

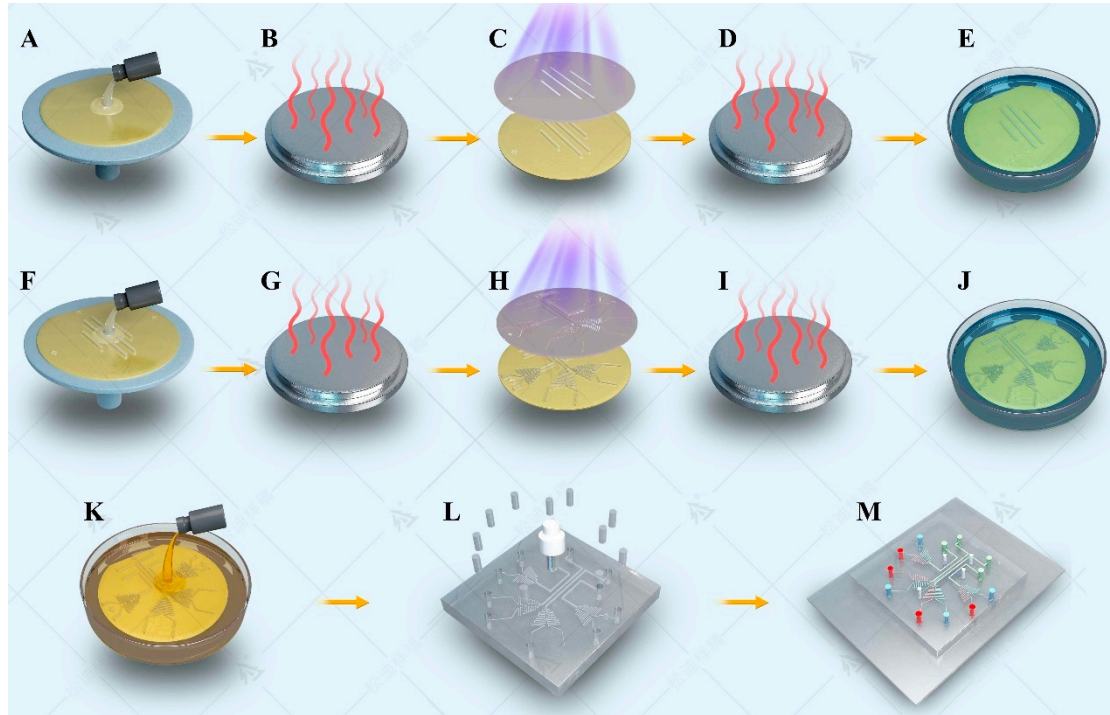
# **A novel microfluidic device for the neutrophil functional phenotype analysis: Effects of glucose and its derivatives AGEs**

Ke Yang<sup>\*a</sup>, Xiao Yang<sup>b</sup>, Chaoru Gao<sup>b</sup>, Changyi Hua<sup>a</sup>, Chenggang Hong<sup>c</sup>, and Ling Zhu<sup>a\*</sup>

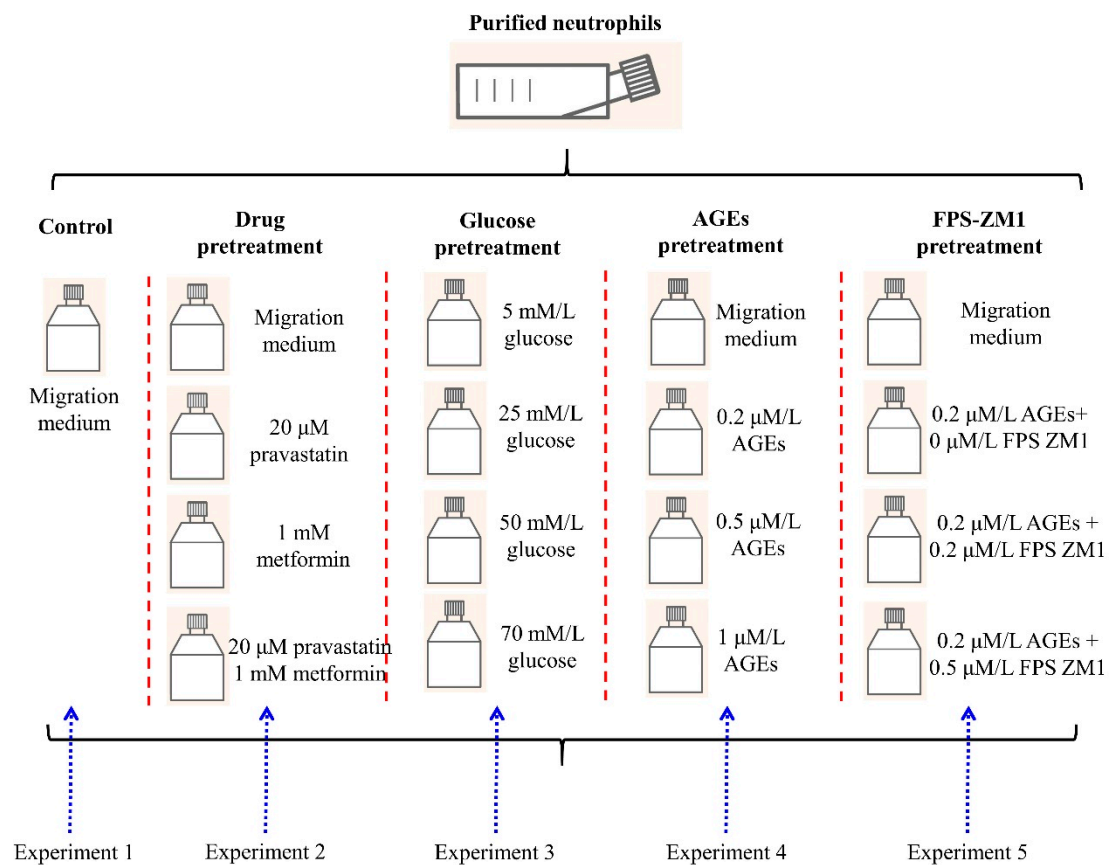
*a. Anhui Institute of Optics and Fine Mechanics, Hefei Institutes of Physical Science, Chinese Academy of Sciences, Hefei 230031, China. E-mail addresses: [keyang@aiofm.ac.cn](mailto:keyang@aiofm.ac.cn) (Ke Yang), [zhul@aiofm.ac.cn](mailto:zhul@aiofm.ac.cn) (Ling Zhu)*

*b. School of Biomedical Engineering, Anhui Medical University, Hefei 230032, China.*

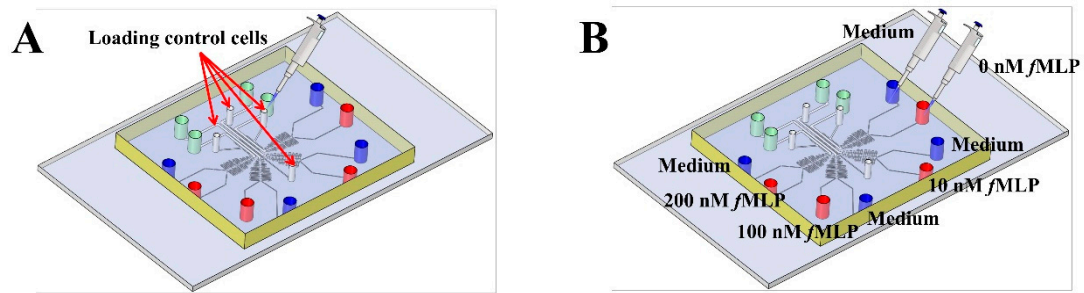
*c. Hefei Zhongke Yikangda Biomedical Co., Ltd., Hefei 230088, China.*



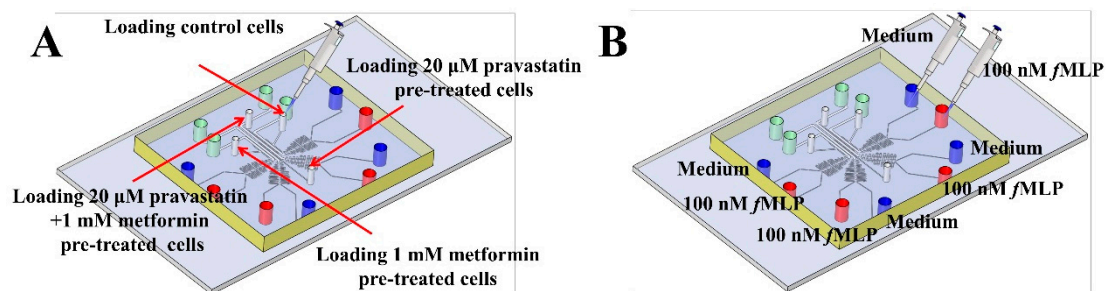
**Figure S1.** The preparation progresses of the F4-chip. (A) Pouring and spinning SU-8 (2  $\mu\text{m}$ ); (B) Baking at 95 ° C for 30 s; (C) UV exposure for 3 s; (D) Baking at 95 ° C for 30 s; (E) Developing for 30 s; (F) Pouring and spinning SU-8 (70  $\mu\text{m}$ ); (G) Baking at 65 ° C for 2 min, 95 ° C for 7 min; (H) UV exposure for 20 s; (I) Baking at 65 ° C for 2 min, 95 ° C for 7 min; (J) Developing for 5 min; (K) Pouring the PDMS; (L) Peeling and punching; (M) Bonding PDMS with glass slider.



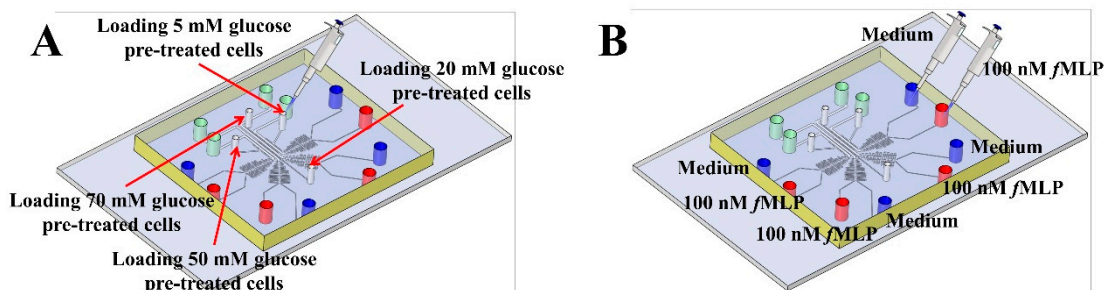
**Figure S2.** The detailed neutrophil pretreatment method for various experiments. Experiment 1: testing the chemotaxis of neutrophil to  $\beta$ MLP chemoattractant. Experiment 2: testing the function of metformin and pravastatin on neutrophil chemotaxis. Experiment 3: testing the function of glucose on neutrophil chemotaxis. Experiment 4: testing the function of AGEs on neutrophil chemotaxis. Experiment 5: testing the function of FPS-ZM1 on neutrophil chemotaxis.



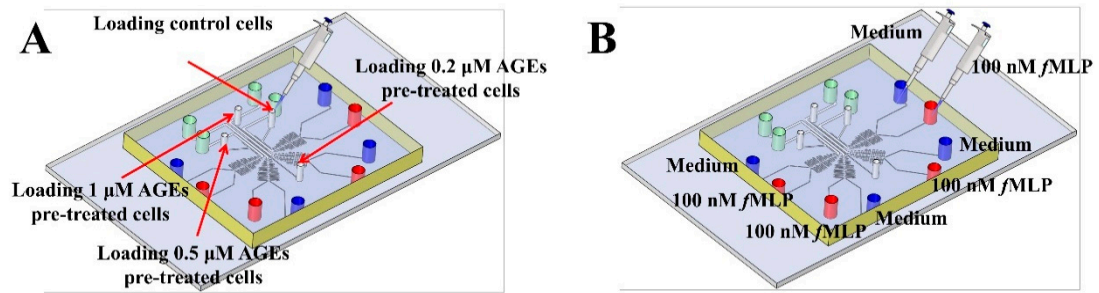
**Figure S3.** Experiment setup method of neutrophil chemotaxis to known fMLP chemoattractant in the F4-Chip.



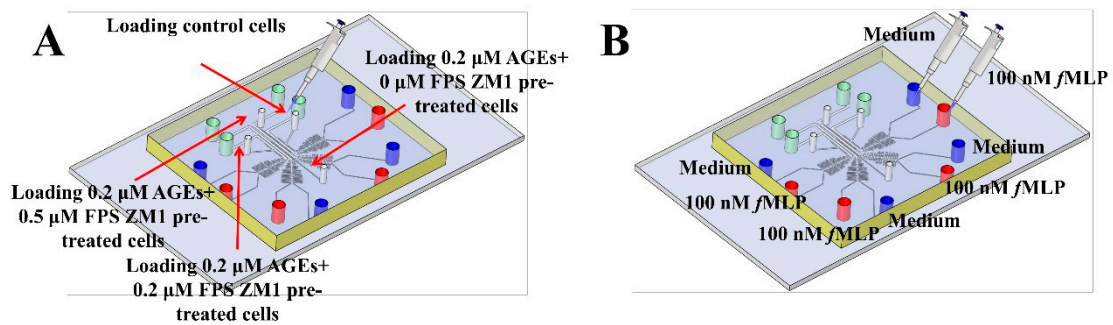
**Figure S4.** Experiment setup method of testing the function of pravastatin and metformin on neutrophil chemotaxis in the F4-Chip.



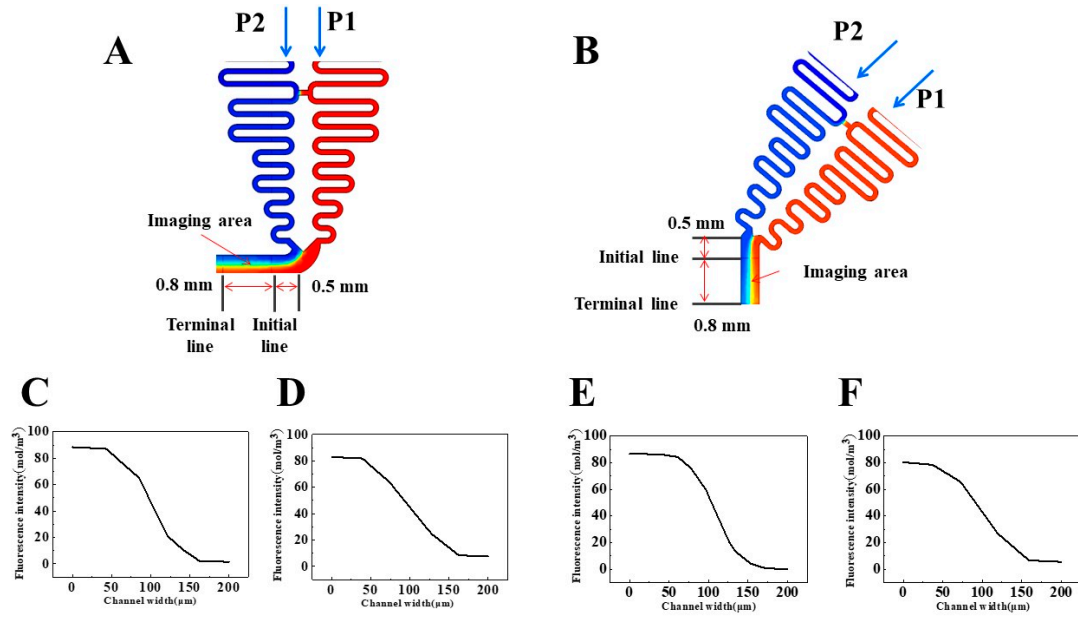
**Figure S5.** Experiment setup method of testing the function of glucose on neutrophil chemotaxis in the F4-Chip.



**Figure S6.** Experiment setup method of testing the function of AGEs on neutrophil chemotaxis in the F4-Chip.



**Figure S7.** Experiment setup method of testing the function of FPS-ZM1 on neutrophil chemotaxis in the F4-Chip.



**Figure S8.** Gradient simulation results of microfluidic chip. (A) Gradient simulation image of unit 1 (unit 4); (B) Gradient simulation image of unit 2 (unit 3); (C) The gradient simulation curve at the initial line of the imaging area in unit 1 (unit 4); (D) The gradient simulation curve at the terminal line of the imaging area in unit 1 (unit 4); (E) The gradient simulation curve at the initial line of the imaging area in unit 2 (unit 3); (F) The gradient simulation curve at the terminal line of the imaging area in unit 2 (unit 3).