CLAIMS

1. A therapeutic device comprising:
   a half-cell comprising:
   an electrically conductive electrode;
   an active material in contact with the electrode, the active material comprising an oxidizing agent or a reducing agent;
   an electrolyte in contact with the active material;
   one or more electrically conductive paths for electron transfer between an organism and the electrode, and
   one or more ionically conductive paths for ion transfer between the organism and the half-cell,
   wherein the half-cell, when electrically coupled to the organism, functions as a first half-cell of a galvanic cell and the organism functions as a second half-cell of the galvanic cell, and
   wherein the therapeutic device forms a galvanic cell when electrically and ionically coupled to the organism.

2. The therapeutic device of claim 1, wherein the half-cell comprises a container configured to contain the electrolyte, the electrode, or both.

3. The therapeutic device of claim 1, wherein the active material comprises an oxidizing agent, and the therapeutic device, when electrically coupled to the organism via at least one of the one or more electrically conductive paths, withdraws electrons from the organism via the at least one of the one or more electrically conductive paths.

4. The therapeutic device of claim 3, wherein the oxidizing agent comprises hydrogen peroxide.

5. The therapeutic device of claim 1, wherein the active material comprises a reducing agent, and the therapeutic device, when electrically coupled to the organism via at least one of the one or more electrically conductive paths, transfers electrons to the organism via the least one of the one or more electrically conductive paths.

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6. The therapeutic device of claim 5, wherein the reducing agent comprises magnesium.

7. The therapeutic device of claim 1, wherein the half-cell comprises an additive in contact with the active material, wherein the additive increases the rate of electron transfer between the half-cell and the organism.

8. The therapeutic device of claim 1, wherein the electrode comprises the active material.

9. The therapeutic device of claim 1, wherein at least one of the one or more electrically conductive paths is formed by the electrode.

10. The therapeutic device of claim 1, comprising a single half-cell.

11. The therapeutic device of claim 1, comprising a support configured to position the therapeutic device proximate the organism or to couple the therapeutic device to the organism.

12. The therapeutic device of claim 1, wherein at least one of the one or more ionically conductive paths comprises a salt bridge configured to allow ion transfer between the organism and the half-cell.

13. The therapeutic device of claim 1, comprising a battery, wherein the battery forms a portion of at least one of the one or more electrically conductive paths between the organism and the electrode, wherein a first terminal of the battery is coupled to the electrode in an electrolyte, with the electrolyte coupled to the organism via at least one of the one or more ionically conductive paths and a second terminal of the battery is coupled to the organism.

14. The therapeutic device of claim 1, wherein the therapeutic device is configured to achieve a net transfer of electrons to or from the organism.

15. The therapeutic device of claim 1, comprising an enclosure having a surface configured to contact the organism, and the one or more ionically conductive paths are formed through the surface of the enclosure configured to contact the organism.

16. The therapeutic device of claim 15, wherein the flow rate of ions through the one or more ionically conductive paths at the surface of the enclosure is inversely related to the ratio of the total area of the one or more ionically conductive paths at the surface of the enclosure to the sum of the total area of the surface configured to contact the organism and the total area of the one or more ionically conductive paths at the surface of the enclosure.

17. The therapeutic device of claim 1, comprising a drug or nutritional supplement proximate at least one of the one or more ionically conductive paths, wherein therapeutic device is configured to deliver the drug or nutritional supplement to the organism via the at least one of the one or more ionically conductive paths.

18. A kit comprising:
the therapeutic device of claim 1, wherein the therapeutic device is configured to achieve a net transfer of electrons to or from the organism when coupled electrically and ionically to the organism; and
instructions for coupling the therapeutic device to the organism.

19. The kit of claim 18, comprising instructions for replacing or maintaining the therapeutic device.

20. The kit of claim 18, comprising an electrolyte for the therapeutic device.

21. The kit of claim 20, comprising instructions for preparing an electrolyte for use in the therapeutic device.

22. The kit of claim 21, comprising instructions for delivering the electrolyte to the therapeutic device.

23. The kit of claim 18, wherein the therapeutic device comprises the therapeutic device of claim 1.

24. A method of making a therapeutic device, the method comprising:

contacting an electrically conductive electrode and an active material;

contacting an electrolyte with the active material;

providing an electrically conductive path configured to allow electron transfer between a half-cell comprising the electrically conductive electrode and an organism; and

providing an ionically conductive path configured to allow ion transfer between the active material and the organism,

wherein the active material comprises an oxidizing agent or a reducing agent, and

wherein the half-cell, when electrically coupled to the organism, functions as a first half-cell of a galvanic cell and the organism functions as a second half-cell of the galvanic cell.