CLAIMS

1. A microfluidic device for selective capture of target biological entities comprising,

a) array of symmetric hydrofoil shaped pillars (1) in which the geometric centers of the pillars form a rhombic lattice (4) characterized by the side length of a rhombus in the lattice, which is the Euclidean distance between the geometric centers of two neighbouring symmetric hydrofoil shaped pillars (1), and chord lines (5) of the pillars are parallel to each other,

b) a meandering microfluidic channel (2) including said symmetric hydrofoil shaped pillars (1) acting as obstacles, and

(c) a capture volume (3)

characterized in that

the capture volume (3) is defined by Boolean subtraction of the array of symmetric hydrofoil shaped pillars from the meandering microfluidic channel; and wherein boundaries of the capture volume including the surface of the symmetric hydrofoil shaped pillars are coated with antibodies for providing the selective capture of the target biological entities.

2. The microfluidic device according to Claim 1 characterized in that said meandering microfluidic channel (2) comprises an ellipse segment (13) characterized by a chord parallel to either of the major or minor axis of the ellipse, characterized in that the said chord is divided into inflow section (17) and outflow section (18) through which target biological entity flow into and out of the ellipse segment (13), respectively.

3. The microfluidic device according to claim 2, where length of inflow section (17) is equal to the outflow section (18).

4. The microfluidic device according to Claims 2 or 3 characterized in that said meandering microfluidic channel comprises a sequence of ellipse segments (13) connected to each other, where succeeding ellipse segment is formed by flipping the preceding ellipse segment about its chord and panned by a distance equal to the inflow section (17) along the chord.

5. The microfluidic device according to Claims 2-4 characterized in that said device comprises at least a channel unit where this unit consists of two ellipse segments (13), where outflow section (18) of preceding ellipse segment is connected to the inflow section (17) of

succeeding ellipse segment through a straight microchannel (23) wherein the straight microchannel comprises the array of symmetric hydrofoil shaped pillars.

6. The microfluidic device according to any of the preceding claims characterized in that ellipse segments (13) are in the form of a half-circle.

7. The microfluidic device according to any of the preceding claims characterized in that the distance between neighbouring symmetric hydrofoil shaped pillars is between 75-150 µm.

8. The microfluidic device according to any of the preceding claims characterized in that the target biological entity is selected from the group consisting of Circulating Tumor Cells, rare cells, peripheral blood cells, or any combination thereof.