Claims:

1. A sensor head comprising:

a housing configured to attach to a body surface of a patient comprising a bottom surface and an inner housing having a sensor mount;

at least two light sources configured to deliver light into a first region of the patient comprising a blue LED first light source and a green LED second light source, wherein the blue LED first light source delivers light at an excitatory wavelength; and

at least one light detector configured to detect light emitted from the tissue of the patient at an emission wavelength at a second region of the patient;

wherein the housing encloses the at least two light sources and the at least one light detector.

2. The sensor head according to claim 1, wherein the sensor head further comprises a contact surface on the bottom surface of the housing.

3. The sensor head according to claim 2, wherein the contact surface is configured to be attached to the body surface of a patient with a biocompatible adhesive material.

4. The sensor head according to claim 3, wherein the adhesive material is configured to transmit light through the at least two light sources into the patient and from the patient to the light detectors.

5. The sensor head according to claim 3, wherein the adhesive material is an optically transparent material.

6. The sensor head according to claim 3, wherein the adhesive material is produced from a non-fluorescing material.

7. The sensor head according to claim 2, wherein the contact surface comprises an aperture plate including one or more apertures configured to transmit light between the skin of the patient and the at least two light sources and the at least one light detector.

8. The sensor head according to claim 2, wherein the contact surface comprises a temperature sensor opening configured to provide a thermal path from the skin surface of the patient to a temperature sensor inside the housing.

9. The sensor head according to claim 7, wherein the aperture plate comprises the sensor mount, and wherein the sensor mount is configured to inhibit leakage of light between the at least one light source and the at least one light detector.

10. The sensor head according to claim 9, wherein the sensor mount is comprised of an electrically conductive material.

11. The sensor head according to claim 7, wherein the apertures are positioned towards the center of the contact surface.

12. The sensor head according to claim 11, wherein the bottom surface of the housing is configured to be flared to provide a greater surface area to contact the body surface of the patient.

13. The sensor head according to claim 12, wherein the contact surface is configured to be attached to the body surface of a patient with a transparent adhesive material.

14. The sensor head according to claim 13, wherein the transparent adhesive material is positioned on the bottom surface such that the adhesive material covers the apertures.

15. A sensor head comprising a housing configured to attach to a body surface of a patient, the housing comprising:

(i) an inner housing having a sensor mount;

(ii) at least two light sources configured to deliver light into a first region of the patient, wherein at least one light source delivers light at an excitatory wavelength; and

(iii) at least two light detectors configured to detect light at an emission wavelength at a second region of the patient,

wherein the housing encloses the at least two light sources and the at least two light detectors,

wherein the sensor mount comprises:

a first detection well having a first light detector mounted therein;

a second detection well having a second light detector mounted therein; and

a light source well having a first light source and a second light source mounted therein, and

wherein the first detection well, the second detection well and the light source well are configured to be optically isolated from one another to ensure that light from the light sources does not reach the light detectors without coupling through the body surface of the patient.

16. The sensor head according to claim 15, wherein the inner housing further comprises:

a first detection aperture configured to align with the first detection well;

second detection aperture configured to align with the second detection well; and

a light source aperture configured to align with the light source well.

17. The sensor head according to claim 16, wherein the inner housing further comprises optically transparent windows configured to couple within the first detection aperture, the second detection aperture, and the light source aperture.

18. The sensor head according to claim 17, wherein the inner housing further comprises diffusers configured to couple over the optically transparent windows.

19. The sensor head according to claim 15, wherein the first light source comprises a blue LED and the second light source comprises a green LED, and wherein the blue LED first light source delivers light at the excitatory wavelength.