

## Supplemental information

### An automatic integrated microfluidic system for allergy microarray chips

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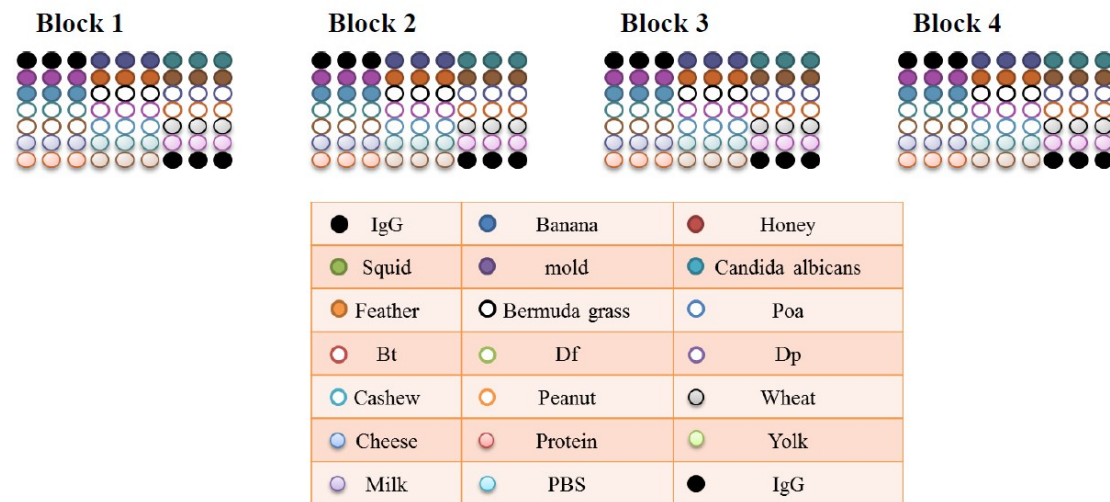
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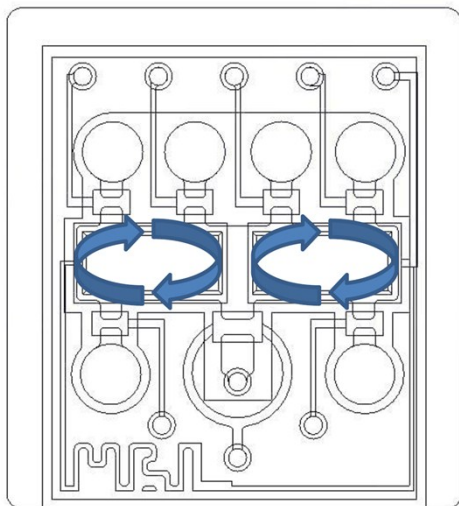
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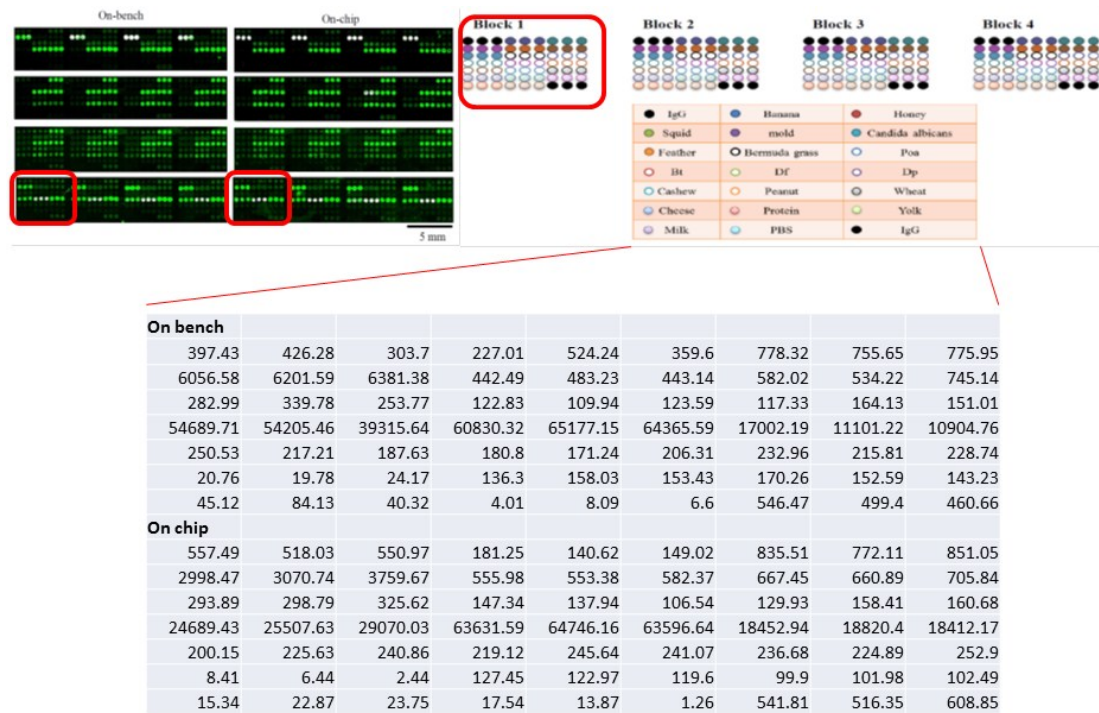
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**Fig. S1.** Illustrations of the allergy microarray chip. There were four identical blocks, each containing twenty kinds of allergens (or control immunoglobulin G [IgG] spots) in triplicate spots. Poa, allergens from *Poa annua*; Bt, allergens from *Bacillus thuringiensis*; Df and Dp, Der p and Der F peptidases from mites; PBS, phosphate buffered saline.



**Fig. S2.** Illustration of the vortex flows generated in the micropump. The video was available online: <http://xxxxxx>



**Fig. S3.** The fluorescence intensities (a. u.) from Fig. 10. The raw data of spots in block 1 area in the fourth test (red rectangle; bottom row) were shown. The fluorescence intensities (a. u.) were almost comparable between the on-bench and on-chip tests.

Table S1. Methods comparison.

Sequential procedure	On bench (time)	On chip (time)	Note
1. Serum-allergen hybridization	30 min	30, 20, or 15 min	
2. Remove slides from a shaker, briefly dry, put it back, and add reagents	~2 min	N/A	
3. Wash	5 min	5 min	3 times
4. Remove slides from a shaker, briefly dry, put it back, and add reagents	~2 min	N/A	3 times
5. 2 <sup>nd</sup> antibody hybridization	30 min	30, 20, or 15 min	
6. Remove slides from a shaker, briefly dry, put it back, and add reagents	~2 min	N/A	
7. Wash	5 min	5 min	3 times
8. Remove slides from a shaker, briefly dry, put it back, and add reagents	~ 2 min	N/A	3 times
9. RO rinse	2 min	2 min	2 times
Total	~110 min	94, 74, or 64 min	
Time reduction		~15%, ~33%, or ~42%, respectively	