I/We claim:

1. 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),

wherein the body wrap comprises:

an inlet (204) and an outlet (206) at a constriction provided 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);

a hood portion (210) at a top end (212) of the body wrap (100) for wrapping around the patient's head, wherein the main channel (106a) causes flow of the coolant fluid from the inlet at the bottom end (208) of the body wrap (100) to the hood portion (210) along the periphery (202) of the body wrap (100), and wherein, at the hood portion (210), the main channel (106a) opens into the plurality of sub-channels (106b) to cause flow of the coolant fluid into the plurality of sub-channels (106b) after the coolant fluid has passed through the main channel (106a);

a mid portion (220) for wrapping around the patient's body, wherein the plurality of sub-channels (106b) branch out in the mid portion (220) for distribution of the coolant fluid through the body wrap (100) for cooling the patient's body, and wherein the plurality of sub-channels (106b) are connected to the outlet (206) at the bottom end (208) to cause the coolant fluid

to flow out of the body wrap (100) after the coolant fluid has passed through the mid portion (220); and

a neck portion (214) formed as a constriction between the hood portion (210) and the mid portion (220), wherein the plurality of sub-channels (106b) constrict at the neck portion (214) to slow down flow of coolant fluid from the hood portion (210) to beyond the neck portion (214).

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 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.
7. The body wrap (100) as claimed in claim 1, wherein the coolant fluid is selected from the group comprising water, de-ionized water, and propylene glycol.
8. The body wrap (100) as claimed in any one of claims 1 and 7, wherein the coolant fluid comprises an additive.
9. The body wrap (100) as claimed in claim 8, wherein the additive is selected from the group consisting of potassium formate, and potassium acetate.
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).

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 one of claims 10 and 11, wherein the channels barriers (108a) are curved channel barriers, segmented channel barriers, or a combination thereof.

13. The body wrap (100) as claimed in any one 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 claim 1, wherein the plurality of sub-channels (106b) in the 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.

15. A system (300) for inducing hypothermia, the system comprising:

a body wrap (100) as claimed in any one of claims 1-14; 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;

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

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

16. The system (300) as claimed in claim 15, 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.

17. The system (300) as claimed in claim 15, 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).

18. The system (300) claimed in any one of claims as 15-17, 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.

19. The system (300) as claimed in claim 15, wherein the thermo-control unit (302) 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.