

I/We claim:

1. A body wrap (100) comprising:
 - a heat exchange layer (102) for contact with a patient's body;
 - 5 an insulating layer (104); and
 - an intermediate layer (103) comprising a plurality of channels (106a, 106b) between the heat exchange layer (102) and the insulating layer (104), wherein the plurality of channels (106a, 106b) comprises:
 - a main channel (106a) along at least a periphery (202)
 - 10 of the body wrap (100); and
 - a plurality of sub-channels (106b), wherein the main channel (106a) is connected to the plurality of sub-channels (106b),
 - an inlet (204) and an outlet (206) at a bottom end (208) of the body
 - 15 wrap (100), wherein the inlet (204) is for flow of the coolant fluid into the main channel (106a) and the outlet (206) is for flow of the coolant fluid out from the plurality of sub-channels (106b); and
 - a hood portion (210) at a top end (212) of the body wrap (100) for wrapping around the patient's head, wherein the coolant fluid flows into the
 - 20 body wrap (100) through the inlet (204) at the bottom end (208), wherein the coolant fluid flows from the inlet (204) through the main channel (106a) along the periphery (202) of the body wrap (100) into the plurality of sub-channels (106b) at the hood portion (210), and wherein the coolant fluid flows out of the body wrap (100) from the outlet (206) at the bottom end (208).
- 25 2. The body wrap (100) as claimed in claim 1, wherein the body wrap (100) comprises a phase change material (PCM) layer (110) provided between the heat exchange layer (102) and the plurality of channels (106a, 106b).

3. The body wrap (100) as claimed in claim 2, wherein the PCM is selected from the group consisting of polymers, waxes, and combinations thereof
4. The body wrap (100) as claimed in claim 1, wherein the body wrap comprises a plurality of fasteners (218a, 218b, 218c, 218d, 218e, 218f) for fastening the
5 body wrap around the patient's body.
5. The body wrap (100) as claimed in claim 1, wherein the heat exchange layer (102) is fabricated from the group consisting of polyurethanes and silicones.
6. The body wrap (100) as claimed in claim 1, wherein the insulating layer (104) is fabricated from one of cellulose sheets and polystyrene sheets.
- 10 7. The body wrap (100) as claimed in claim 1, wherein the coolant fluid is selected from the group comprising water, de-ionized water, propylene glycol and the like.
8. The body wrap (100) as claimed in any of claims 1 and 7, wherein the coolant fluid comprises an additive.
- 15 9. The body wrap (100) as claimed in claim 8, wherein the additive is selected from the group consisting of potassium formate, potassium acetate, and the like.
10. The body wrap (100) as claimed in claim 1, wherein the intermediate layer (103) is formed by etching channel barriers (108a, 108b) on the heat exchange layer (102) or the insulating layer (104).
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11. The body wrap (100) as claimed in claim 1, wherein the intermediate layer (103) is formed by interposing channel barriers (108a, 108b) between the heat exchange layer (102) and the insulating layer (104).
12. The body wrap (100) as claimed in any of claims 10 and 11, wherein the
25 channels barriers (108a) are curved channel barriers, segmented channel barriers, or a combination thereof.
13. The body wrap (100) as claimed in any of claims 10, 11, and 12, wherein the channel barriers (108a) are provided in a zig-zag manner.

14. The body wrap (100) as claimed in claims 1, wherein the body wrap (100) is constricted at a neck portion (214) of the body wrap (100).
15. The body wrap (100) as claimed in claim 1, wherein the plurality of sub-channels (106b) in a mid-portion (220) of the body wrap (100) are formed by segmented channel barriers (108a) arranged in a zig-zag manner such that each segment of the segmented channel barriers (108a) is parallel to the other segments of the channel barrier (108a) and substantially parallel to the periphery (202) of the body wrap.
16. The body wrap (100) as claimed in claim 1, wherein the body wrap (100) is constricted at the bottom end (218).
17. A system (300) for inducing hypothermia, the system comprising:
a body wrap (100) comprising:
a heat exchange layer (102) for contact with a patient's body;
an insulating layer (104); and
an intermediate layer (103) comprising a plurality of channels (106a, 106b) between the heat exchange layer (102) and the insulating layer (104), wherein the plurality of channels (106a, 106b) comprises:
a main channel (106a) along at least a periphery (202) of the body wrap (100); and
a plurality of sub-channels (106b), wherein the main channel (106a) is connected to the plurality of sub-channels (106b),
an inlet (204) and an outlet (206) at a bottom end (208) of the body wrap (100), wherein the inlet (204) is for flow of the coolant fluid into the main channel (106a) and the outlet (206) is for flow of the coolant fluid out from the plurality of sub-channels (106b), wherein the coolant fluid flows into the body wrap (100) through the inlet (204) at the bottom end (208), wherein the coolant fluid flows from the inlet (204) through the main channel

(106a) along the periphery (202) of the body wrap (100) into the plurality of sub-channels (106b) at the hood portion (210), and wherein the coolant fluid flows out of the body wrap (100) from the outlet (206) at the bottom end (208); and

5 a hood portion (210) at a top end (212) of the body wrap (100) for wrapping around the patient's head; and

 a thermo-control unit (302) coupled to the body wrap (100), wherein the thermo-control unit (302) comprises:

 a cooler (412) for cooling the coolant fluid;

10 a pump (410) for pumping the coolant fluid into the body wrap (100) through the inlet (204) of the body wrap (100);

 a microcontroller (408) for controlling the cooler (412) and the pump (410); and

15 a cerebral function monitor (422) for monitoring the brain activity and providing diagnosis and prognosis on the brain's condition.

18. The system (300) as claimed in claim 17, wherein the cooler (412) works on a Peltier cooling principle to increase or decrease the temperature of the coolant fluid based on a direction of current supplied to the cooler (412) to maintain a core body temperature of the patient.

20 19. The system (300) as claimed in claim 17, wherein the body wrap (100) and the thermo-control unit (302) comprises a plurality of temperature sensors, a plurality of pressure sensors, and a plurality of flow meters for communicating with the microcontroller (408) to maintain the temperature, pressure, and flow rate of the coolant fluid in the body wrap (100).

25 20. The system (300) claimed in any of claims as 17-19, wherein the microcontroller (408) is configured to maintain the patient's core body temperature at a set temperature, wherein the microcontroller (408) is configured to:

set the set temperature, a set flow rate, and a set pressure;
continuously:

receive a measured temperature from the plurality of
temperature sensors corresponding to temperature of the coolant fluid in a
reservoir (404) and the patient's core body temperature;

receive measured flow rates of the coolant fluid at the inlet and
outlet of the body wrap (100);

receive measured pressure of the coolant fluid at the reservoir
(404); and

compare the measured temperature, the measured flow rate,
and the measured pressure with the set temperature, the set flow rate, and the
set temperature to obtain compared values, wherein the microcontroller (408)
is configured to control the cooler (412), an outlet valve (420), and the pump
(410) based on the compared values.

21. The system (300) as claimed in claim 17, wherein the coolant fluid is selected
from the group comprising water, de-ionized water, propylene glycol and the
like.

22. The system (300) as claimed in any of claims 17 and 21, wherein the coolant
fluid comprises an additive.

23. The system (300) as claimed in claim 21, wherein the additive is selected
from the group consisting of potassium formate, potassium acetate, and the
like.

24. The system (300) as claimed in claim 17, wherein the interfaces with at least
one of a rectal and an esophagus temperature probe to monitor Core Body
Temperature (CBT) and to adjust the cooler (412) to heat or cool the coolant
fluid to maintain the CBT.