CLAIMS

1. A wirelessly triggered device for implantation in vivo comprising:
an electrically conductive suture configured as an antenna for receiving a wireless triggering signal; and
an electronic circuit coated with a biocompatible encapsulating material and communicatively coupled to the electrically conductive suture, wherein the electronic circuit is arranged to convert the wireless triggering signal into an electrical signal for passing through the electrically conductive suture.

2. A wirelessly triggered device according to claim 1, the electrically conductive suture comprising a first conductive portion; a second conductive portion; and an insulating portion between the first and second conductive portions, the electronic circuit being communicatively coupled to the first and second conductive portions and arranged to pass the electrical signal through the first and second conductive portions.

3. A wirelessly triggered device according to claim 1 or 2, wherein the electrically conductive suture comprises electrically conductive surgical thread, wherein the electrically conductive surgical thread comprises an inner surgical thread; an electrically conductive coating on the inner surgical thread, and wherein the electrically conductive coating comprises a bio-compatible conductive polymer; and a bio-compatible protective coating on the electrically conductive coating.

4. A wirelessly triggered device according to any one of claims 1 to 3, wherein the wirelessly triggered device is a passive electronic device, and/or wherein the biocompatible encapsulating material is selected from PDMS, silicone, parylene-C, and polyurethane.

5. A wirelessly triggered device according to any one of claims 1 to 4, wherein the electronic circuit includes a modulating circuit operable to modulate the wireless triggering signal to produce a backscatter response signal having a specific harmonic as the electrical signal, the backscatter response signal for passing through the electrically conductive suture.

6. A wirelessly triggered device according to claim 5, wherein the wirelessly triggered device is a sensing device for monitoring conditions at a site, further comprising a detector operable to detect a predetermined condition at the site, and wherein the modulating circuit is operable to modulate the backscatter response signal based on the detected predetermined condition, wherein the detector optionally comprises a passive component of the modulating circuit, and wherein the passive component optionally is a capacitor or inductor.

7. A wirelessly triggered device according to any of claims 1 to 4, wherein the electronic circuit includes a rectifier operable to rectify the wireless triggering signal to produce an electrical current as the electrical signal, the electrical current for passing through the electrically conductive suture.

8. A wirelessly triggered device according to claim 7, wherein the wirelessly triggered device is configured to stimulate a nerve by passing the electrical current through the electrically conductive suture, or wherein the electrically conductive suture is in electrical connection with an electronic device and configured to supply power to the electronic device.

9. A wirelessly triggered device according to claim 6, wherein the predetermined condition comprises one or more adverse physiopathological states, wherein the one or more adverse physiopathological states optionally comprises one or more of bleeding, bacterial infection, gastric juice leakage and anastomotic leakage.

10. A wirelessly triggered device according to claim 6 or 9, wherein the modulating circuit is an RLC circuit and a resonance frequency of the RLC circuit varies based on the detected predetermined condition.

11. A wirelessly triggered device according to any one of claims 6, 9, and 10, wherein the detector comprises the passive component of the modulating circuit, the wirelessly triggered device further comprising a support member for supporting a layer of responsive material which is susceptible to undergo a change in the predetermined condition, the support member configured to support the responsive material over the passive component, wherein the responsive material optionally is a hydrogel.

12. A wirelessly triggered device according to claim 11, wherein the support member comprises a plurality of relief structures projecting from the modulating circuit and defining a cavity for receiving the responsive material, wherein the responsive material optionally is a hydrogel.

13. A wirelessly triggered device according to any one of claims 6, and 9 to 12, further comprising a responsive material which is susceptible to undergo a change in the predetermined condition, the responsive material being coated over the passive component, wherein the responsive material optionally is a hydrogel.

14. A wirelessly triggered device of any one of claims 11 to 13, wherein the predetermined condition includes bacterial infection and the responsive material is a DNA hydrogel susceptible to degradation in the presence of nuclease secreted by bacteria, or wherein the predetermined condition includes gastric juice leakage and the responsive material is a peptide hydrogel susceptible to degradation in the presence of pepsin.

15. A system comprising a reader and the wirelessly triggered device of any one of claims 6 and 9 to 14, the reader comprising:

a transmitter configured to transmit a plurality of interrogation signals configured to stimulate a backscatter response signal from the wirelessly triggered device;

a receiver configured to receive the backscatter response signal from the wirelessly triggered device; and

a processor configured to determine a condition at the site based on the backscatter response signal.

16. The system of claim 15, wherein the condition at the site includes one or more of healing, bleeding, infection, bacterial growth, dehiscence, suture breakage, heart rate and respiration rate.

17. A method of monitoring conditions at a site in vivo,

the method comprising:

implanting a wirelessly triggered device according to any one of claims 6 and 9 to 14 into the site;

transmitting a plurality of interrogation signals configured to stimulate a backscatter response signal from the wirelessly triggered device;

receiving the backscatter response signal from the wirelessly triggered device; and

determining a condition at the site based on the backscatter response signal.

18. A method according to claim 17, wherein the condition comprises one or more physiopathological conditions, or wherein the condition includes one or more of healing, bleeding, infection, dehiscence, suture breakage, heart rate and respiration rate.

19. A method according to claim 17 or 18, comprising implanting a wirelessly triggered device according to claim 6, wherein implanting the wirelessly

triggered device comprises suturing at least a portion of a wound with the electrically conductive suture.

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