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ABSTRACT

The invention relates to an ingestible, implantable or wearable medical device comprising a microarray which comprises a bioactive agent capable of interacting with a disease marker biological analyte; a reservoir which comprises at least one therapeutic agent and is capable of releasing the therapeutic agent(s) from the medical device; and a plurality of microchips comprising a microarray scanning device capable of obtaining physical parameter data of an interaction between the disease marker biological analyte with the bioactive agent; a biometric recognition device capable of comparing the physical parameter data with an analyte interaction profile; optionally a therapeutic agent releasing device capable of controlling release of the therapeutic agent from the reservoirs; an interface device capable of facilitating communications between the microarray scanning device, biometric recognition device and the therapeutic agent releasing device; and an energy source to power the medical device. Specifically, the invention relates to a medical device capable of detecting an analyte in a bodily fluid comprising at least one microneedle capable of obtaining a sample of a bodily fluid, a first microchannel through which the sample flows and is in fluid communication with the at least one microneedle, a second microchannel in fluid communication with the first microchannel, through which a buffer flows, wherein the second channel comprises a microarray with a bioactive agent, a microarray scanning device to detect an interaction between the bioactive agent and the analyte in the bodily fluid; and an interface device.

22 Claims, 13 Drawing Sheets