Electronic Supplementary Material (ESI) for Lab on a Chip.

Electronic Supporting Information

A competitive, bead-based assay combined with microfluidics for multiplexed toxin detection

Hamid Aghamohammadi,[a] Kathryn E Thomas,[b] Sanjana Srikant,[a] Jason Deglint,[b,c] Alexander Wong,[c] and Mahla Poudineh*[a]

[a] Department of Electrical and Computer Engineering, University of Waterloo, Waterloo, ON N2L 3G1, Canada.

[b] Blue Lion Labs, Waterloo, Ontario, Canada

[c] Department of System Design Engineering, University of Waterloo, Waterloo, Ontario N2L 3G1, Canada

Corresponding author: Mahla Poudineh, mahla.poudineh@uwaterloo.ca

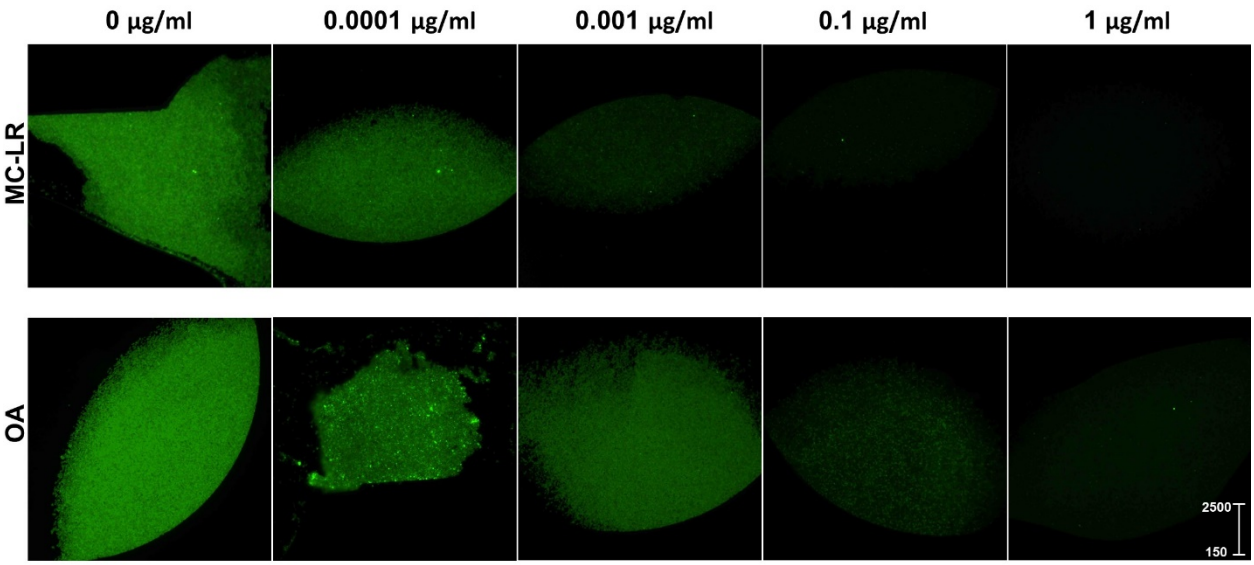

Figure S1 Fluorescence images of retained beads in the collection chambers. The images show the decrease in the fluorescence signal of beads from left to right by increasing the target toxin concentration.

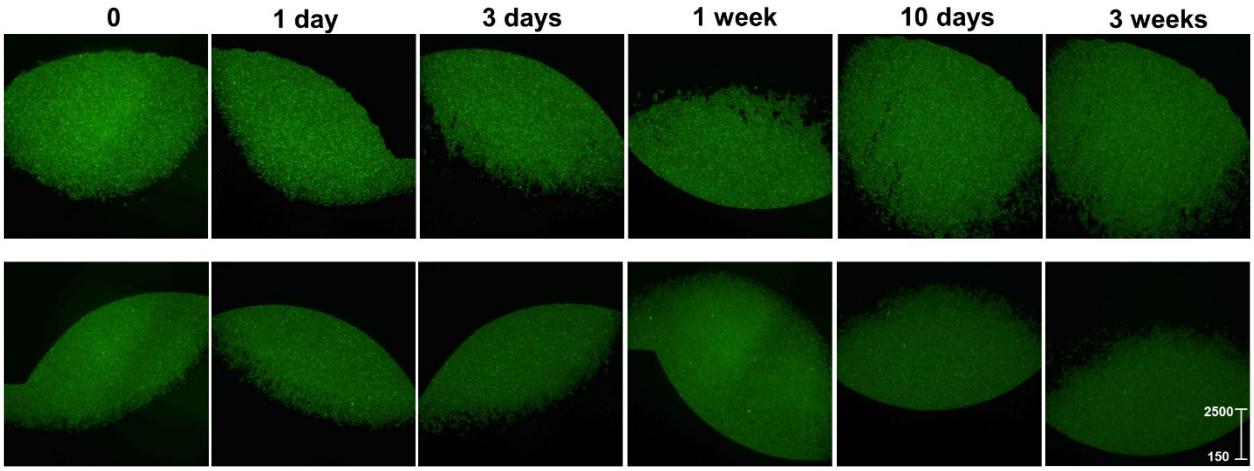

Figure S2 Monitoring the signal stability of the assay. The images were taken from thre beads retained in the chamber in a three-week period.

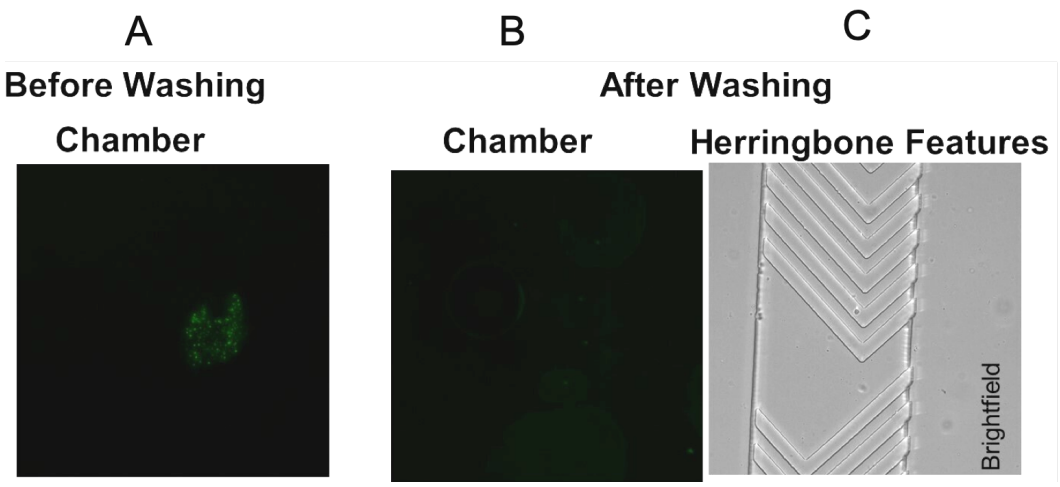

Figure S3. A) The chamber of Toxin-Chip where magnetic beads were collected. B) The chamber after washing. C) the herringbone structure after washing.

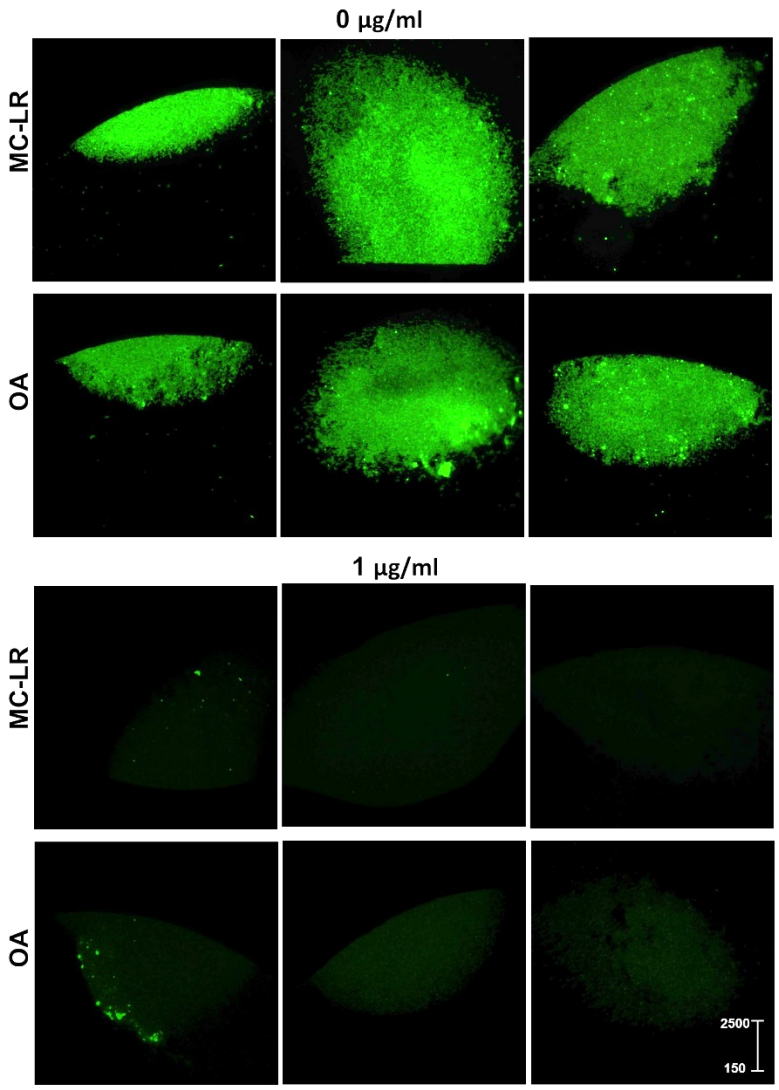

Figure S4. Fluorescence images of detecting injected toxin from lake water samples.

Table S1 Toxin-Chip dimensions

Geometry	**Dimensions**
Mixing module length	30 cm
Mixing module width	300 μm
Mixing module height	45 μm
Herringbone structures height	45 μm
Chamber diameter	1.5 mm
Chamber height	45 μm

Table S2 Microscope setting for collecting the fluorescence images

Setting	**Value**
Magnification	30X
Exposure time	10ms
Lookup Tables (LUT)	100-2500

Table S3 Spiked and calculated concentrations of toxin related to Figure 6.

Spiked conc.	**Calculated MC-LR conc.**	**Calculated OA conc.**
Sample 1- 0 μg/ml MC-LR, 0 μg/ml OA	0.0008 μg/ml	0.00075 μg/ml
Sample 2- 1 μg/ml MC-LR, 0 μg/ml OA	1 μg/ml	0.00001 μg/ml
Sample 3- 0 μg/ml MC-LR, 1 μg/ml OA	0 μg/ml	0.75 μg/ml
Sample 4- 1 μg/ml MC-LR, 1 μg/ml OA	0.85 μg/ml	1 μg/ml

Table S4 Spiked and recovered concentration from lake water experiment.

Spiked conc.	**0 μg/ml**	**1 μg/ml**
MC-LR	0.000028 μg/ml	0.76 μg/ml
error	12%	10%
OA	0 μg/ml	0.87 μg/ml
error	8%	17%