CLAIMS

1. A fluidic device configured to drive movement of fluid under centrifugal force, the fluidic device comprising:

a central region about a central rotational axis of the device and a peripheral region extending radially outwards from the central region;

a fluid reservoir provided in the central region of the device for receiving a fluid sample, the fluid reservoir in communication with at least one fluidic system, the at least one fluidic system extending radially outwards from the fluid reservoir into the peripheral region of the device; the or each fluidic system comprising:

a fluid analysis chamber configured to retain a portion of a fluid sample for analysis;

a fluidic channel arrangement configured to enable fluid communication between the fluid reservoir and the fluid analysis chamber, in which movement of the fluid sample through the fluidic channel arrangement is driven by centrifugal force arising from rotational motion of the device about the central rotational axis; and

a first valve mechanism configured to prevent fluid flow through a portion of the fluidic channel arrangement when the speed of rotation of the device is less than a first predetermined value, in which the first valve mechanism is arranged between the fluid reservoir and the analysis chamber.

2. A fluidic device according to Claim 1, in which the fluidic channel arrangement comprises:

a separation chamber configured to remove unwanted particles from the fluid sample prior to the fluid sample entering the analysis chamber; and

a first fluidic channel extending radially outwardly from the fluid reservoir to the separation chamber and communicating with the separation chamber through a wall in a radially outer region of the separation chamber.

3. A fluidic device according to Claim 2, in which the separation chamber has a depth (d) defining the height between a base of the separation chamber and the top of the separation chamber, and the first fluidic channel is arranged to communicate with the separation chamber at or proximate the base of the separation chamber.

4. A fluidic device according to Claim 2 or 3, in which the fluidic channel arrangement comprises:

a second fluidic channel configured for fluid communication between the separation chamber and the fluid analysis chamber,

and in which the first valve mechanism is located in the flow path of the second fluidic channel between the separation chamber and the analysis chamber.

5. A fluidic device according to Claim 4, in which the second fluidic channel comprises a pair of channel arms configured to enable fluid flow in substantially antiparallel directions, and in which the first valve mechanism is located in the flow path between the two channel arms.

6. A fluidic device according to Claim 4 or 5, in which the second fluidic channel comprises a first channel arm for fluid communication between the separation chamber and the first valve mechanism, the first channel arm extending radially inwardly from the separation chamber to the first valve mechanism and communicating with the separation chamber through a wall in a radially inner region of the separation chamber.

7. A fluidic device according to any of Claims 4 to 6, in which the second fluidic channel comprises a second channel arm for fluid communication between the first valve mechanism and the analysis chamber, the second channel arm extending radially outwardly from the first valve mechanism to the analysis chamber.

8. A fluidic device according to any of Claims 5 to 7, in which the internal corners of the channel arms are rounded, in use to reduce wicking of fluid along the channels in a direction counter to centrifugal forces acting on the fluid.

9. A fluidic device according to any preceding claim, in which the first valve mechanism is located radially inwardly of the separation chamber and/or the fluid analysis chamber.

10. A fluidic device according to any preceding claim, in which the first valve mechanism defines a chamber for receiving a predetermined quantity of gas, the chamber having a maximum dimensions in x, y and z axes, in which the x axis defines a radial direction, the y axis defines a direction perpendicular to the x axis in a radial plane, and the z axis defines a direction perpendicular to both the x and y axes parallel to the axis of rotation, and in which the first valve mechanism has a largest dimension in the z axis.

11. A fluidic device according to any preceding claim, in which the first valve mechanism is arranged circumferentially around and adjacent the fluid reservoir.

12. A fluidic device according to any of Claims 2 to 11, in which the fluid analysis chamber is arranged radially outwards of the separation chamber; preferably, in which the fluid analysis chamber is the radially outermost element of the fluidic system.

13. A fluidic device according to any preceding claim, in which the fluid analysis chamber is cylindrical having a substantially circular cross section in an axial plane of the device.

14. A fluidic device according to any preceding claim, in which one or more of the fluidics systems contains in a region thereof at least one drug in a form suitable for dissolution in the fluid sample.

15. A fluidic device according to any preceding claim, in which the fluidic channel arrangement further comprises a third fluidic channel, the third fluidic channel arranged to extend between the fluid analysis chamber and a second valve mechanism, and in which the second valve mechanism is located radially inwardly of the analysis chamber.

16. A fluidic device according to any preceding claim, in which at least one fluidics system contains at least one drug to be assayed against the fluid sample, in which the drug is provided in the fluid analysis chamber, in a first drug retention chamber located between the first valve mechanism and the fluid analysis chamber, or in a second drug retention chamber located between the second valve mechanism and the fluid analysis chamber.

17. A fluidic device according to any of Claims 14 to 16, comprising:

at least one fluidic system containing the antibiotic Amoxicillin;

at least one fluidic system containing the antibiotic combination Amoxicillin / clavulanic acid;

at least one fluidic system containing the antibiotic Cefalexin;

at least one fluidic system containing the antibiotic Ciprofloxacin;

at least one fluidic system containing the antibiotic Ertapenem;

at least one fluidic system containing the antibiotic Fosfomycin;

at least one fluidic system containing the antibiotic Levofloxacin;

at least one fluidic system containing the antibiotic Mecillinam;

at least one fluidic system containing the antibiotic Nitrofurantoin;

at least one fluidic system containing the antibiotic Trimethoprim; and/or

at least one fluidic system containing the antibiotic combination Trimethoprim / sulfamethoxazole; and optionally:

at least one fluidic system that doesn't contain an antibiotic and/or at least one fluidic system that contains an effective amount of a bactericidal agent.

18. A fluidic device according to Claim 17, in which a plurality of fluidic systems contain one of the antibiotics or antibiotic combinations, and in which each microsystem of the plurality of microsystems contains a different predetermined quantity of the antibiotic or antibiotic combination such that, in use, a predetermined different concentration of the antibiotic is generated in a fluid sample within each analysis chamber respectively of the plurality of fluidic systems.

19. A fluidic device according to any preceding claim, further comprising a bacterial growth media configured to promote growth of bacteria potentially present in the fluid sample when mixed with the fluid sample; the growth media provided in the fluid reservoir or in a growth media compartment that is in fluid communication with the fluid reservoir.

20. A fluidic device according to Claim 19, in which the growth media is provided in a growth media compartment that is in fluid communication with the fluid reservoir via a filter element or membrane.

21. A fluidic device according to Claim 19 or 20, further comprising a sample receiving well for receiving fluid sample to be transferred into the fluid reservoir and the at least one fluidic system.

22. A fluidic device according to any preceding claim, in which the central region of the fluidic device comprises a sample receiving well for receiving a fluid sample, and in which the sample receiving well is communicable with the fluid reservoir via a growth media compartment containing a growth media and a filter element arranged, in use, to filter the mixture of fluid sample and growth media before it enters the fluid reservoir.

23. A fluidic device according to Claim 21 or 22, which further comprises a cap for enclosing the sample receiving well, and in which the sample receiving well is formed within an upstanding neck portion of the central region of the device, the neck portion being provided with a securing feature for engagement with a complementary securing feature of the cap.

24. A fluidic device according to Claim 23, in which the cap further comprises a cylindrical plunger element downstanding from the top wall of the cap and arranged radially inside the outer annular perimeter wall; in which the outer annular surface of the plunger element is configured to match the inner annular surface of the sample receiving well so as to displace a predetermined volume of fluid from the sample receiving well when the cap is engaged with the neck of the fluidic device.

25. A fluidic device according to any preceding claim, which comprises an antibiotic sensitivity panel comprising a plurality of antibiotics; preferably in which the plurality of antibiotics are in amounts selected from one or more of the antibiotic amounts disclosed in Tables 1 or 2 or Table 3.

26. A fluidic device according to any preceding claim, which comprises an antibiotic sensitivity panel according to the CLSI standard and/or the EUCAST standard as defined in Table 3.

27. An apparatus comprising:

the fluidic device of any preceding claim;

a driving mechanism for driving rotational motion of the fluidic device about the rotational axis of the fluidic device; and

a controller executing machine readable code to cause the driving mechanism to control flow of the fluid sample from the fluid reservoir to the or each analysis chamber.

28. An apparatus according to Claim 27, further comprising an optical apparatus, the optical apparatus comprising:

a light source configured to emit an incident beam of light and illuminate the fluid sample in the or each fluid analysis chamber; and

a photodetector configured to detect scattered light exiting the or each fluid analysis chamber.

29. An apparatus according to Claim 28, further comprising a sample container carousel arranged to engage the container and configured to bring the or each fluid analysis chamber periodically into and out of alignment with the incident beam of light from the light source of the optical apparatus.

30. A method of moving a fluid sample from a fluid reservoir through a fluidic system formed in a fluidic device, the fluidic system comprising a fluid analysis chamber, and a fluidic channel arrangement configured to enable fluid communication between the fluid reservoir and the fluid analysis chamber, the method comprising:

rotating, by a driving mechanism, the fluidic device about a rotational axis at a first rotational speed and for a first duration to generate a first centrifugal force sufficient to drive flow of the fluid sample from the fluid reservoir into a first portion of the fluidic channel arrangement;

preventing, by a valve mechanism, onward flow of the fluid sample from the first portion of the fluidic channel arrangement into a second portion of the fluidic channel arrangement via pressure exerted by the valve mechanism in opposition to the first centrifugal force; and

rotating, by the driving mechanism, the fluidic device about the rotational axis at a second higher rotational speed and for a second duration to generate a second centrifugal force sufficient to overcome the pressure of the valve mechanism and drive flow of the fluid sample into the second portion of the fluidic channel arrangement and thereby into the fluid analysis chamber.