CLAIMS

1. A catheter assembly, comprising:

a catheter having a distal end and an opposing proximal end, wherein a longitudinal axis extends between the distal end and the proximal end; and

a connector coupled in fluid communication to the proximal end of the catheter, the connector comprising:

a base extending along the longitudinal axis and including a flange extending in a perpendicular direction relative to the longitudinal axis, the base comprising a sensor assembly having at least one sensor, the at least one sensor configured to sense one or more environmental characteristics at an access site and generate at least one signal representative of the one or more environmental characteristics; and

an electrical lead wire operatively coupling the at least one sensor to an external device, wherein the electrical lead wire terminates at a contact point molded into or formed on a distally-facing surface of the flange, wherein the contact point is configured to transmit the at least one signal received from the at least one sensor to the external device.

2. The catheter assembly of claim 1, wherein the one or more environmental characteristics includes a temperature within a body lumen, a blood pressure within the body lumen, a blood glucose level, a sodium level, a potassium level, an indication of pregnancy, a drug concentration level, a white blood cell count, different markers, proteins, and/or chemicals in the patient's blood stream, or any combination thereof.

3. The catheter assembly of claim 1, wherein the electrical lead wire is one of molded in the base or coupled to a surface of the base.

4. The catheter assembly of claim 1, wherein the at least one sensor comprises a temperature sensor, a sensor that senses a chemical within a patient's blood, a sensor that senses a marker in the patient's blood, a sensor that senses a protein in the patient's blood, or any combination thereof.

5. The catheter assembly of claim 1, comprising a plurality of electrical lead wires forming an array of electrical lead wires arranged in a parallel configuration, each electrical lead wire of the array of electrical lead wires embedded within the connector, wherein the contact

point is configured to facilitate transmission of signals between the connector and the external device.

6. The catheter assembly of claim 5, further comprising an additional plurality of electrical lead wires forming a second array of electrical lead wires arranged in a parallel configuration and embedded within the connector, each electrical lead wire of the second array of electrical lead wires terminating at a second contact point on the base.

7. The catheter assembly of claim 5, wherein the contact point is formed through a cylindrical wall of the connector, molded into the cylindrical wall, or formed on an outer surface of the cylindrical wall.

8. The catheter assembly of claim 5, wherein the array of electrical lead wires forms a cylindrical ring positioned about an outer surface of a cylindrical wall of the connector.

9. A catheter assembly, comprising:

a catheter having a distal end and an opposing proximal end, a longitudinal axis extending between the distal end and the proximal end, and a cannula extending along the longitudinal axis from the distal end toward the proximal end;

a connector coupled in fluid communication with the catheter, the connector configured to provide signal communication between the catheter assembly and an external device, the connector comprising:

a base extending along the longitudinal axis and having a flange extending in a perpendicular direction relative to the longitudinal axis, the flange forming threads;

a sensor assembly coupled to the base, the sensor assembly configured to sense one or more environmental characteristics at an access site and generate at least one signal representative of the one or more environmental characteristics; and

a coupling disposed on a distally-facing surface of the flange, the coupling configured to operatively couple the connector to the external device, the coupling configured to transmit at least one of a data signal and a command signal between the sensor assembly and the external device.

10. The catheter assembly of claim 9, wherein the coupling comprises one of more of the following: an electrical coupling, and an optical coupling.

11. The catheter assembly of claim 9, wherein the coupling comprises an electrical lead wire electrically coupling an electrical component of the connector to the external device

12. The catheter assembly of claim 11, wherein the electrical component comprises one or more of the following: the sensor assembly, an electronic module, circuitry, a microcontroller, or a circuit board.

13. The catheter assembly of claim 11, wherein at least a portion of the electrical lead wire is molded onto or molded in the connector.

14. The catheter assembly of claim 13, wherein the electrical lead wire extends along a surface of a wall of the connector or is embedded within at least a portion of a length of the wall between a distal end and an opposing proximal end of the connector.

15. The catheter assembly of claim 9, wherein the coupling comprises a plurality of electrical lead wires forming an array of electrical lead wires arranged in a parallel configuration, each electrical lead wire of the array of electrical lead wires terminating at a contact point on the base, the contact point configured to facilitate transmission of signals between the sensor assembly and the external device.

16. The catheter assembly of claim 15, further comprising an additional plurality of electrical lead wires forming a second array of electrical lead wires arranged in a parallel configuration, each electrical lead wire of the second array of electrical lead wires terminating at a second contact point on the base, the second contact point configured to facilitate transmission of signals between the sensor assembly and the external device.

17. The catheter assembly of claim 15, wherein the contact point is formed through a cylindrical wall of the connector, molded into the cylindrical wall, or formed on a surface of the cylindrical wall.

18. The catheter assembly of claim 15, wherein the contact point forms a cylindrical ring positioned about an outer surface of a cylindrical wall of the base.

19. The catheter assembly of claim 15, wherein the distally-facing surface of the flange comprises at least one end of the threads.

20. The catheter assembly of claim 9, wherein the coupling comprises an optical coupling in the connector, the optical coupling configured for optical light transmission between the connector and the external device.