CLAIMS

1. An energized ophthalmic device with a retinal vascularization monitoring system, the ophthalmic device comprising:

a media insert comprising a front curve arcuate surface and a back curve arcuate surface, wherein the front curve arcuate surface and the back curve arcuate surface form a cavity capable of containing an energy source dimensioned to conform to an area within the cavity, wherein the energy source is in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller, the controller comprising a computer processor in digital communication with a digital media storage device and wherein the digital media storage device stores software code;

a transmitter in logical communication with the processor and also in logical communication with a communication network, wherein the software is executable upon demand and operative with the processor to:

receive data descriptive of at least one identified portion of a pulsating vessel forming part of a retinal vascularization of an eye;

cause the micro-piezoelectric element to output a signal towards the at least one identified portion of the pulsating vessel;

receive data from the electronic feedback circuit descriptive of the change of the outputted signal outputted towards the at least one identified portion of the pulsating vessel;

image the at least one identified portion of the pulsating vessel using the data received from the electronic feedback circuit; and

monitor changes of the retinal vascularization by comparing said at least one identified portion imaged with a previous image over time; and

a radio frequency antenna in connection with the communication network and capable of transmitting data with a wireless device wherein the monitoring of the retinal vascularization includes determining the cardiac rhythm by analyzing changes in diameter of the at least one identified portion over the vessel over time; and wherein the software is operative with the processor to:

transmit, through the radio frequency antenna, to a drug dispensing device a signal to dispense an active agent when the determined cardiac rhythm is outside a predetermined threshold.

2. The device as claimed in claim 1, wherein the software is additionally operative with the processor to:

send a signal to the wireless device when the determined cardiac rhythm is outside a predetermined threshold.

3. The device as claimed in claim 1, additionally comprising:

a photon emitter element in connection with the communication network and capable of providing a visual signal to the user when the determined cardiac rhythm is outside a predetermined threshold.

4. The device as claimed in claim 3, additionally comprising:

a micro-electromechanical transducer capable of transmitting an audible signal to the user when the determined cardiac rhythm is outside a predetermined threshold.

5. The device as claimed in claim 1, wherein the monitoring of the retinal vascularization includes tracking the displacement over time of the at least one identified portion of a vessel.

6. The device as claimed in claim 1, additionally comprising:

a microsensor in connection with a processor, wherein the microsensor is used to capture sound frequencies arising from one or more pulsating vessels of the retina.

7. The device as claimed in claim 1, wherein the software is additionally operative with the processor to: correlate a change of cardiac rhythm with an associated event detected by the wireless device.

8. The device as claimed in claim 7, wherein the software is operative with the

processor to record one or both of an action or a feedback when the monitored cardiac rhythm falls outside a pre-determined range.

9. The device as claimed in claim 1, wherein the energy source is fabricated using stacked integrated component device packaging technologies.

10. A method of monitoring the retinal vascularization of a patient's eye, the method comprising:

identifying at least one location of a pulsating vessel in the retinal vascularization of an eye;

providing an ophthalmic device with a retinal vascularization monitoring system comprising an energy source in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller comprising a computer processor, a digital media storage device, a transmitter in logical communication with the processor and also in logical communication with a communication network and a radio frequency antenna in connection with the communication network and capable of transmitting data with a wireless device;

outputting a signal towards the at least one pulsating location identified using the micro-piezoelectric element with the electronic feedback circuit;

receiving, using the feedback circuit, a return signal from the outputted signal;

imaging the at least one pulsating location using the change in the outputted signal and the return signal; and

monitoring changes of the retinal vascularization by comparing said at least one identified portion images with a previous image of the same said at least one identified portion over time wherein the monitoring of the retinal vascularization includes determining the cardiac rhythm by analyzing changes in diameter of the at least one identified portion over the pulsating vessel over time; and wherein the software is operative with the processor to transmit, through the radio frequency antenna, to a drug dispensing device a signal to dispense an active agent when the determined cardiac rhythm is outside a predetermined threshold.

11. The method as claimed in claim 10, wherein the monitoring changes of the retinal vascularization include recording the changes in the diameter of the pulsating vessel over time.

12. The method as claimed in claim 11, additionally comprising:

determining the cardiac rhythm of a patient using the recorded changes in the diameter of the pulsating vessel over time.

13. The method as claimed in claim 12, additionally comprising:

sending a signal alert to the user of the ophthalmic device when the determined cardiac rhythm falls outside a pre-determined range.

14. The method as claimed in claim 13, wherein one or both the action of sending a signal alert to the user and the determined cardiac rhythm is recorded as part of a patient's medical history.

15. The method as claimed in claim 10, wherein the monitoring changes of the retinal vascularization include looking at the rate of displacement of the pulsating vessel.

16. The method as claimed in claim 15, additionally comprising:

sending a signal alert to the user of the ophthalmic device when the rate of displacement of the pulsating vessel falls outside a pre-determined range.

17. A method of monitoring the retinal vascularization of a patient's eye, the method comprising:

identifying locations forming part of the retinal vascularization of the patient's eye including at least a portion of a pulsating vessel;

providing an ophthalmic device with a retinal vascularization monitoring system comprising an energy source in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller comprising a computer processor, a digital media storage device, a transmitter in logical

communication with the processor and also in logical communication with a communication network;

detecting a change in a controlled signal outputted towards the at least said portion of the pulsating vessel identified;

imaging the at least said portion of the retinal vascularization of the patient's eye using the detected change in said controlled signal; and

recording the changes in the at least said portion of the retinal vascularization between a series of images over time.

CLAIMS

1. An energized ophthalmic device with a retinal vascularization monitoring system, the ophthalmic device comprising:

a media insert embedded in the ophthalmic device and comprising a front curve arcuate surface and a back curve arcuate surface, wherein the front curve arcuate surface and the back curve arcuate surface form a cavity capable of containing an energy source dimensioned to conform to an area within the cavity, wherein the energy source is in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller, the controller comprising a computer processor in digital communication with a digital media storage device and wherein the digital media storage device stores software code;

a transmitter in logical communication with the processor and also in logical communication with a communication network, wherein the software is executable upon demand and operative with the processor to:

receive data descriptive of at least one identified portion of a pulsating vessel forming part of a retinal vascularization of an eye;

cause the micro-piezoelectric element to output a signal towards the at least one identified portion of the pulsating vessel;

receive data from the electronic feedback circuit descriptive of the change of the outputted signal outputted towards the at least one identified portion of the pulsating vessel;

image the at least one identified portion of the pulsating vessel using the data received from the electronic feedback circuit; and

monitor changes of the retinal vascularization by comparing said at least one identified portion imaged with a previous image over time; and

a radio frequency antenna in connection with the communication network and capable of transmitting data with a wireless device wherein the monitoring of the retinal vascularization includes determining the cardiac rhythm by analyzing changes in diameter of the at least one identified portion over the vessel over time.

2. The device as claimed in claim 1, wherein the software is additionally operative with the processor to:

send a signal to the wireless device when the determined cardiac rhythm is outside a predetermined threshold.

3. The device as claimed in claim 1, additionally comprising:

a photon emitter element in connection with the communication network and capable of providing a visual signal to the user when the determined cardiac rhythm is outside a predetermined threshold.

4. The device as claimed in claim 1, additionally comprising:

a micro-electromechanical transducer capable of transmitting an audible signal to the user when the determined cardiac rhythm is outside a predetermined threshold.

5. The device as claimed in claim 1, wherein the software is additionally operative with the processor to:

transmit, through the radio frequency antenna, to a drug dispensing device a signal to dispense an active agent when the determined cardiac rhythm is outside a predetermined threshold.

6. The device as claimed in claim 1, wherein the monitoring of the retinal vascularization includes tracking the displacement over time of the at least one identified portion of a vessel.

7. The device as claimed in claim 1, additionally comprising:

a microsensor in connection with a processor, wherein the microsensor is used to capture sound frequencies arising from one or more pulsating vessels of the retina.

8. The device as claimed in claim 1, wherein the software is additionally operative with the processor to correlate a change of cardiac rhythm with an associated event detected by the wireless device.

9. The device as claimed in claim 8, wherein the software is operative with the processor to record one or both of an action or a feedback when the monitored cardiac rhythm falls outside a pre-determined range.

10. The device as claimed in claim 1, wherein the energy source is fabricated using stacked integrated component device packaging technologies.

11. A method of monitoring the retinal vascularization of a patient's eye, the method comprising:

identifying at least one location of a pulsating vessel in the retinal vascularization of an eye;

providing an ophthalmic device with a retinal vascularization monitoring system, the ophthalmic device comprising a media insert embedded in the ophthalmic device and comprising a front curve arcuate surface and a back curve arcuate surface, wherein the front curve arcuate surface and the back curve arcuate surface form a cavity capable of containing an energy source dimensioned

to conform to an area within the cavity, wherein the energy source is in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller, the controller comprising a computer processor in digital communication with a digital media storage device and wherein the digital media storage device stores software code, a transmitter in logical communication with the processor and also in logical communication with a communication network and a radio frequency antenna in connection with the communication network and capable of transmitting data with a wireless device;

outputting a signal towards the at least one pulsating location identified using the micro-piezoelectric element with the electronic feedback circuit;

receiving, using the feedback circuit, a return signal from the outputted signal;

imaging the at least one pulsating location using the change in the outputted signal and the return signal; and

monitoring changes of the retinal vascularization by comparing said at least one identified portion images with a previous image of the same said at least one identified portion over time wherein the monitoring of the retinal vascularization includes determining the cardiac rhythm by analyzing changes in diameter of the at least one identified portion over the pulsating vessel over time.

12. The method as claimed in claim 11, wherein the monitoring changes of the retinal vascularization include recording the changes in the diameter of the pulsating vessel over time.

13. The method as claimed in claim 12, additionally comprising:

determining the cardiac rhythm of a patient using the recorded changes in the diameter of the pulsating vessel over time.

14. The method as claimed in claim 13, additionally comprising:

sending a signal alert to the user of the ophthalmic device when the determined cardiac rhythm falls outside a pre-determined range.

15. The method as claimed in claim 14, wherein one or both the action of sending a signal alert to the user and the determined cardiac rhythm is recorded as part of a patient's medical history.

16. The method as claimed in claim 11, wherein the monitoring changes of the retinal vascularization include looking at the rate of displacement of the pulsating vessel.

17. The method as claimed in claim 16, additionally comprising:

sending a signal alert to the user of the ophthalmic device when the rate of displacement of the pulsating vessel falls outside a pre-determined range.

18. The method as claimed in claim 11, further comprising transmitting, through the radio frequency antenna, to a drug dispensing device a signal to dispense an active agent when the determined cardiac rhythm is outside a predetermined threshold.

19. A method of monitoring the retinal vascularization of a patient's eye, the method comprising:

identifying locations forming part of the retinal vascularization of the patient's eye including at least a portion of a pulsating vessel;

providing an ophthalmic device with a retinal vascularization monitoring system, the ophthalmic device comprising a media insert embedded in the ophthalmic device and comprising a front curve arcuate surface and a back curve arcuate surface, wherein the front curve arcuate surface and the back curve arcuate surface form a cavity capable of containing an energy source dimensioned to conform to an area within the cavity, wherein the energy source is in electrical connection and capable of energizing a micro-piezoelectric element with an electronic feedback circuit and a controller, the controller comprising a computer processor in digital communication with a digital media storage device and wherein the digital media storage device stores software code, a transmitter in logical communication with the processor and also in logical communication with a communication network;

detecting a change in a controlled signal outputted towards the at least said portion of the pulsating vessel identified;

imaging the at least said portion of the retinal vascularization of the patient's eye using the detected change in said controlled signal; and

recording the changes in the at least said portion of the retinal vascularization between a series of images over time.