We claim:

1. A microassay device test microchip for measuring clotting in a blood or plasma sample,

the test microchip comprising

an inlet for the blood or plasma sample, the inlet communicating with one or more microchannels having a length between tens of microns and millimeters, each microchannel comprising one or more test chambers, each microchannel having a defined volume between nanoliters and milliliters a microchannel device comprising an opening to one or more channels,

the channel one or more microchannels each comprising at least one surface anionically charged surface which activates clotting of the blood or plasma sample upon entry of the blood or plasma sample into the one or more microchannels or test chamber such as glass, wherein the test chamber is formed of a material which allows changes in viscosity, impedance, acoustic properties, or optical properties in the blood or plasma in the test chamber,

wherein the test microchip is insertable into a reader, the reader comprising

a detector which determines the channel comprising a testing chamber in which changes in viscosity, impedance, acoustic properties, or optical properties can be measured in the blood or plasma sample in a test chamber which are indicative of clotting,

a temperature control controlling element regulating the temperature of the test chamber, and

electrical means for output conveying the clotting time determined from the time of activation of the blood or plasma sample to the time results of the change in viscosity, impedance, acoustic properties, or optical properties in the test chamber indicative of clotting, to an external reader or monitor.

2. The device test microchip of claim 1 wherein the test microchip comprises a single microchannel comprising multiple channels for measuring clotting.

3. The device test microchip of claim 1 wherein the test microchip is comprising microfluidic chips fabricated through anisotropic wet etching of silicon wafers and subsequent thermal oxidation, isotropic wet etching of clear, low-thermal-expansion borosilicate glass wafers, sputter deposition of thin metal films onto both wafers through stencils, anodic bonding of silicon and clear, low-thermal-expansion borosilicate glass wafers, or germanium or gallium and subsequent separation of single chips by wafer dicing.

4. The device test microchip of claim 1 wherein the detector in the reader comprises an IR, LED and photodiode inserted into their reader parts for measuring optical changes in the test chamber of the test microchip.

5. The device test microchip of claim 1 wherein the test microchip comprises comprising electrodes and conductor lines realized through integration of or patterned metal sheets or films that are inserted and sandwiched between reader parts.

6. The device test microchip of claim 5 comprising fabricated microfluidic chips formed of semiconductor material, the comprising electrodes semiconductor material can serve as an electrode, and which can be used to directly measure directly electrical properties of an analyte such as resistance, capacitance, or impedance.

7. The device test microchip of claim 1 wherein the microchip comprises a metal patterned doped semiconductor substrate fabricated into a resistor heating element.

8. The device of claim 1 further comprising

a reader,

a microassay device for measuring clotting in a blood or plasma sample from an individual, the device comprising a test microchip, the test microchip comprising

an inlet for the blood or plasma sample, the inlet communicating with one or more microchannels having a length between tens of microns and millimeters, each microchannel comprising one or more test chambers, each microchannel having a defined volume between nanoliters and milliliters,

the one or more microchannels each comprising at least one anionically charged surface which activates clotting of the blood or plasma sample upon entry of the blood or plasma sample into the one or more microchannels or test chamber, and

the test chamber is formed of a material which allows changes in viscosity, impedance, acoustic properties, or optical properties in the blood or plasma in the test chamber,

wherein the test microchip is inserted into a reader, the reader comprising

a detector which determines changes in viscosity, impedance, acoustic properties, or optical properties in the blood or plasma sample in the test chamber which are indicative of clotting,

a temperature control regulating the temperature of the test chamber, and

output conveying the clotting time determined from the time of activation of the sample to the time of the change in viscosity, impedance, acoustic properties, or optical properties in the test chamber indicative of clotting.

9. The device of claim 8 wherein the output from the reader communicates with a monitor or comprises means for display or information storage of information and communication capability.

10. A method for measuring clotting time comprising

introducing a blood or plasma sample into the device of claim 1,

a test microchip inserted into a reader for measuring clotting in a blood or plasma sample,

the test microchip comprising

an inlet for the blood or plasma sample, the inlet communicating with one or more microchannels having a length between tens of microns and millimeters, each microchannel comprising one or more test chambers, each microchannel having a defined volume between nanoliters and milliliters,

the one or more microchannels each comprising at least one anionically charged surface which activates clotting of the blood or plasma sample upon entry of the blood or plasma sample into the one or more microchannels or test chamber,

wherein the test chamber is formed of a material which allows changes in viscosity, impedance, acoustic properties, or optical properties in the blood or plasma sample to be measured in the test chamber, and

the reader comprising

a detector which determines changes in viscosity, impedance, acoustic properties, or optical properties in the blood or plasma sample in the test chamber which are indicative of clotting,

a temperature control regulating the temperature of the test chamber, and

output conveying the clotting time determined from the time of activation of the blood or plasma sample to the time of the change in viscosity, impedance, acoustic properties, or optical properties in the test chamber indicative of clotting.

11. The method of claim 10 comprising inserting the device into a reader recording the clotting time.

12. The method of claim 11 wherein transmission through the sample is measured to determined time to peak clotting time.

13. The method of claim 12 wherein the measurement is made with light at a wavelength between 1150 and 1700 nm.

14. The method of claim 13 wherein the measurement is made with light at a wavelength of 1300 nm.

15. The method of claim 11 wherein the temperature control heats the sample to body temperature for measurement of clotting time.

16. The test microchip of claim 1 wherein the charged surface is glass or oxidized silica.

17. The test microchip of claim 1 comprising resistive heating structures.

18. The test microchip of claim 1 wherein the volume of the test chamber is between about one and ten microliters.

19. The test microchip of claim 1 comprising multiple microchannels and test chambers.

20. The test microchip of claim 1 comprising electrodes for determination of impedance, resistance or capacitance.

21. The test microchip of claim 1 wherein the test microchip is single use.

22. The microassay device of claim 8, wherein the reader comprises an integrated heater for controlling the temperature of the test chamber in the inserted test microchip.

23. The microassay device of claim 8 comprising electrical, optical or fluidic interfaces with the test microchip.

24. The microassay device of claim 8 comprising an infrared source and an infrared detector, positioned to detect change in viscosity in the test chamber of the inserted test microchip.

25. The microassay device of claim 8 wherein clotting is measured by the reader from changes through the test chamber of the test microchip by changes in resistance.

26. The microassay device of claim 8 wherein clotting is measured by the reader using acoustic transducers.