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Supplementary Information

Construction and Manipulation of Serial Gradient Dilution Array on a Microfluidic Slipchip for Screening and Characterizing Inhibitors against Human Pancreatic Lipase

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1. The fabrication processing of microfluidic slipchip

A silicon wafer was first prepared by washing with acetone and DI water. Then, 1 mL of silicone oil was dropped on the silicon wafer, followed by spinning at 3000 rpm for 50 s. After that, the cured PDMS bottom layer from a 3D printed mold was stamped onto the silicone wafer for 1 min to form a silicone oil film. Then, the PDMS bottom layer with silicone oil film was peeled from the wafer and assembled with the punched PDMS top layer. After assembling, the SlipChip was then placed horizontally for 10 min to make the silicon oil layer uniform. The fabrication processing of microfluidic SlipChip is shown in Figure S1.

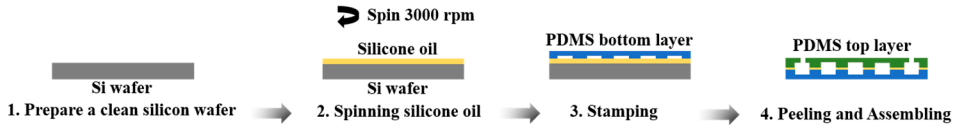

Figure S1. The fabrication processing of microfluidic SlipChip.

2. The detailed microfluidic slipchip design parameters

The microfluidic SlipChip consists of two opposing microfluidic layers that have microfabricated microchambers and fluidic ducts on the contact surface. The top PDMS layer consists of four rows of microchambers (diameter: 2 mm, height: 200 μm) and ducts (3 mm*1 mm*0.2 mm) with of the same height. The bottom PDMS layer consists of five rows of microchambers with different heights (200 μm and 600 μm) and the same diameter (2 mm). The detailed design parameters are shown in Figure S2 and Table S1.

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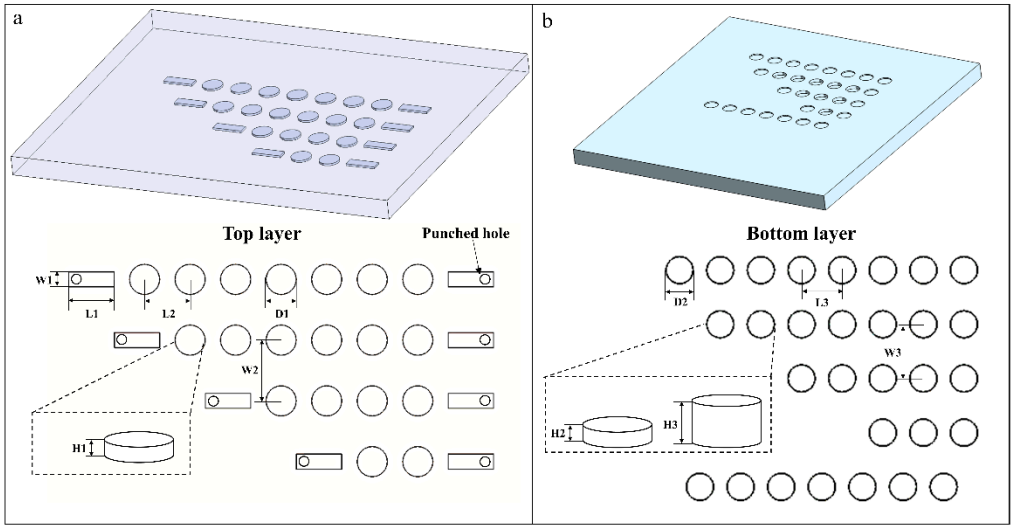

Figure S2. The design of the microfluidic SlipChip.

L_1	3 mm	L_3	3 mm
W_1	1 mm	D_2	2 mm
H_1	200 μm	W_3	4 mm
D_1	2 mm	H_2	200 μm
L_2	3 mm	H_3	600 μm
W_2	4 mm		

Table S1. The detailed parameters of the microfluidic SlipChip.

3. Boundary conditions of the simulation

In the simulation of this work, the diffusion coefficient was set as 5×10^{-10} m^2/s and the concentrations of the solution in the top chamber and bottom chamber were set as 1 mol/m^3 and 0 mol/m^3, respectively. The solution was set as water with a fluid viscosity of 1×10^{-3} Pa·s and a density of 1×10^3 kg/m^3. The simulation is on a three-dimensional scale and the heights of the top layer chamber and bottom layer chamber were set as 200 μm and 600 μm, respectively. The diameter of the chambers was set as 2 mm.