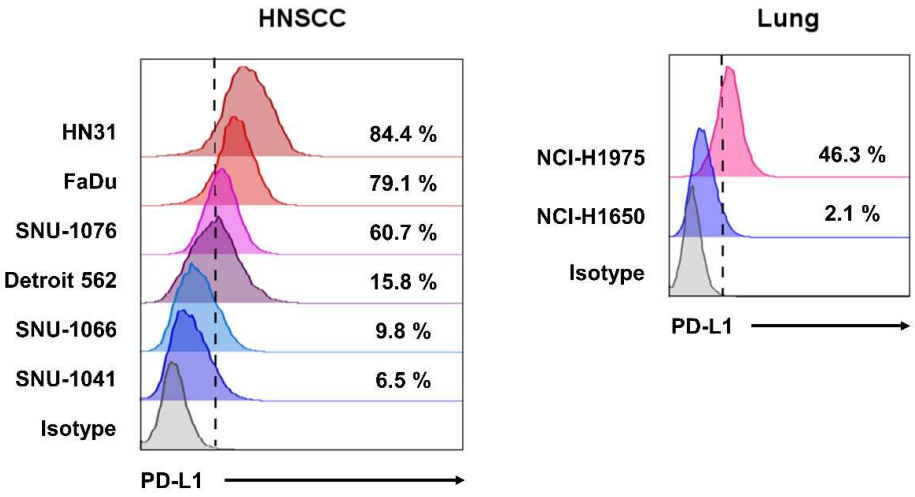
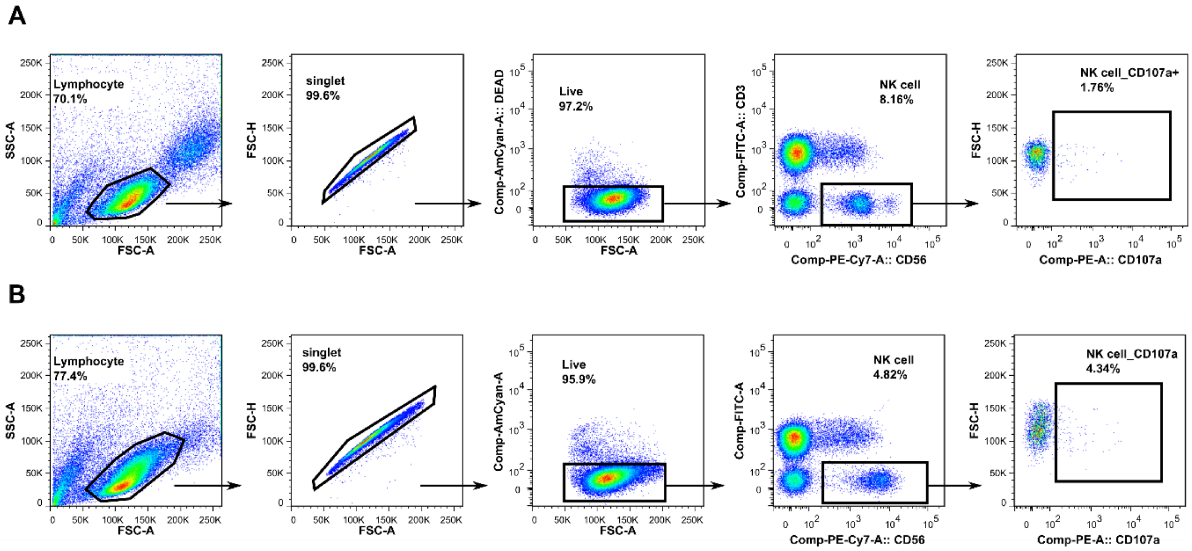
Supplementary table 1. The percentage of NK cells in the PBMCs of each donor.

Donor	% of NK cells (CD3-CD56+)	
	Resting	Activated
2014-5	9.4%	8.4%
2014-9	6.2%	5.2%
2016-1	7.2%	5.4%
2016-4	6.2%	4.1%
2016-7	5.5%	4.8%
2016-11	5.3%	5.5%
2016-12	3.7%	3.9%
2016-13	3.9%	2.7%
2016-15	16.0%	12.4%
2017-3	8.3%	6.8%
2017-5	8.2%	8.6%
2017-8	11.4%	12.5%
2017-11	11.5%	8.1%
2018-2	15.0%	12.1%
2018-3	1.8%	1.1%
2018-4	21.4%	24.0%
2019-1	21.5%	14.3%
2013-4	7.4%	_
2013-1	6.4%	_



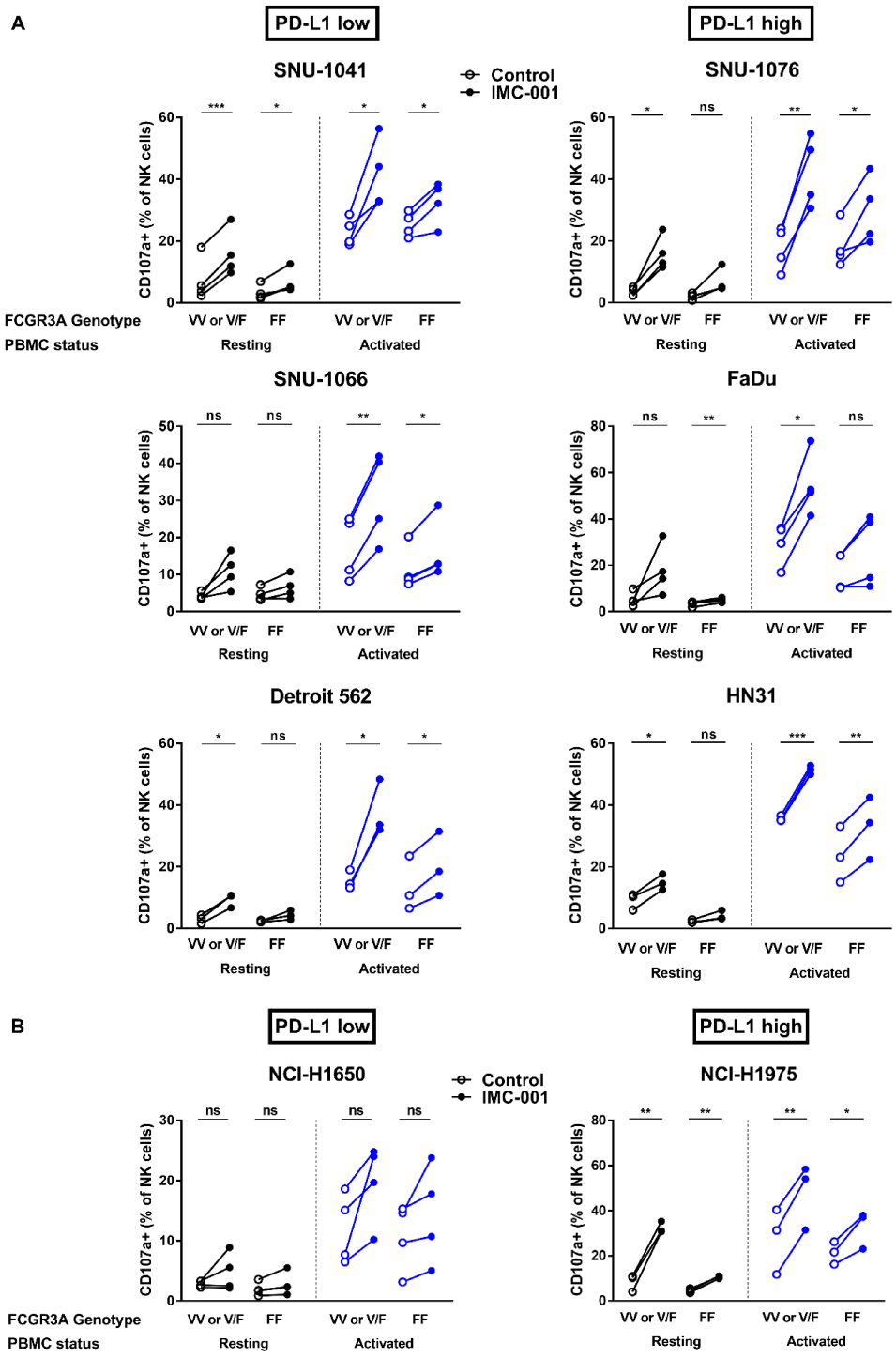
Supplementary figure S1. The PD-L1 score using both % of PD-L1 positive cells

Expression level of surface PD-L1 was analyzed by flow cytometry. Representative histograms showing isotype control (gray shaded) and an anti-PD-L1 antibody. Data were merged with each cancer type, head and neck squamous cell carcinoma (HNSCC) and non-small-cell lung cancer (NSCLC). Histogram represent one of three independent experiments.



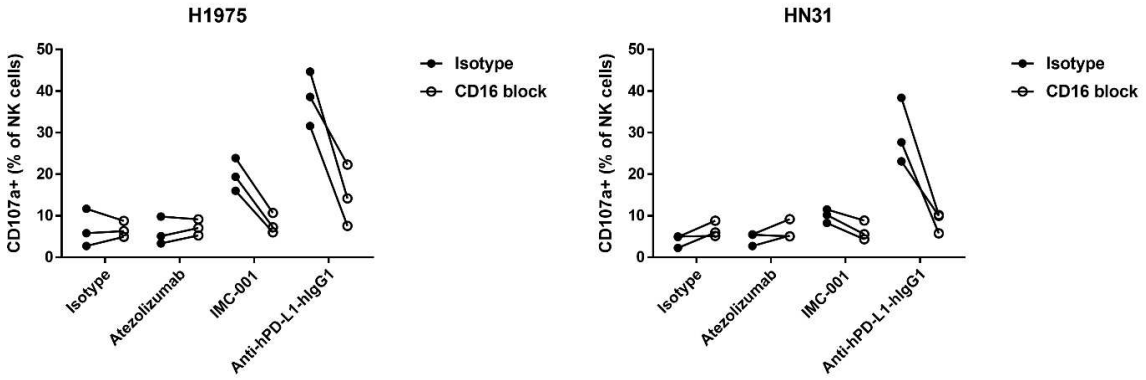
Supplementary figure S2. Gating strategy for CD107a degranulation assay.

Flow cytometry gating strategy used to gate on CD107a + NK cells to measure cytotoxicity of primary NK cells by CD107a degranulation. Total lymphocytes were first gated on FSC × SSC and then singlet gated. A Fixable Viability Dye marker was used to identify live cells. CD3-CD56+ gating was used to select NK cells. Gates for CD107+ NK cell subsets based on expression were determined using respective fluorescence minus one (FMO) controls**. (A)** Representation of primary NK cells either unstimulated or **(B)** stimulated by 1 ng/mL IL-15.



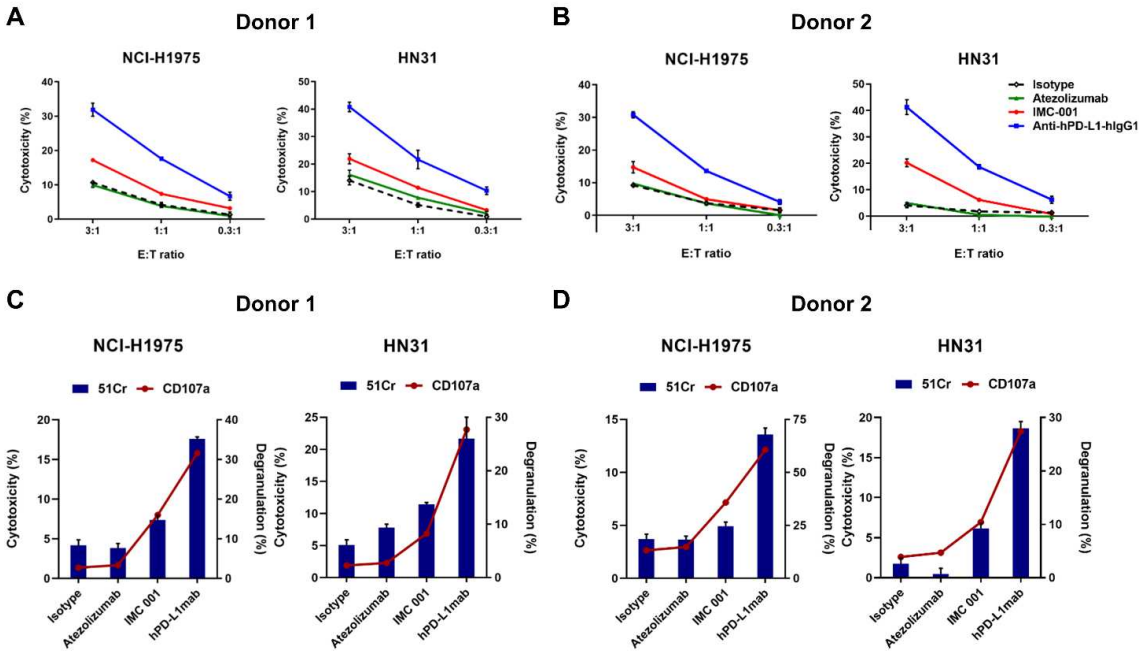
Supplementary figure S3. Anti-PD-L1 mAb that induce ADCC could be enhanced by IMC-001

Graphs show cytotoxicity of NK cells by IMC-001-mediated ADCC (figure 4) according to their FCGR3A genotypes. We grouped the primary NK cells as resting primary (black) and activated (blue) cells. Primary NK cells were rested overnight or activated by IL-15 for 3days. **(A)** Head and neck and **(B)** Lung cancer cell lines were used for target cell. A two-tailed paired Student's t-test was used to compare statistical significance. *, $p<0.05$; **, $p<0.01$; ***, $p<0.001$; ****, $p<0.0001$; ns, not significant.



Supplementary figure S4. ADCC of NK cells occurs in a CD16 dependent manner

The graphs show the result of the anti-CD16 blocking assay. We use the NCI-H1975 and HN31 for target cells. PBMCs from a healthy donor (n=3) were pre-incubated with anti-CD16 blocking antibody at 10 μg/mL for 2 h. To evaluate the cytotoxicity of NK cells, we using CD107a degranulation assay with E: T ratio of 1:1



Supplementary figure S5. Cytotoxicity of primary NK cells mediated by anti-PD-L1 mAb was evaluated by 51Cr release assay results, similar to CD107a degranulation

(A-B) The cytotoxicity of PBMCs from two healthy donors were measured by a standard ^{51}Cr-release assay with various E: T ratios (3:1, 1:1, 0.3:1). Both NCI-H1975(Lung) and HN31(head and neck) cancer cell lines were treated with 10 μg/mL of each mAb. All experiments were performed three times independently. All data are shown as mean ± SD. **(C-D)** The graphs show the CD107a degranulation and 51Cr release assay evaluated in parallel. The line graphs(red) and bar graphs(blue) represent the results of CD107a degranulation and ^{51}Cr release assay at ratio E: T of 1:1 each. PBMCs from two healthy donors were used as effector cells and NCI-H1975 and HN31 cells as target cells.