

1 Electronic Supplementary Information (ESI)

2 Surface nanotopography and cell shape modulate
3 tumor cell susceptibility to NK cell cytotoxicity

4 *Yongbum Cho¹, JangHyuk Kim², Jeehun Park^{*3}, Junsang Doh^{*2,3,4}*

5 ¹ School of Interdisciplinary Bioscience and Bioengineering (I-Bio), Pohang University of
6 Science and Technology, 77, Cheongam-ro, Pohang, Gyeongbuk, 37673, Republic of Korea

7 ² Department of Materials Science and Engineering, Seoul National University, Seoul, South
8 Korea

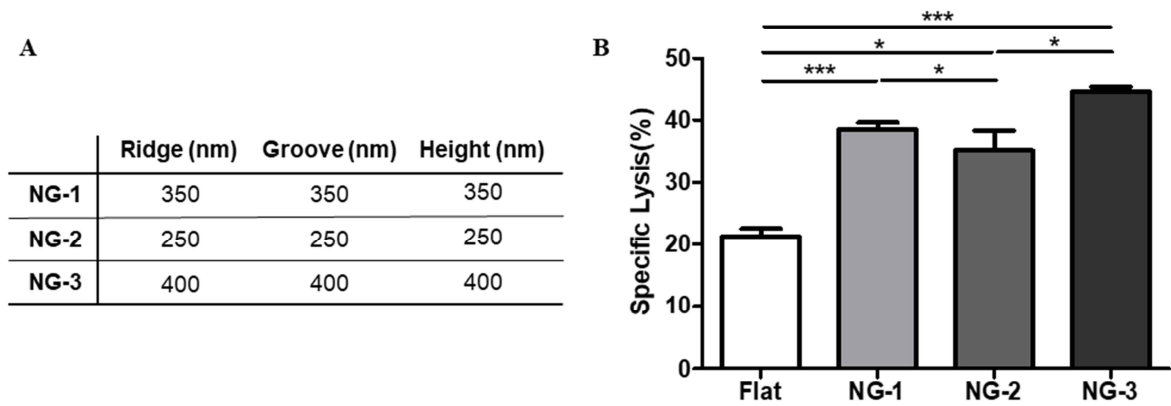
9 ³ SOFT Foundry Institute, Seoul National University, Seoul, South Korea

10 ⁴ Institute of Engineering Research, BioMAX, Seoul National University, Seoul, South Korea

11
12
13
14
15
16 *Address correspondence to jeehun@snu.ac.kr (Dr. Jeehun Park) and jsdoh@snu.ac.kr (Prof.
17 Junsang Doh)

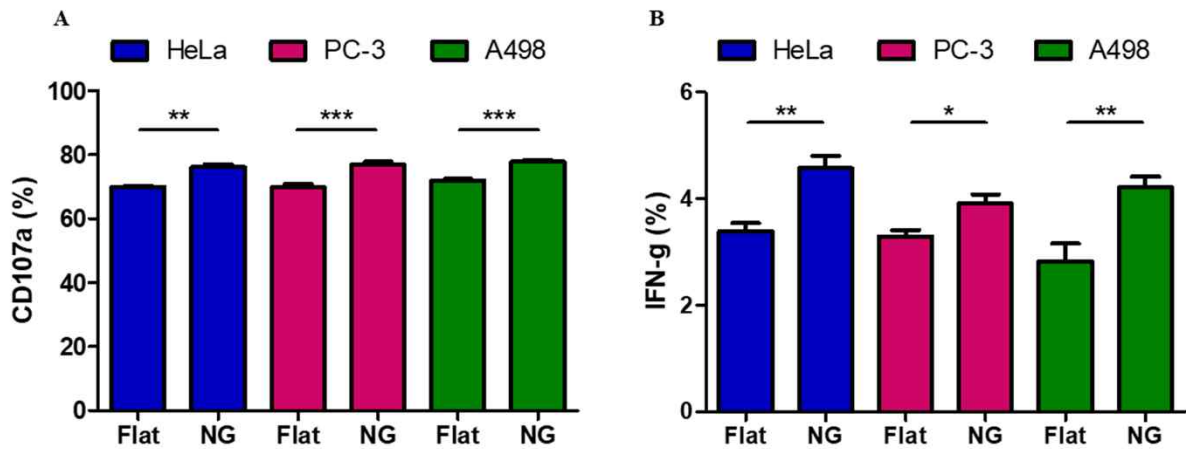
18

1 **Supplementary Figures**



2
3
4
5
6
7

Figure S1. Effects on nanogrooved dimensions on NK cell cytotoxicity. (A) Dimensions of nanogrooved surfaces used in the experiments. (B) NK cell cytotoxicity against HeLa cells on nanogrooved vs. flat surfaces. Data are shown as mean \pm s.e.m. [two-sided Student's t-test] * $p < 0.05$, *** $p < 0.001$.



8
9
10
11
12
13
14
15
16
17
18
19
20

Figure S2. The percentage of CD107a (A) and IFN- γ (B) expressing NK-92 cells co-cultured with tumor cells on flat or nanogrooved surfaces. NK-92 cells were added to tumor cells in the present of FITC-conjugated anti-CD107a antibody (Biolegend). After 1 h of incubation, monensin and brefeldin A (BD Biosciences) were added to the cells, and incubated for another 5 h. The NK-92 cells were fixed and permeabilized using BD Cytotfix/Cytoperm™ kit (BD Biosciences) and stained with APC-conjugated anti-human IFN- γ antibody (Biolegend) for 30 min. Finally, the cells were analyzed using FACS cantoII (BD Bioscience) and FlowJo software (FlowJo, LLC). Data are shown as mean \pm s.e.m. [two-sided Student's t-test] * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.

1 **Supplementary Movie Legends**

2

3 **Movie S1.** A representative movie showing an NK cell killing a tumor cell in an elliptical
4 micropattern.

5

6

7 **Movie S2.** A representative composite movie with bright field (left) and fluorescence (right;
8 lifeact-GFP: green, lytic granule: red) showing an NK cell killing a tumor cell in an elliptical
9 micropattern.