Supplementary Materials:

Supplementary Fig1: Oncolytic Fitness and expression of Ad-Cab (A) Cell viability assay on B16F10, B16F1, 4T1, MDA-MB-436 and A549 cell lines. Cell lines were infected with Ad-Cab (blue) and Unarmed virus (green). Cell viability was checked after 3 days using an MTS assays. The data are presented as mean ± s.d. (n = 3). B) IgGA Fc-fusion protein expression and secretion from oncolytic adenoviruses. A549 cells were infected with 100 MOI of Ad-Cab, Ad-Cab Ft and Unarmed virus and at day 2 supernatant was collected and IgGA Fc-fusion proteins were subsequently purified and analysed by Western Blot under native and denaturing conditions. Dotted line represents composite of two different gels.

Supplementary Fig2: Gating Neutrophils for trogocytosis. A) Neutrophils were gated on cells that were CD15+ CD14- and then DiO was measured to calculate trogocytosis

Supplementary Fig.3: Comparison between Fc-fusion peptides and FDA-approved PD-L1 inhibitors. A) The percentage of PD-L1 expression on all cell lines used in the assays. B) FACS-based CDC assay against all five different cell line with Ad-Cab, Atezolizumab, IgG1-PDL1, IgA-PDL1 and Unarmed virus. Cells were infected at two indicated MOIs, incubated for 48 hours and pooled serum from healthy volunteers was then added at a final concentration of 15.5%. Antibodies were added at a final concentration of 10 μg/ml. After 4 hours at 37 °C, cell lysis was measured using 7-AAD. ADCC against five different cell lines using either C) PBMCS or D) PMN as effector cells. Indicated viruses were added at 10 and 100 MOI and incubated for 48 hours. Indicated antibodies were added at a final concentration at 10 μg/ml. Subsequently, PBMCs and PMNs were added at an E:T ratio of 100:1 and 40:1, respectively, and lysis was by quantifying LDH release after 4 hours at 37 °C. Levels of significance were set at *$p < 0.05$, **$p < 0.01$, ***$p < 0.001$, and ****$p < 0.0001$. Error bars represent s.d.

Supplementary Fig.4: Live-cell killing assays and real time cytotoxicity analysis: A) Representative live-cell killing images of at indicated times. 10^5 A549 cells were plated and after 15 minutes cells were treated with 3 μM of Incucyte® Caspace3/7 green apoptosis reagent. At one-hour, PBMCs and PMNS were added at 10:1 and 4:1 E:T ratios, respectively, and treated with 10 μg/ml of indicated antibody or Fc-fusion peptides. Scale bars 400μm. B) Cell death from each indicated treatment. Cell death was measured by counting Caspase3/7+ green spots over the phase confluency normalized at 15 minutes.

Supplementary Fig.5: Real-time quantitative analysis of Ad-Cab. B16F10 A), B16F1 B), A549 C), 4T1 D) and MDA-MB-436 E) cells were seeded and cultured for 24 hours. After, 5μg/ml of antibody or Fc-fusion peptide was added along with PBMCs and PMN at 10:1 and 4:1 E:T ratios, respectively. Cell index was determined every five minutes for a course of six hours. The curves represent the average of duplicates. F) Killing rate (Cell index/min) of Ad-Cab, IgG1-PD-L1 and IgA-PD-L1 with five different cell lines.

Supplementary Fig.6: Whole blood assay with Ad-Cab. Unmanipulated whole blood from three different donors was incubated with 50μg/ml of purified IgGA Fc-fusion peptide, Trastuzumab or PBS for 24 hours. After incubation, samples were lysed with ACK buffer and stained to determine cell populations A). Cell percentage and absolute number of cells were then determined B).

Supplementary Fig.7: Individual tumor growth and weight in syngeneic mouse model CT26 colon carcinoma. A) Individual tumor growth curves for all treatment groups. A

threshold of 688 mm3 (dotted line) was set to define mice responding to therapy. Green lines represent mice that responded. B) Weight distribution among groups during treatment.

Supplementary Fig.8: PBMC engraftment in Nod/Scid mice. Mice were injected with $5x10^6$ isolated PBMCs. At day 9, peripheral blood was collected and stained with anti-hCD3 and anti-hCD45.

Supplementary Fig.9: Tumor microenvironment in 4T1 bearing mice. NK cells, dendritic cells, CD8+ T cells and CD4+ T cells populations were analyzed in 4T1 bearing mice given indicated treatments.

Supplementary Fig.10: Viral infection and PBMC infiltration of RCC PDOs RCC1 A), RCC3 B), RCC4 C) PDOs were infected with $5x10^5$ vp of Ad5-RFP Δ24 at days 3 and 4. Cell viability was visualized using Calcein green and images taken using EVOS FL cell imaging system. Scale bars 200µm. D) RCC2 PDOs were infected with $5x10^5$ vp of Ad5-RFP Δ24. Cell viability was visualized using Calcein green. Scale bars 200µm. E) Images of RCC2 PDOs infiltrated by Calcein green stained PBMCs. 10^5 PBMCs, stained with Calcein green, were added on top of Matrigel and after 4 hours images were taken using an EVOS FL cell imaging system. Scale bars 400 or 200µm

Movie S1. Cell contacts between PBMCs and A549 mediated by Fc-fusion peptide Ad-Cab. A549 cells were co-incubated with PBMCs at 100:1, E:T ratio, with 10 µg/ml of Ad-Cab.

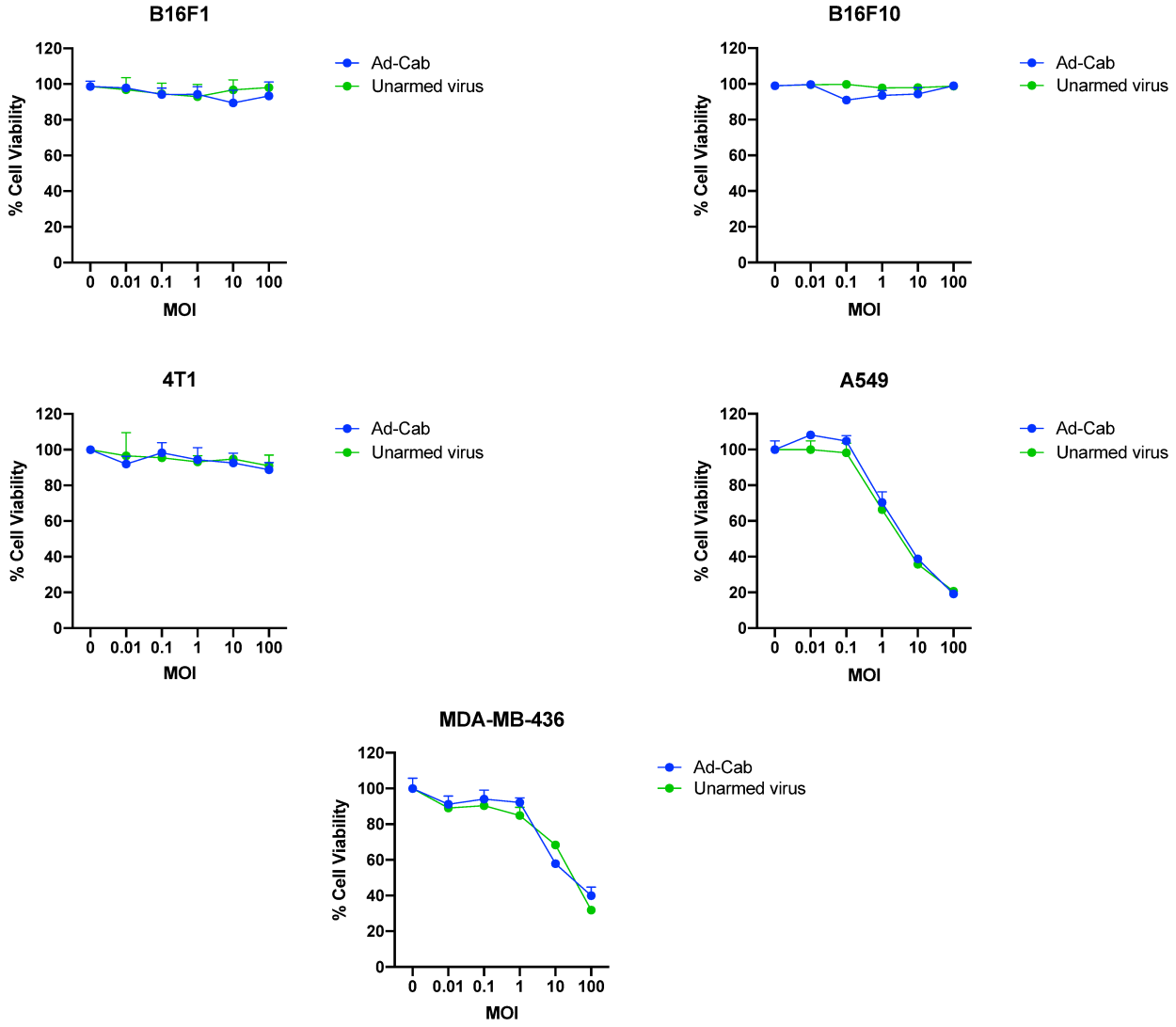
Movie S2. Cell contacts between PBMCs and A549 mediated by Atezolizumab. A549 cells were co-incubated with PBMCs at 100:1, E:T ratio, with 10 µg/ml of Atezolizumab.

Movie S3. Live killing cell assay with A549, PBMCs (10:1, E:T) + PMNs (4:1, E:T) and Fc-fusion peptide Ad-Cab. A549 cells were co-incubated with PBMCs and PMNs at 10:1 and 4:1 E:T ratios, respectively, and treated with purified 5μg/ml of Ad-Cab. Apoptosis was visualized using Incucyte® Caspace3/7 green apoptosis assay reagent (Sartorius).

Movie S4. Live killing cell assay with A549, PBMCs (10:1, E:T) + PMNs (4:1, E:T) and IgG1-PD-L1. A549 cells were co-incubated with PBMCs and PMNs at 10:1 and 4:1 E:T ratios, respectively, and treated with purified 5μg/ml of IgG1-PD-L1. Apoptosis was visualized using Incucyte® Caspace3/7 green apoptosis assay reagent (Sartorius).

Movie S5. Live killing cell assay with A549, PBMCs (10:1, E:T) + PMNs (4:1, E:T) and Atezolizumab. A549 cells were co-incubated with PBMCs and PMNs at 10:1 and 4:1 E:T ratios, respectively, and treated with purified 5μg/ml of Atezolizumab. Apoptosis was visualized using Incucyte® Caspace3/7 green apoptosis assay reagent (Sartorius).

A)



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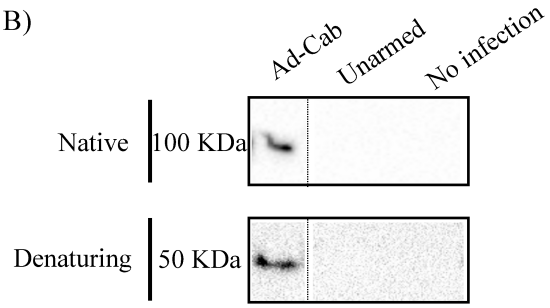
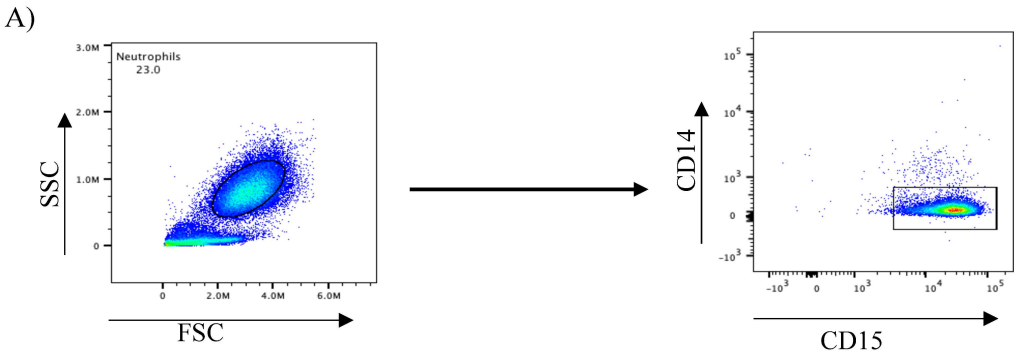
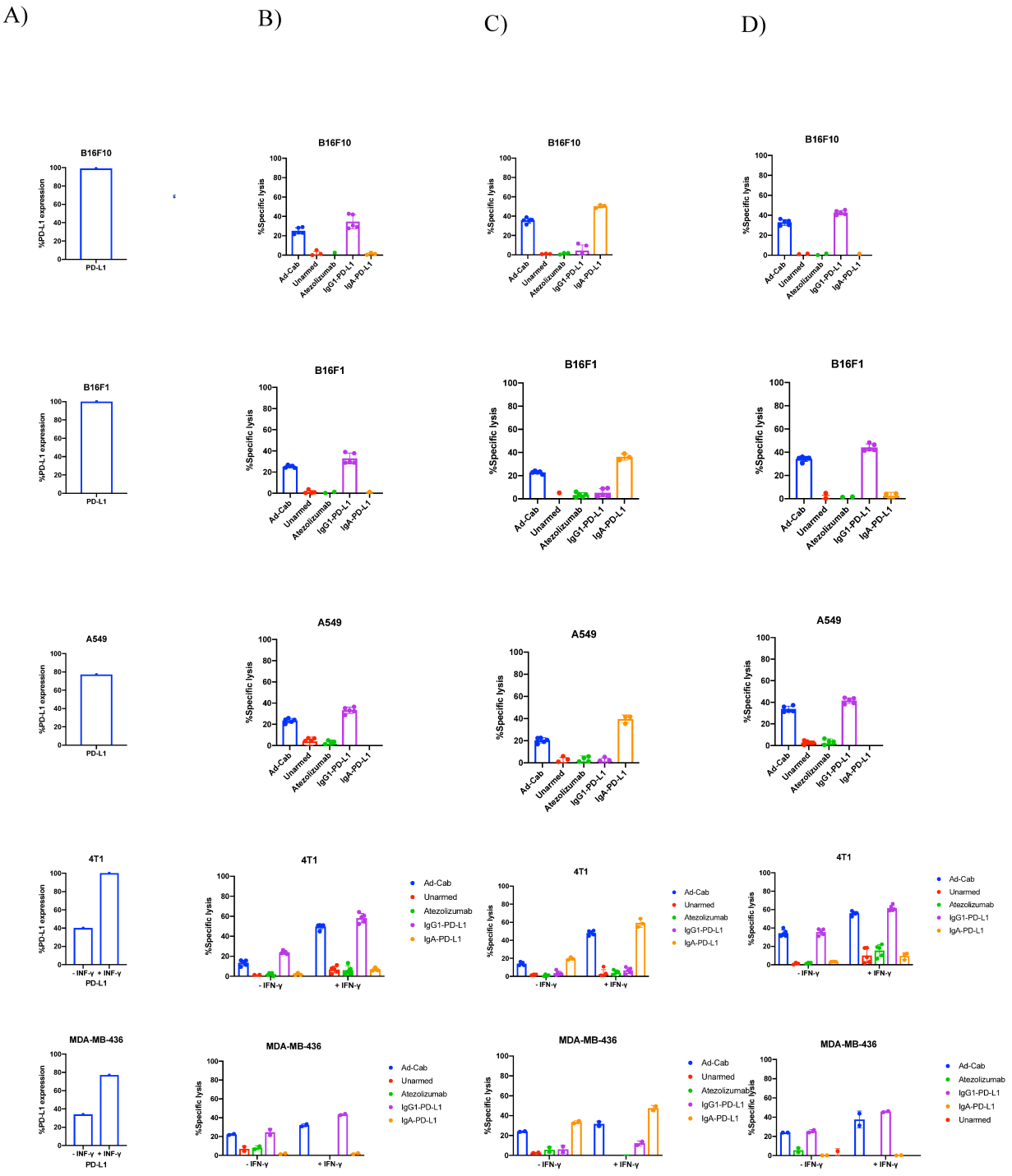


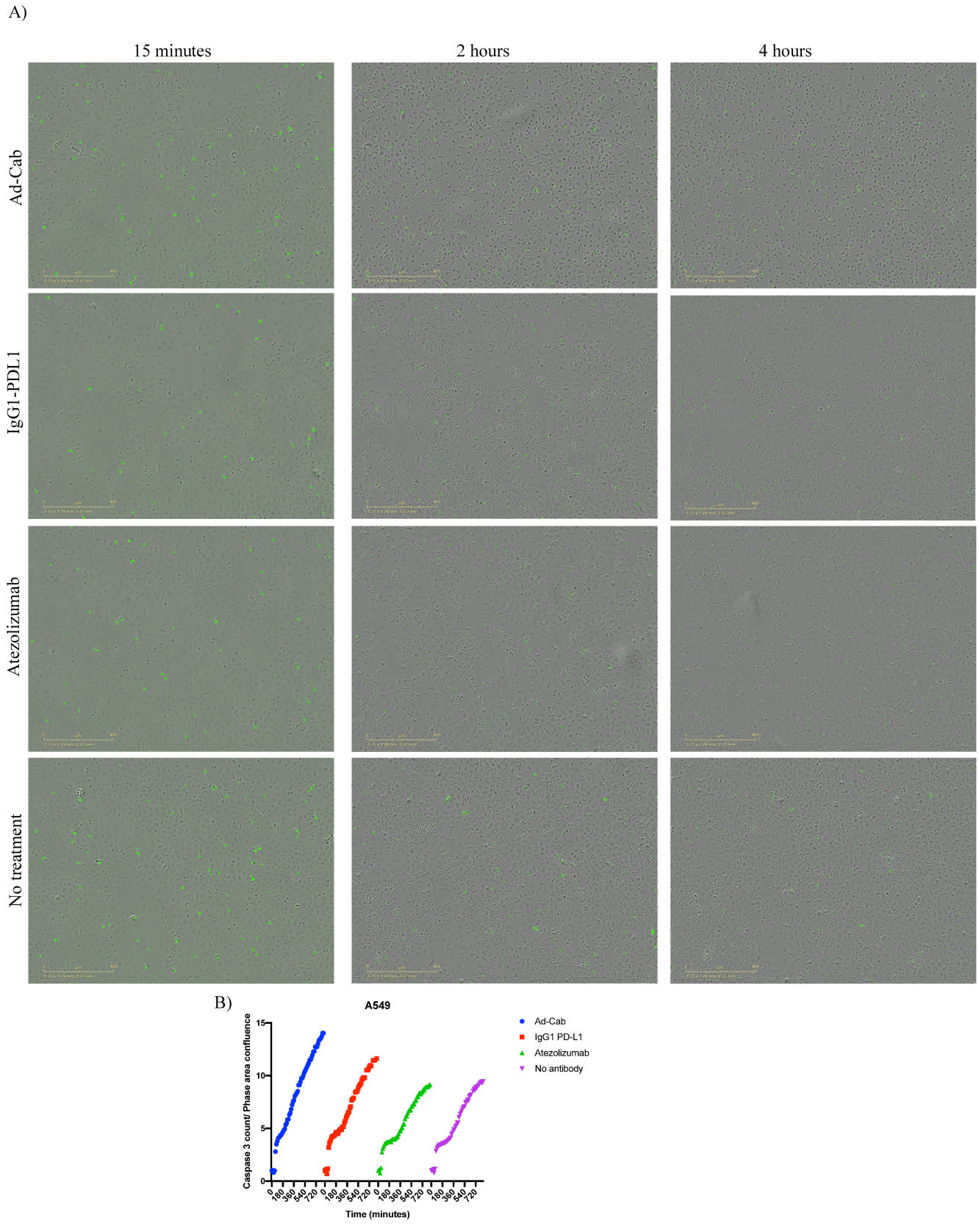
Supplementary Figure 1



Supplementary Figure 2



Supplementary Figure 3



Supplementary Figure 4

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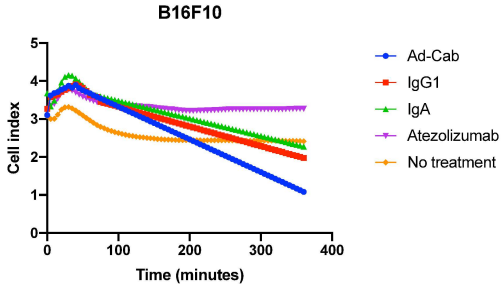

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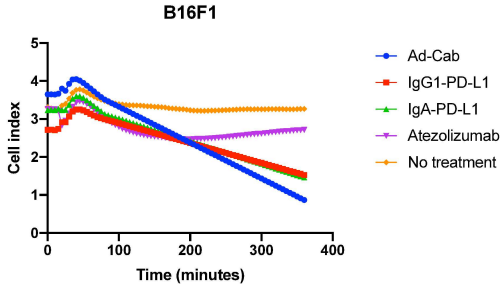

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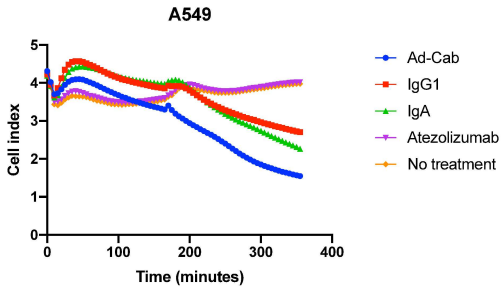

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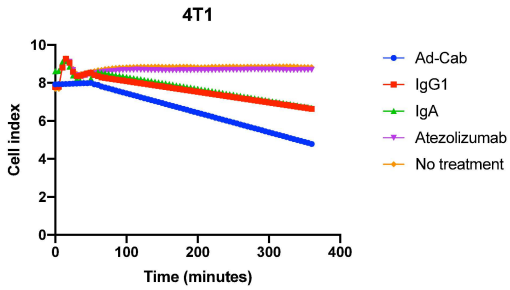

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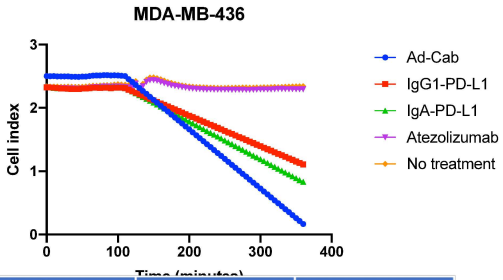
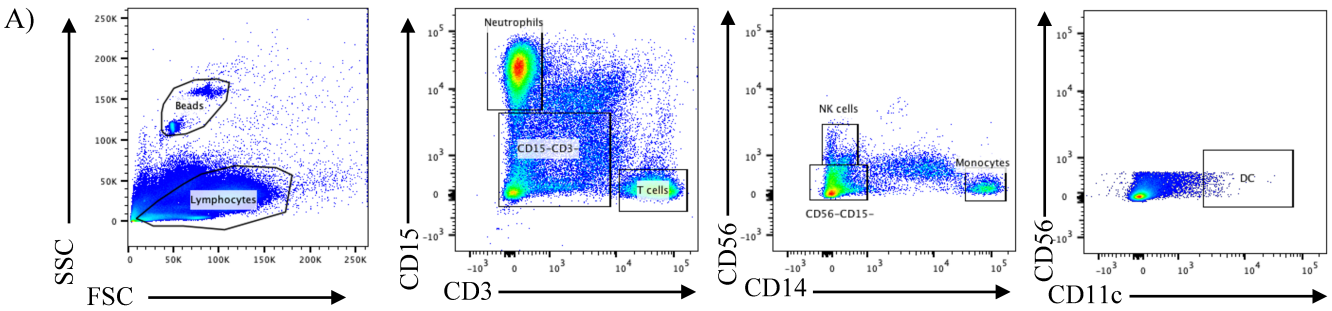
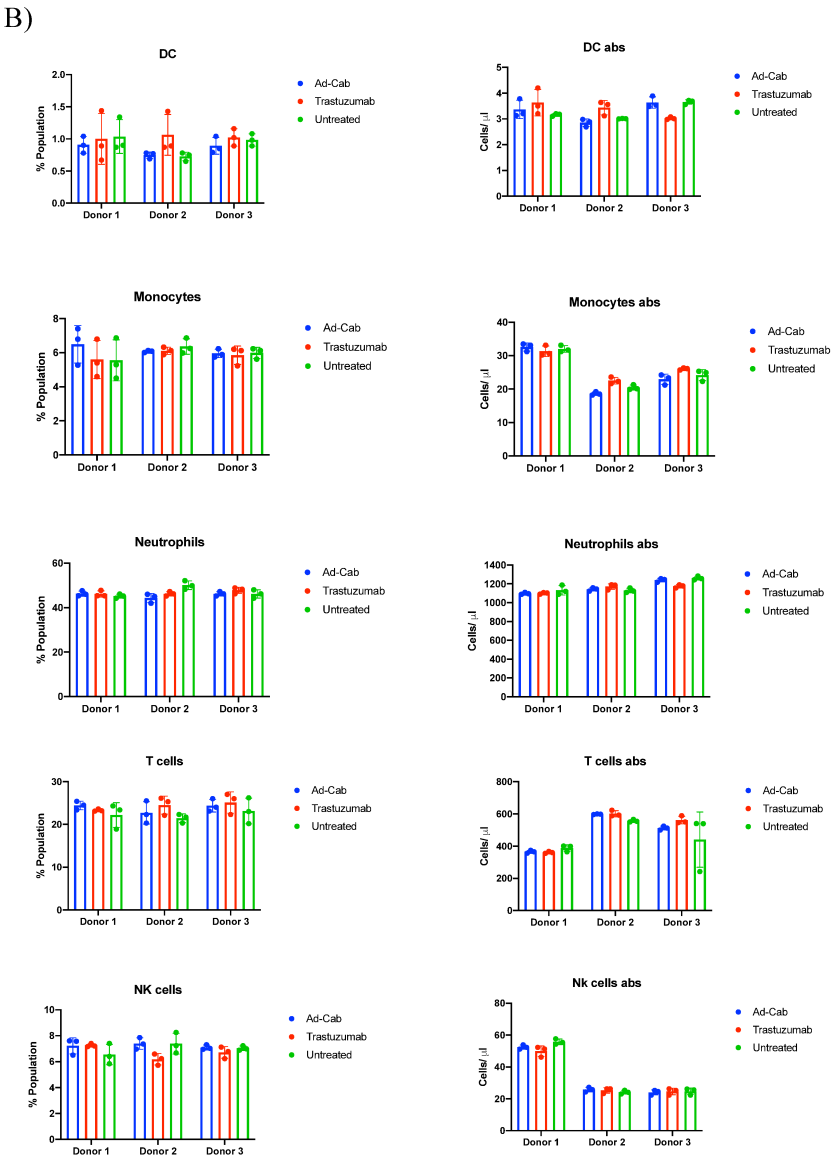


F)

	Ad-Cab	IgG-PD-L1	IgA-PD-L1
B16F10	-0,0403	-0,0261	-0,0223
B16F1	-0,045	-0,0291	-0,0227
A549	-0,04	-0,0289	-0,0253
4T1	-0,0482	-0,0278	-0,0282
MDA-MB-436	-0,0361	-0,0229	-0,0186

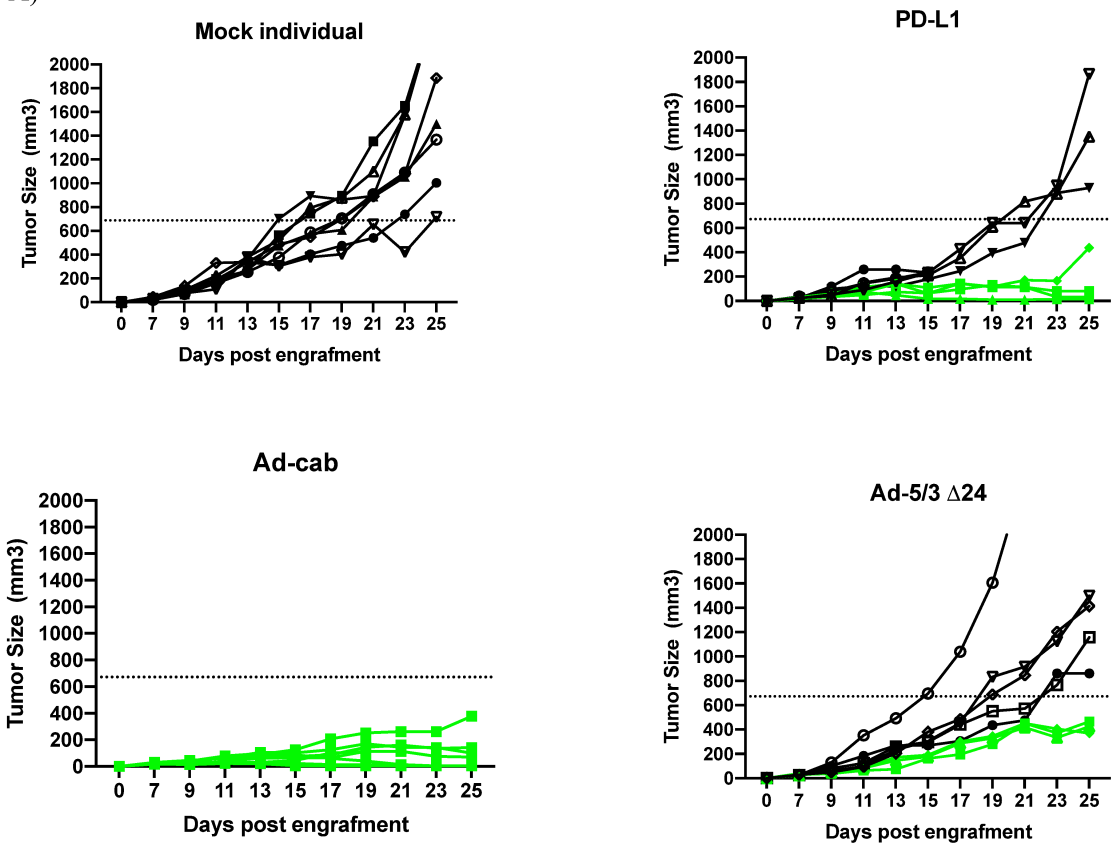
Supplementary Figure 5





Supplementary Figure 6

A)



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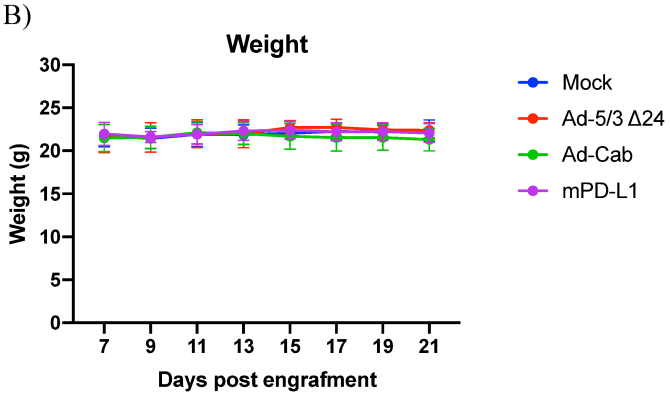

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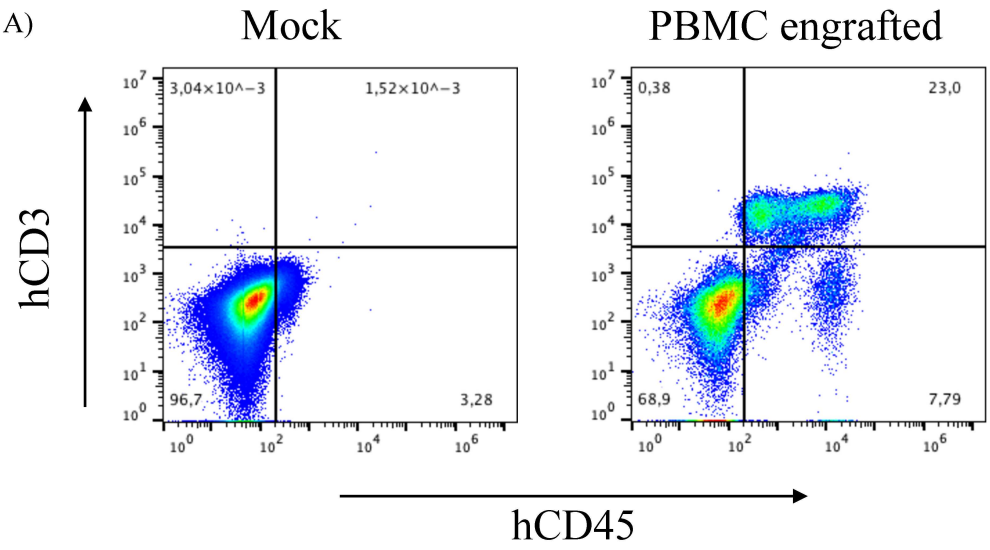
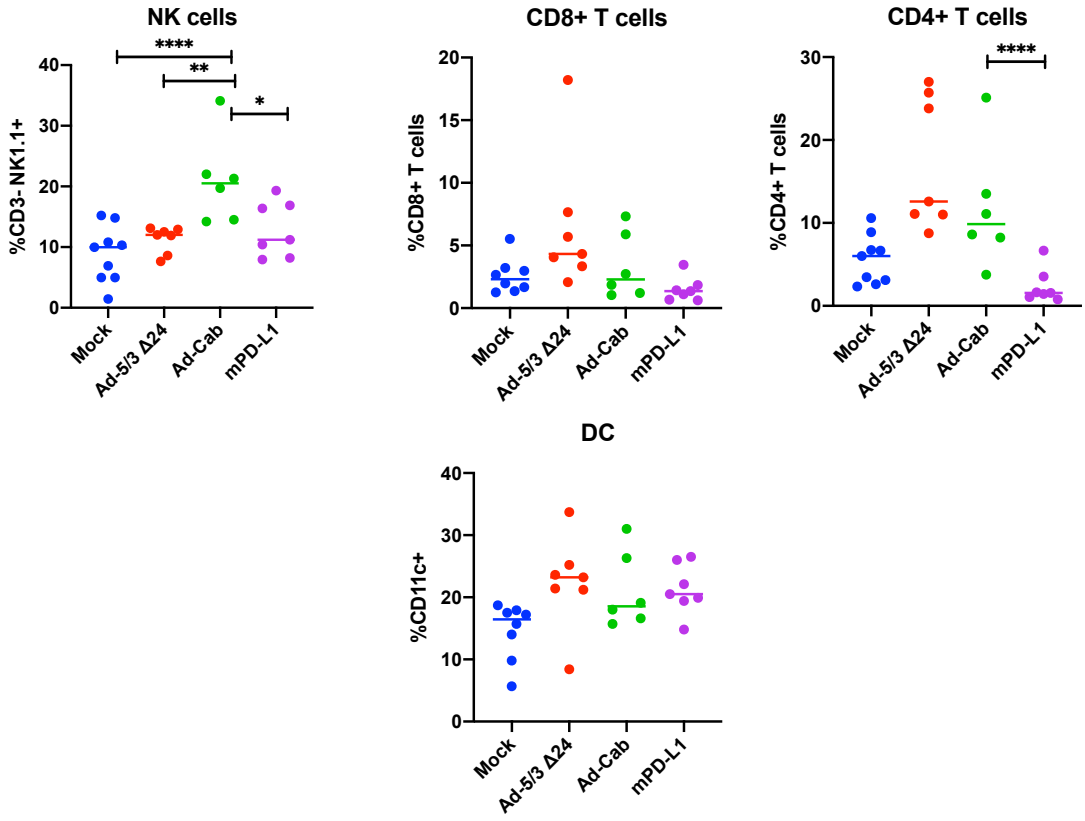
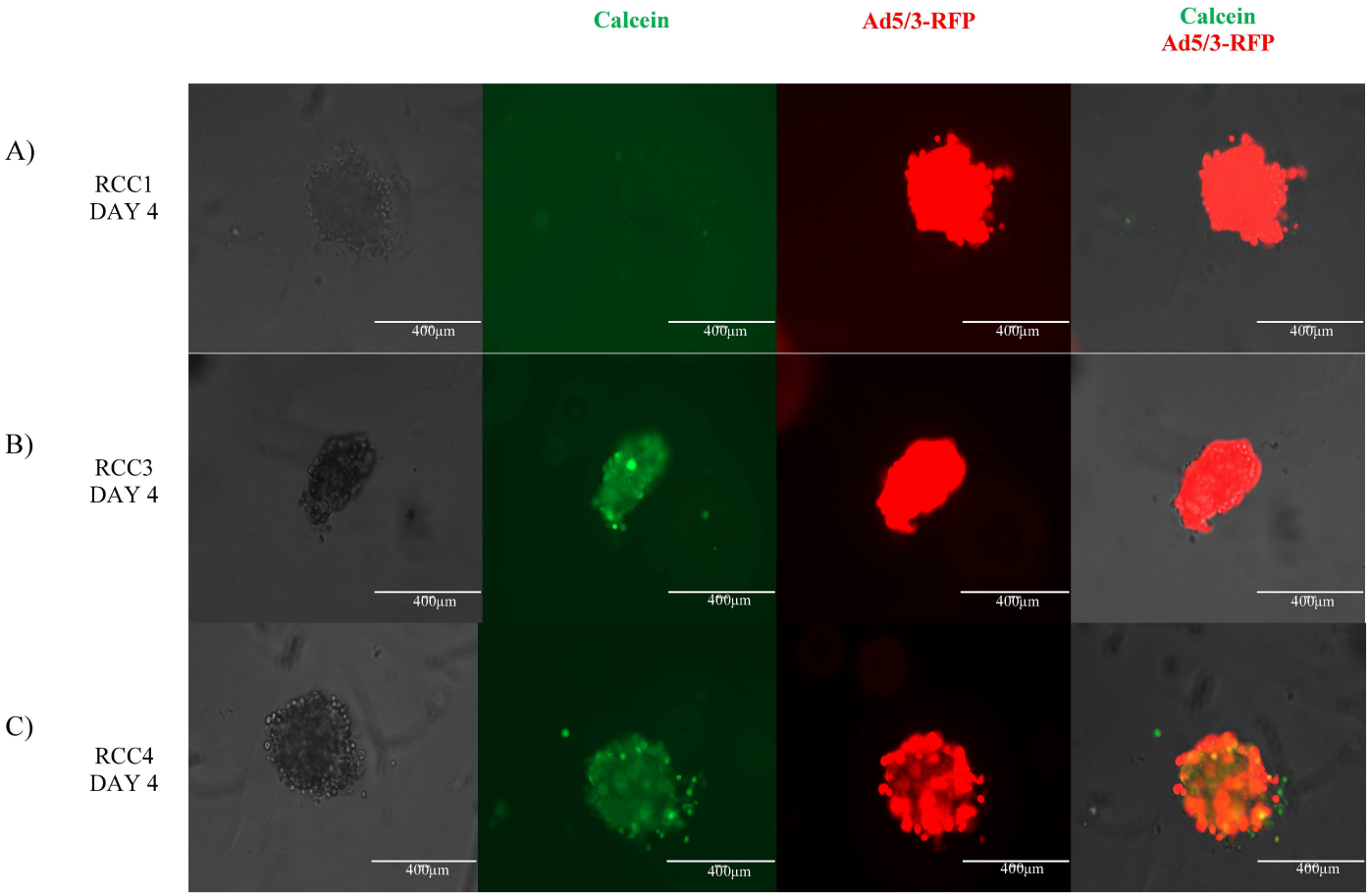


Supplementary Figure 8

A)



Supplementary Figure 9



Supplementary Figure 10