CLAIMS

1. A smart obturator assembly, comprising:

a hub forming a central passage; and

an obturator movably positionable within a lumen of a device operatively coupled to the hub, the obturator movable within the lumen between a first position and a second position, the obturator comprising:

a distal end having a tip portion and an opposing proximal end; and

a sensor at the distal end of the obturator,

wherein, with the obturator in the first position, the distal end limits fluid flow through the lumen and, with the obturator in the second position, the distal end provides fluid flow through the lumen,

further comprising a locking collar operatively coupled to the hub, the locking collar configurable in a locked configuration to prevent movement of the obturator within the lumen and in an unlocked configuration to allow movement of the obturator within the lumen, and

further comprising electronic circuitry in the locking collar, the electronic circuitry coupled in signal communication with the sensor.

2. The smart obturator assembly of claim 1, wherein, in the locked configuration, the locking collar is configured to prevent movement of the obturator within the lumen with the obturator in the first positon or the second position.

3. The smart obturator assembly of claim 1, wherein the locking collar comprises a tab configured to interfere with a depression formed in the obturator with the locking collar in the locked configuration.

4. The smart obturator assembly of claim 1, further comprising:

an electrical contact positioned within the obturator, the electrical contact electrically coupled to the sensor; and

an electrical lead wire extending through the obturator electrically coupling the electrical contact with the electronic circuitry.

5. The smart obturator assembly of claim 1, further comprising communication circuitry in the locking collar, the communication circuitry coupled in signal communication with the

electronic circuitry for wireless communication with remote reception circuitry.

6. The smart obturator assembly of claim 1, wherein the electronic circuitry comprises a connection port for connecting the electronic circuitry with remote reception circuitry.

7. The smart obturator assembly of claim 1, wherein obturator has a central axis extending between the distal end and the proximal end of the obturator, at least a portion of the distal end having one of a symmetrical profile with respect to the central axis or an asymmetrical profile with respect to the central axis.

8. The smart obturator assembly of claim 1, wherein the sensor is configured to measure one or more of the following: a temperature within a body lumen, a blood glucose level, a sodium level, a potassium level, a drug concentration level, a white blood cell count, a blood pressure within the body lumen, or a combination thereof.

9. The smart obturator assembly of claim 1, wherein the hub comprises a small-bore connector configured to couple the hub to a tube.

10. The smart obturator assembly of claim 1, wherein, with the obturator in the first position, the tip portion is positioned within the lumen to prevent fluid flow into the lumen and, with the obturator in the second position, the tip portion extends from the lumen in a distal direction to allow fluid flow into the lumen.

11. A smart obturator assembly, comprising:

a hub forming a central passage; and

an obturator movably positionable within a lumen of a device operatively coupled to the hub, the obturator movable within the lumen between a first position and a second position, the obturator comprising:

a distal end having a tip portion and an opposing proximal end; and

a sensor at the distal end of the obturator,

wherein, with the obturator in the first position, the distal end limits fluid flow through the lumen and, with the obturator in the second position, the distal end provides fluid flow through the lumen, and

wherein the device comprises a small-bore connector and the proximal end of the obturator forms a channel in fluid communication with the lumen, the obturator assembly further comprising a seal positioned about an outer periphery of the proximal end of the obturator and contacting an inner surface of the small-bore connector at a proximal end of the device.

12. The smart obturator assembly of claim 11, wherein the seal is positioned within an annular slot formed in the inner surface of the small-bore connector.

13. A smart obturator assembly, comprising:

a hub forming a central passage;

a collar on the hub, the collar including electronic circuitry in signal communication with remote reception circuitry; and

an obturator movably positionable within a lumen of a device, wherein the hub is coupled to a proximal end of the device such that the central passage is in fluid communication with the lumen, the obturator movable within the lumen between a first position and a second position, the obturator comprising:

a distal end; and

a sensor at the distal end, the sensor configured to sense an environmental characteristic within a patient's blood stream, generate a signal representative of the environmental characteristic, and transmit the signal to the electronic circuitry, wherein the electronic circuitry is configured to receive the signal and transmit the signal to the remote reception circuitry.

14. The smart obturator assembly of claim 13, wherein, with the obturator in the first position, the distal end limits fluid communication through the lumen and, with the obturator in the second position, the distal end provides fluid communication through the lumen.

15. The smart obturator assembly of claim 13 or 14, wherein the collar is configurable in a locked configuration to prevent movement of the obturator within the lumen and in an unlocked configuration to allow movement of the obturator within the lumen.

16. The smart obturator assembly of any of claims 13-15, further comprising:

communication circuitry coupled in signal communication with the electronic circuitry for wireless communication with the remote reception circuitry; and

a connection port operatively coupled to the electronic circuitry for connecting the electronic circuitry with the remote reception circuitry.

17. A smart obturator assembly, comprising:

an obturator movably positionable within a lumen of a device, the obturator movable within the lumen between a first position and a second position, the obturator comprising:

a distal end; and

a sensor assembly at the distal end, the sensor assembly configured to sense one or more environmental characteristics within a patient's blood vessel and to generate one or more signals representative of the one or more environmental characteristics;

a hub forming a central passage, the hub coupled to the device such that the central passage is in fluid communication with the lumen; and

a collar operatively coupled to the hub, the collar comprising electronic circuitry in signal communication with the sensor, the electronic circuitry configured to receive the one or more signals and transmit the one or more signals to remote reception circuitry.

18. The smart obturator assembly of claim 17, wherein the collar further comprises:

communication circuitry coupled in signal communication with the electronic circuitry for wireless communication with remote reception circuitry; and

a connection port operatively coupled to the electronic circuitry for connecting the electronic circuitry with the remote reception circuitry.

19. The smart obturator assembly of claim 17 or 18, wherein the device comprises a catheter having a distal end and an opposing proximal end, the catheter forming the lumen extending between the distal end and the proximal end of the catheter.