## CLAIMS

1. A membrane for covering a peripheral surface of a stent, the membrane comprising a plurality of line openings formed therein,

wherein the membrane is coatable on the peripheral surface of the stent and wherein the membrane is a continuous membrane,

wherein the membrane is radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

2. The membrane as claimed in claim 1, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

~~2~~3. The membrane as claimed in claim 1, wherein each line opening of the plurality of line openings is shaped to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

~~3~~4. The membrane as claimed in claim ~~2~~3, wherein each flap is pivotable between ~~an~~ the open position in which the flap extends outwardly from the membrane thereby defining ~~an~~ the opening in the membrane, and ~~a~~ the closed position in which the flap extends in line with the membrane thereby at least substantially closing ~~said~~ the opening.

45. The membrane as claimed in claim 1 or 2, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

~~5~~6. The membrane as claimed in claim 4~~5~~, wherein each slit is oriented perpendicular to a longitudinal axis of the membrane.

~~6. The membrane as claimed in claim 4 or 5, wherein each slit is changeable between a closed position in which the slit is in a non-expanded state, and an open position in which the slit, in response to a pressure gradient of blood flow through the membrane, expands from the non-expanded state into a pore in the membrane.~~

7. The membrane as claimed in claim 1, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

~~7~~8. The membrane as claimed in claim ~~2 or 3~~3 or 4, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

~~8~~9. A method of forming a membrane on a stent, the method comprising:

forming the membrane on a peripheral surface of the stent; and

forming a plurality of line openings in the membrane,

wherein forming the membrane comprises forming a continuous membrane on the peripheral surface of the stent, and

wherein forming the membrane further comprises coating the membrane on the peripheral surface of the stent,

wherein the stent and the membrane are radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

~~9~~10. The method as claimed in claim ~~8~~9, wherein forming the membrane comprises:

expanding the stent in a radial direction such that the stent is in the expanded configuration; and

forming the membrane on the peripheral surface of the ~~expanded~~ stent when the stent is in the expanded configuration.

~~10~~11. The method as claimed in claim ~~9~~10, comprising forming, when the stent is in the expanded configuration, the plurality of line openings in the membrane formed on the peripheral surface of the ~~expanded~~ stent.

12. The method as claimed in any one of claims 9 to 11, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

~~11~~13. The method as claimed in any one of claims ~~8 to 10~~9 to 11, wherein forming the plurality of line openings comprises shaping each line opening of the plurality of line openings to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

~~12~~14. The method as claimed in claim ~~11~~13, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

~~13~~15. The method as claimed in any one of claims ~~8 to 10~~9 to 12, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

~~14~~16. The method as claimed in claim ~~13~~15, wherein each slit is oriented perpendicular to a longitudinal axis of the stent.

~~15. The method as claimed in claim 13 or 14, wherein each slit is changeable between a closed position in which the slit is in a non-expanded state, and an open position in~~

~~which the slit, in response to a pressure gradient of blood flow through the membrane, expands from the non-expanded state into a pore in the membrane.~~

17. The method as claimed in claim 9, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

~~16~~18. The method as claimed in any one of claims ~~8 to 15~~9 to 17, wherein coating the membrane on the peripheral surface of the stent comprises dip coating or spray coating.

~~17~~19. A device for use in a blood vessel, the device comprising:

a stent configured to be received in the blood vessel; and

a membrane configured to cover a peripheral surface of the stent, wherein the membrane comprises a plurality of line openings formed therein,

wherein the membrane is coated on the peripheral surface of the stent, and

wherein the membrane is a continuous membrane,

wherein the stent and the membrane are radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

20. The device as claimed in claim 19, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

~~18~~21. The device as claimed in claim ~~17~~19, wherein each line opening of the plurality of line openings is shaped to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

~~19~~22. The device as claimed in claim ~~18~~21, wherein each flap is formed in the membrane such that a connecting section of the membrane extending between two ends of the line opening is oriented at least substantially transverse to a longitudinal axis of the stent.

~~20~~23. The device as claimed in claim ~~19~~22, wherein each flap is pivotable about the connecting section between ~~an~~ the open position in which the flap extends outwardly from the stent thereby defining ~~an~~ the opening in the membrane, and ~~a~~ the closed position in which the flap extends in line with the membrane thereby at least substantially closing ~~said~~ the opening.

~~21~~24. The device as claimed in claim ~~19 or 20~~22 or 23, wherein the connecting section is configured to face an inflow end of the stent when placed in the blood vessel.

~~22~~25. The device as claimed in claim ~~17~~19 or 20, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

~~23~~26. The device as claimed in claim ~~22~~25, wherein each slit is oriented perpendicular to a longitudinal axis of the stent.

~~24. The device as claimed in claim 22 or 23, wherein each slit is changeable between a closed position in which the slit is in a non-expanded state, and an open position in which the slit, in response to a pressure gradient of blood flow through the membrane, expands from the non-expanded state into a pore in the membrane.~~

27. The device as claimed in claim 19, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

~~25~~28. The device as claimed in any one of claims ~~18 to 21~~21 to 24, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

~~26~~29. The device as claimed in any one of claims ~~17 to 25~~19 to 28, wherein the membrane is arranged on the peripheral surface of the stent to form a stent-membrane structure that is closed at its periphery apart from the plurality of line openings.

## CLAIMS

1. A membrane for covering a peripheral surface of a stent, the membrane comprising a plurality of line openings formed therein,

wherein the membrane is coatable on the peripheral surface of the stent and wherein the membrane is a continuous membrane,

wherein the membrane is radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

2. The membrane as claimed in claim 1, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

3. The membrane as claimed in claim 1, wherein each line opening of the plurality of line openings is shaped to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

4. The membrane as claimed in claim 3, wherein each flap is pivotable between the open position in which the flap extends outwardly from the membrane thereby defining the opening in the membrane, and the closed position in which the flap extends in line with the membrane thereby at least substantially closing the opening.

5. The membrane as claimed in claim 1 or 2, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

6. The membrane as claimed in claim 5, wherein each slit is oriented perpendicular to a longitudinal axis of the membrane.

7. The membrane as claimed in claim 1, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

8. The membrane as claimed in claim 3 or 4, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

9. A method of forming a membrane on a stent, the method comprising:

forming the membrane on a peripheral surface of the stent; and

forming a plurality of line openings in the membrane,

wherein forming the membrane comprises forming a continuous membrane on the peripheral surface of the stent, and

wherein forming the membrane further comprises coating the membrane on the peripheral surface of the stent,

wherein the stent and the membrane are radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

10. The method as claimed in claim 9, wherein forming the membrane comprises:

expanding the stent in a radial direction such that the stent is in the expanded configuration; and

forming the membrane on the peripheral surface of the stent when the stent is in the expanded configuration.

11. The method as claimed in claim 10, comprising forming, when the stent is in the expanded configuration, the plurality of line openings in the membrane formed on the peripheral surface of the stent.

12. The method as claimed in any one of claims 9 to 11, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

13. The method as claimed in any one of claims 9 to 11, wherein forming the plurality of line openings comprises shaping each line opening of the plurality of line openings to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

14. The method as claimed in claim 13, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

15. The method as claimed in any one of claims 9 to 12, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

16. The method as claimed in claim 15, wherein each slit is oriented perpendicular to a longitudinal axis of the stent.

17. The method as claimed in claim 9, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

18. The method as claimed in any one of claims 9 to 17, wherein coating the membrane on the peripheral surface of the stent comprises dip coating or spray coating.

19. A device for use in a blood vessel, the device comprising:

a stent configured to be received in the blood vessel; and

a membrane configured to cover a peripheral surface of the stent, wherein the membrane comprises a plurality of line openings formed therein,

wherein the membrane is coated on the peripheral surface of the stent, and

wherein the membrane is a continuous membrane,

wherein the stent and the membrane are radially expandable from a non-expanded configuration to an expanded configuration, and

wherein in the expanded configuration, for each line opening of the plurality of line openings, the line opening is changeable between a closed position to prevent blood flow through the line opening and an open position in which the line opening defines an opening in the membrane to allow blood flow through the opening.

20. The device as claimed in claim 19, wherein in the closed position, for each line opening of the plurality of line openings, portions of the membrane on opposing sides of the line opening are urged towards each other to facilitate closure of the line opening to prevent blood flow through the line opening.

21. The device as claimed in claim 19, wherein each line opening of the plurality of line openings is shaped to define a partial boundary of a portion of the membrane therewithin, wherein the portion defines a flap.

22. The device as claimed in claim 21, wherein each flap is formed in the membrane such that a connecting section of the membrane extending between two ends of the line opening is oriented at least substantially transverse to a longitudinal axis of the stent.

23. The device as claimed in claim 22, wherein each flap is pivotable about the connecting section between the open position in which the flap extends outwardly from the stent thereby defining the opening in the membrane, and the closed position in which the flap extends in line with the membrane thereby at least substantially closing the opening.

24. The device as claimed in claim 22 or 23, wherein the connecting section is configured to face an inflow end of the stent when placed in the blood vessel.

25. The device as claimed in claim 19 or 20, wherein each line opening of the plurality of line openings is a straight line opening defining a slit.

26. The device as claimed in claim 25, wherein each slit is oriented perpendicular to a longitudinal axis of the stent.

27. The device as claimed in claim 19, wherein each line opening is changeable from the closed position to the open position in response to a pressure gradient of blood flow through the membrane.

28. The device as claimed in any one of claims 21 to 24, wherein each flap has a perimeter edge that is formed at an oblique angle through a thickness of the membrane.

29. The device as claimed in any one of claims 19 to 28, wherein the membrane is arranged on the peripheral surface of the stent to form a stent-membrane structure that is closed at its periphery apart from the plurality of line openings.