 1, wherein the microfluidic component comprises one or more microfluidic elements selected from the group consisting of:
- at least one valve;
- at least one gate;
- at least one filter; and
- at least one waste chamber.
5. The system of claim 4, wherein one or more of the at least one valves is situated in one of the regions of the cartridge that is heated by the heating element, and comprises a material that melts when the heating element applies heat thereto.
6. The system of claim 1, wherein the analyzing is performed by a machine configured to carry out a method selected from the group consisting of: PCR, TMA, SDA, and NASBA.
7. The system of claim 1 wherein the sample is between about 0.5 mL and 2.0 mL in volume.
8. The system of claim 2 further comprising a heating element for heating the sample in the sample inlet.
9. The system of claim 1, further comprising a display that communicates to a user of the system one or more of:
- current status of the system;
- progress of sample preparation; and
- a warning message in case of malfunction of either system or cartridge.
10. The system of claim 1, further comprising an interface for connecting the system to a computer or a network of computers.
11. The system of claim 1, further comprising a computer-readable memory which stores instructions for operating the control circuitry.
12. The system of claim 11 further comprising a processing unit for executing the instructions.
13. The system of claim 1 further comprising an input device for accepting information from a user.
14. The system of claim 1, wherein the cartridge is configured to accept two or more separate samples.
15. The system of claim 1, configured to accept two or more cartridges.
16. The system of claim 15, configured to accept three cartridges.
17. A microfluidic cartridge for converting a sample containing one or more polynucleotides into a form suitable for analyzing the one or more polynucleotides, the cartridge comprising:
- a sample inlet for receiving the sample;
- a reagent inlet for accepting one or more reagents;
- an outlet for directing prepared sample into a PCR tube; and
- a microfluidic component having one or more channels configured to transmit volumes of fluid in the range 0.1-50  $\mu$ l;
- wherein the one or more channels ensure passage of sample, reagents, and fluid between the sample inlet, the reagent inlet, and the outlet; and
- wherein the microfluidic cartridge, in conjunction with an external source of heat, is configured to react the sample and the reagents, in order to produce a prepared sample suitable for analyzing the one or more polynucleotides.
18. The microfluidic cartridge of claim 17, wherein the PCR tube is removable.
19. A multi-sample cartridge for converting a number of samples, including at least a first sample and a second sample, wherein said first sample and said second sample each contain one or more polynucleotides, into respective forms suitable for analyzing the one or more polynucleotides, the multi-sample cartridge comprising:
- at least a first microfluidic cartridge and a second microfluidic cartridge,
- separably affixed to one another, wherein each of said first microfluidic cartridge and said second microfluidic cartridge is according to claim 15, and wherein the first microfluidic cartridge accepts the first sample, and wherein the second microfluidic cartridge accepts the second sample.
20. The multi-sample cartridge of claim 19, wherein said number is eight.
21. The multi-sample cartridge of claim 19 having a size substantially the same as that of a 96-well plate.
22. The multi-sample cartridge of claim 19, further comprising a first PCR tube attached to the first microfluidic component, and a second PCR tube attached to the second microfluidic component.
23. The multi-sample cartridge of claim 22, wherein the first sample is converted into a first prepared sample, delivered to the first PCR tube, and the second sample is converted into a second prepared sample, delivered to the second PCR tube.
24. The multi-sample cartridge of claim 22, wherein the first PCR tube and the second PCR tube are at a distance of