

# *Supplementary Information*

## **Multi-cellular natural killer (NK) cell clusters enhance NK cell activation through localizing IL-2 within the cluster**

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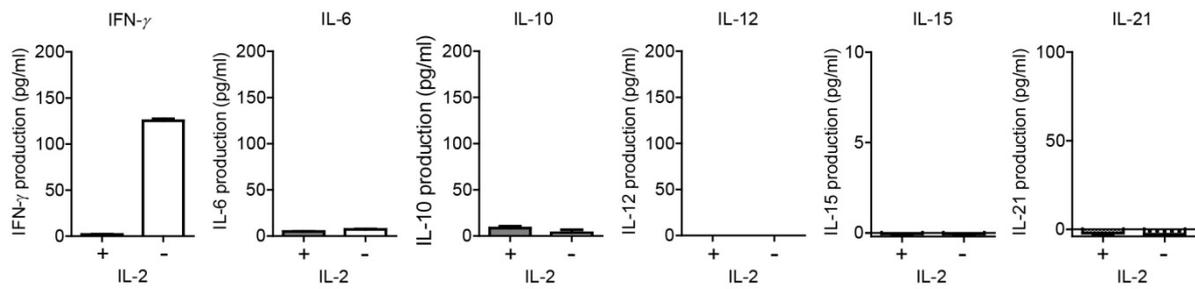
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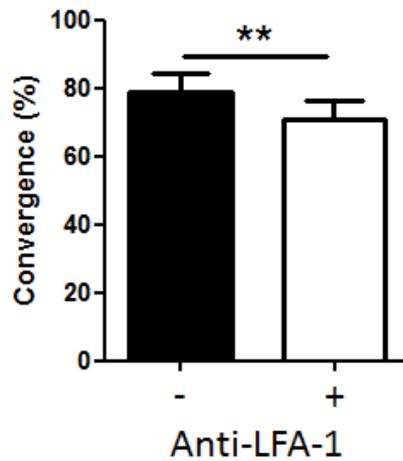
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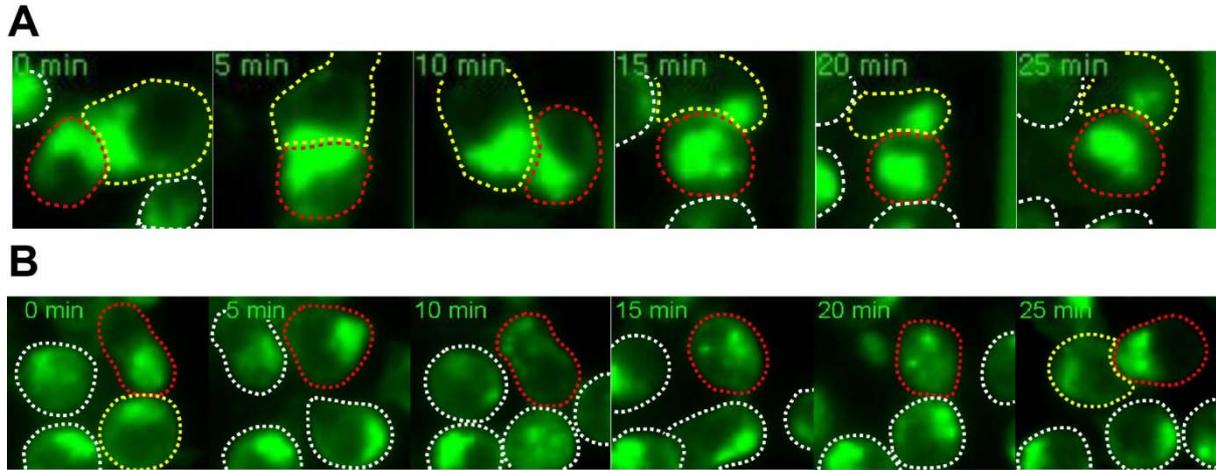
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**Figure S1. Cytokine secretion of IL-2-stimulated NK cells.** NK cells were cultured in the presence (50 ng/ml) or absence of IL-2 for 48 h, and concentrations of various cytokines in the supernatant were measured.



**Figure S2. Effect of anti-LFA-1 treatment on granule convergence of NK cells in social microwells.** NK cells in social microwells were stimulated with IL-2 in the presence (10  $\mu$ g/ml) or absence of anti-LFA-1 (clone: M17/4) for 18 h, and granule convergence was assessed using LysoSensor<sup>TM</sup> Green DND-189. N = 380 (- anti-LFA-1), and N = 369 (+ anti-LFA-1). Error bars: standard deviation. The Mann-Whitney test was performed. \*\* p<0.01.



**Figure S3. NK cells in social microwells exhibited dynamic polarization of lytic granules toward neighboring NK cells.** A. Representative time-lapse images showing stable prolonged lytic granule polarization of a NK cell (a red dashed circle) toward a neighboring NK cells (a yellow dashed circle). Bystander NK cell boundaries are marked with white dashed circles. B. Representative time-lapse images showing transient lytic granule convergence/polarization.