CLAIMS

What is claimed:

1. A biochip fluidic control system, the fluidic control system comprising:

at least one human-on-chip containing at least one organ-on-chip system;

wherein the at least one organ-on-chip system contains at least one ductal scaffold interfacing at least one surrounding compartment;

at least one valving system controlling the flow to each compartment;

at least one micro-pumping mechanism that can pump and control the flow to at least one compartment;

at least one actuator controlling the valves on the chip and leading to the chip; and

at least one actuator controlling fluid pumping to the chip compartments;

wherein the at least one valving system is operable to open or close and shift the flow pathways to every compartment.

2. The biochip fluidic control system of claim 1, wherein the at least one valving system may be at least one of pneumatically, mechanically, electrically, and fluidically actuated.

3. The biochip fluidic control system of claim 1, wherein the at least one valving system connects the at least one biochip to the operating system.

4. The biochip fluidic control system of claim 1, wherein the at least one valving system connects at least two biochips in human-on-chip connection plate.

5. The biochip fluidic control system of claim 1, wherein the at least one valving system controls at least two biochips in human-on-chip connection plate.

6. The biochip fluidic control system of claim 1, wherein the at least one valving system controls at least one inlet and outlet of a biochip.

7. The biochip fluidic control system of claim 1, wherein the at least one valving system connects and controls a connection between at least one duct to another duct.

8. The biochip fluidic control system of claim 1, wherein the at least one valving system connects at least one stroma to another stroma.

9. The biochip fluidic control system of claim 1, wherein the at least one valving system connects, and controls the connection between, at least one duct to at least one stroma.

10. The biochip fluidic control system of claim 1, wherein the at least one valving system connects at least one biochip to at least one measuring device.

11. The biochip fluidic control system of claim 1, wherein the at least one valving system contains at least one bistable and open close valve.

12. The biochip fluidic control system of claim 1, wherein the at least one valving system contains at least one bistable valve, and wherein the at least one bistable valve maintains a state position by a beam, magnet, or any drilled geometrical shape.

13. The biochip fluidic control systems of claim 1, wherein the at least one valving system contains at least one open close valve, and wherein the at least one open close valve maintains a state position by a drilled geometrical shape.

14. A human-on-chip plate for providing the at least one organ-on-chip system of the biochip fluidic control system according to claim 1, the human-on-chip plate comprising:

at least one 3D culture biochip;

at least one micro-valve;

at least one microfluidic channel;

at least one inlet or outlet plate port;

wherein the outlet ports from one chip may be connected to another chip by routing the valves,

wherein multiple chips may be connected in parallel, in series or in combination and one or more chips in the human-on-chip plate may be bypassed,

wherein each fluid connection may be altered independently and at any time,

at least one valving system connecting or separating different compartments of and between the organ-on-chip system,

wherein at least one inlet and one outlet port are configured for providing access to and blocking the microchannels;

wherein the at least one valving system may allow for sampling, changing the model flow map, and/or introducing or reducing at least one fluidic chamber,

wherein the valves may be controlled in a bistable position by actuators and sensors and positioned at channel ports of the chips,

wherein the valves are positioned immediately adjacent to the biochips and may be controlled in a bistable position; and

wherein the human-on-chip plate further comprises the at least one organ-on-chip system including at least one ductal scaffold interfacing at least one surrounding compartment.

15. The human-on-chip of claim 14, wherein the plate may be rapidly connected from the bottom or the side, wherein fluids will be exchanged.