Current Trends in Immuno-Oncology

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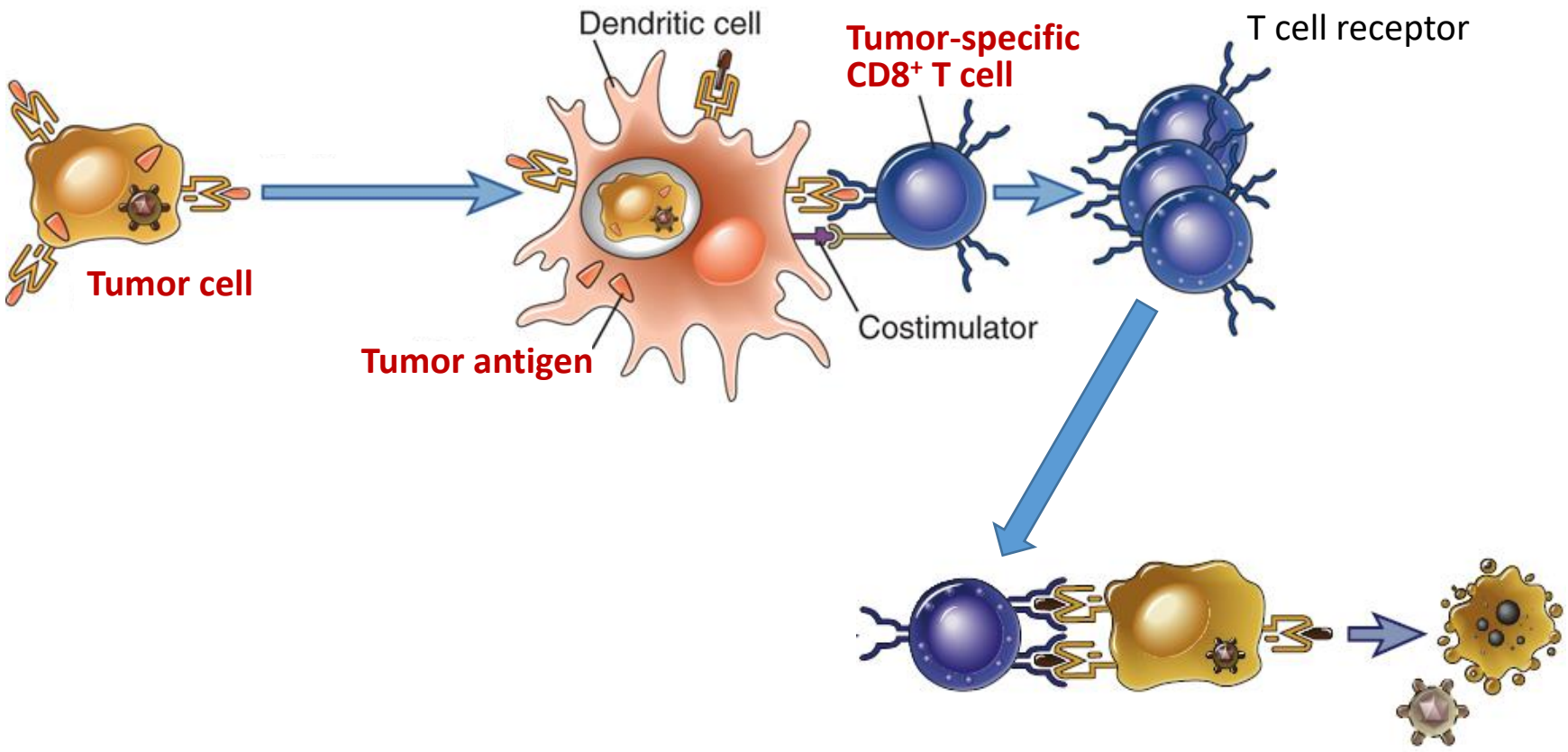
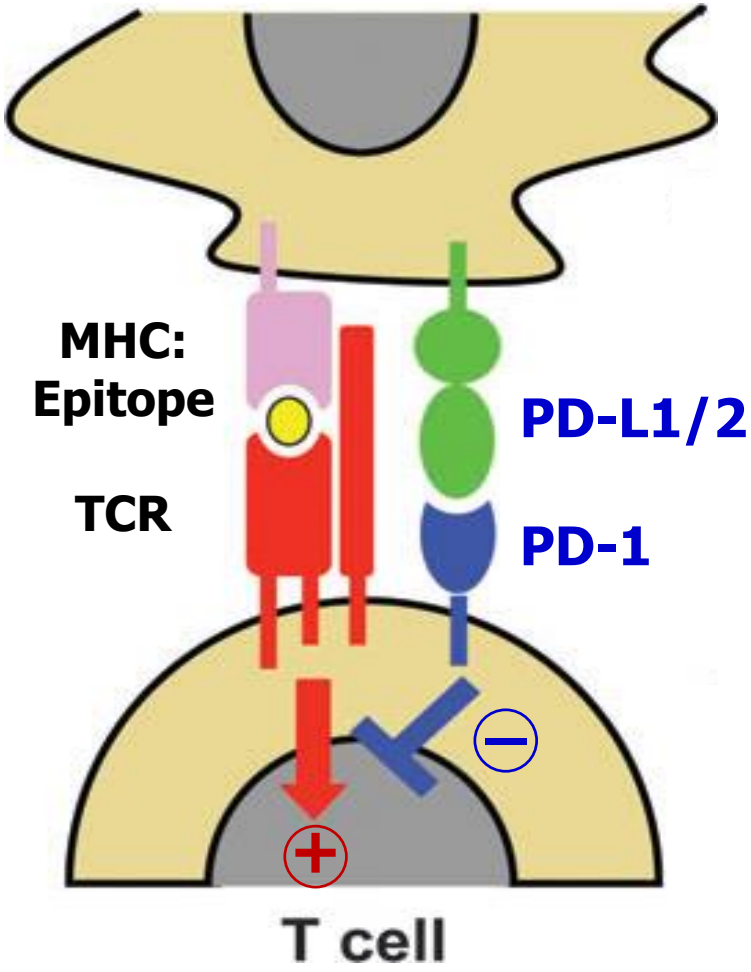
Anti-viral and Anti-tumor Immune Responses

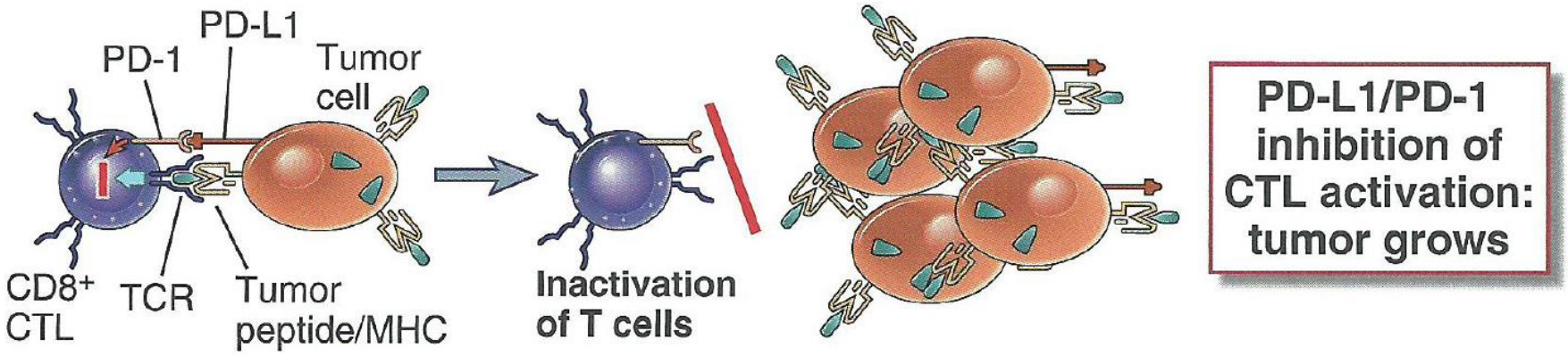


Abbas et al. Cellular and Molecular Immunology

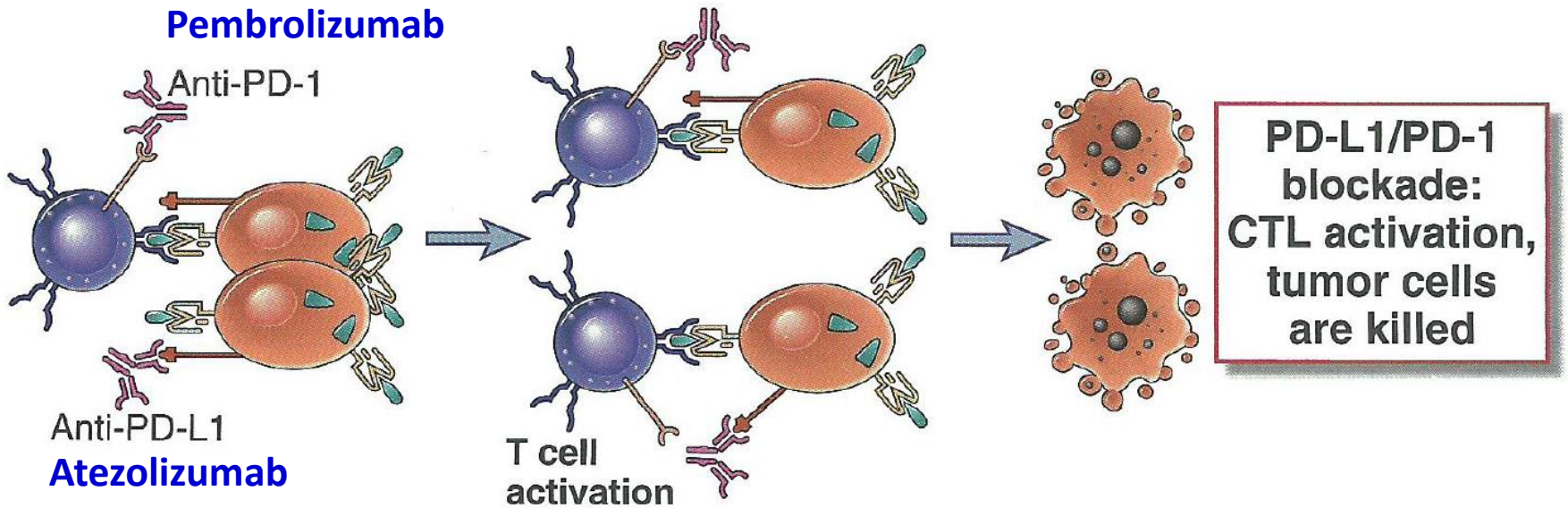
Immune Checkpoint: Inhibitory Receptors



T Cell Exhaustion and Immune Checkpoint Inhibitors



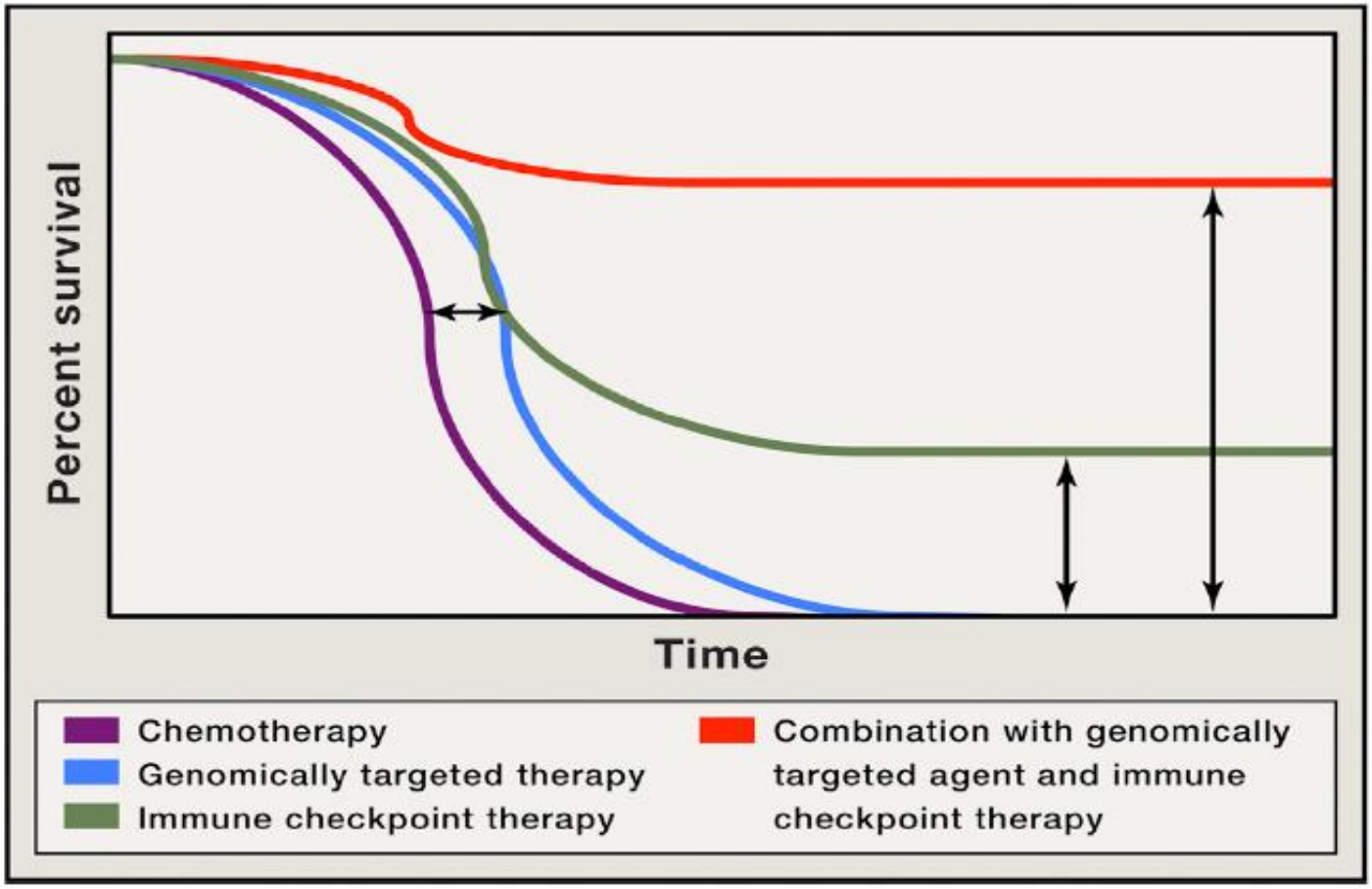
Nivolumab
Pembrolizumab



Atezolizumab
Avelumab
Durvalumab

Abbas et al. Cellular and Molecular Immunology. 8th ed

Response to Immune Checkpoint Inhibitors



- **Broad bioactivity across many tumor types**
- **Durability of the response**
- **Cure even in metastatic and chemoresistant cases**

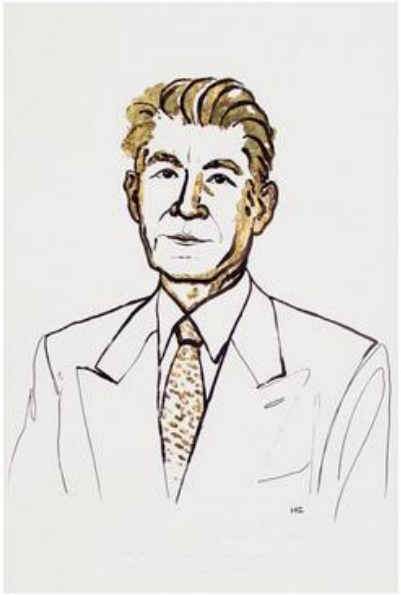
Cell 2015, 161:205

The Nobel Prize in Physiology or Medicine 2018

Ill. Niklas Elmehed. © Nobel Media

James P. Allison

Prize share: 1/2



Ill. Niklas Elmehed. © Nobel Media

Tasuku Honjo

Prize share: 1/2

The Nobel Prize in Physiology or Medicine 2018 was awarded jointly to James P. Allison and Tasuku Honjo "for their discovery of cancer therapy by inhibition of negative immune regulation."

Immuno-Oncology: Future

- Neoantigens → personalized cancer vaccines
- Memory T cell development → long-term prognosis
- Biomarkers → personalized therapy
- Breast cancer

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Personalized Cancer Vaccines

Published online 27 Jul 2017; doi:10.1038/nri.2017.88

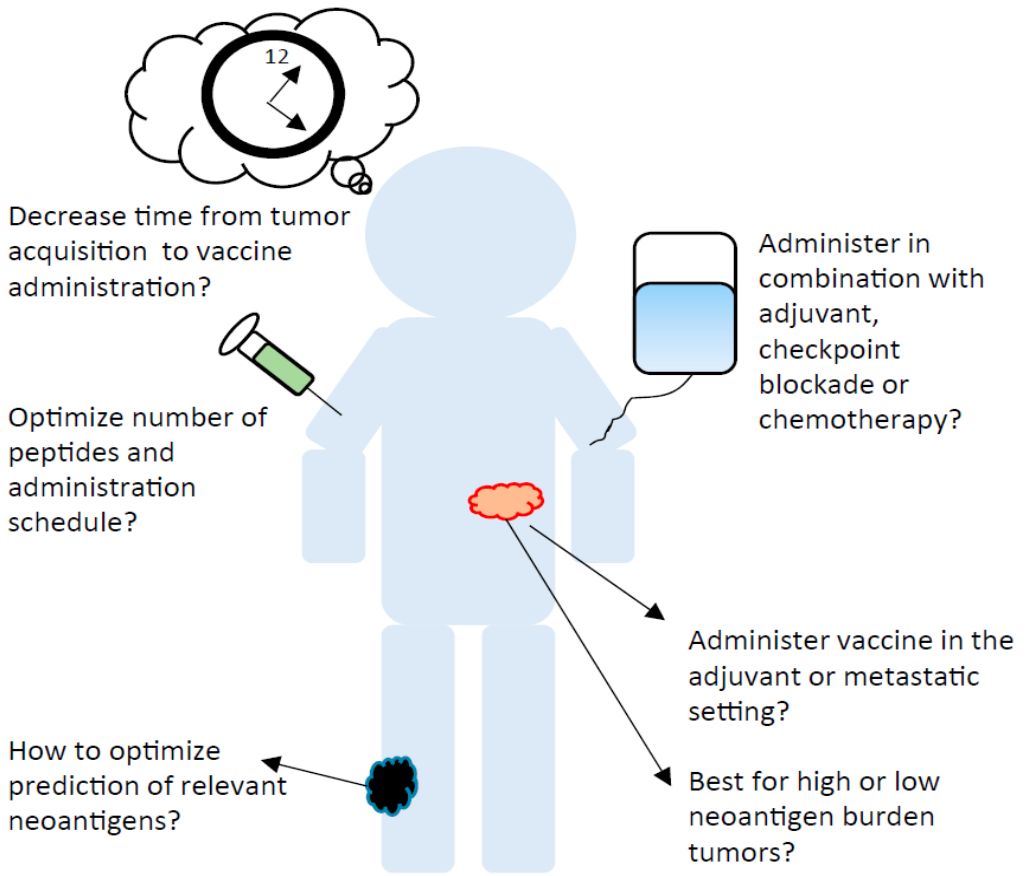
TUMOUR VACCINES

Personal training by vaccination

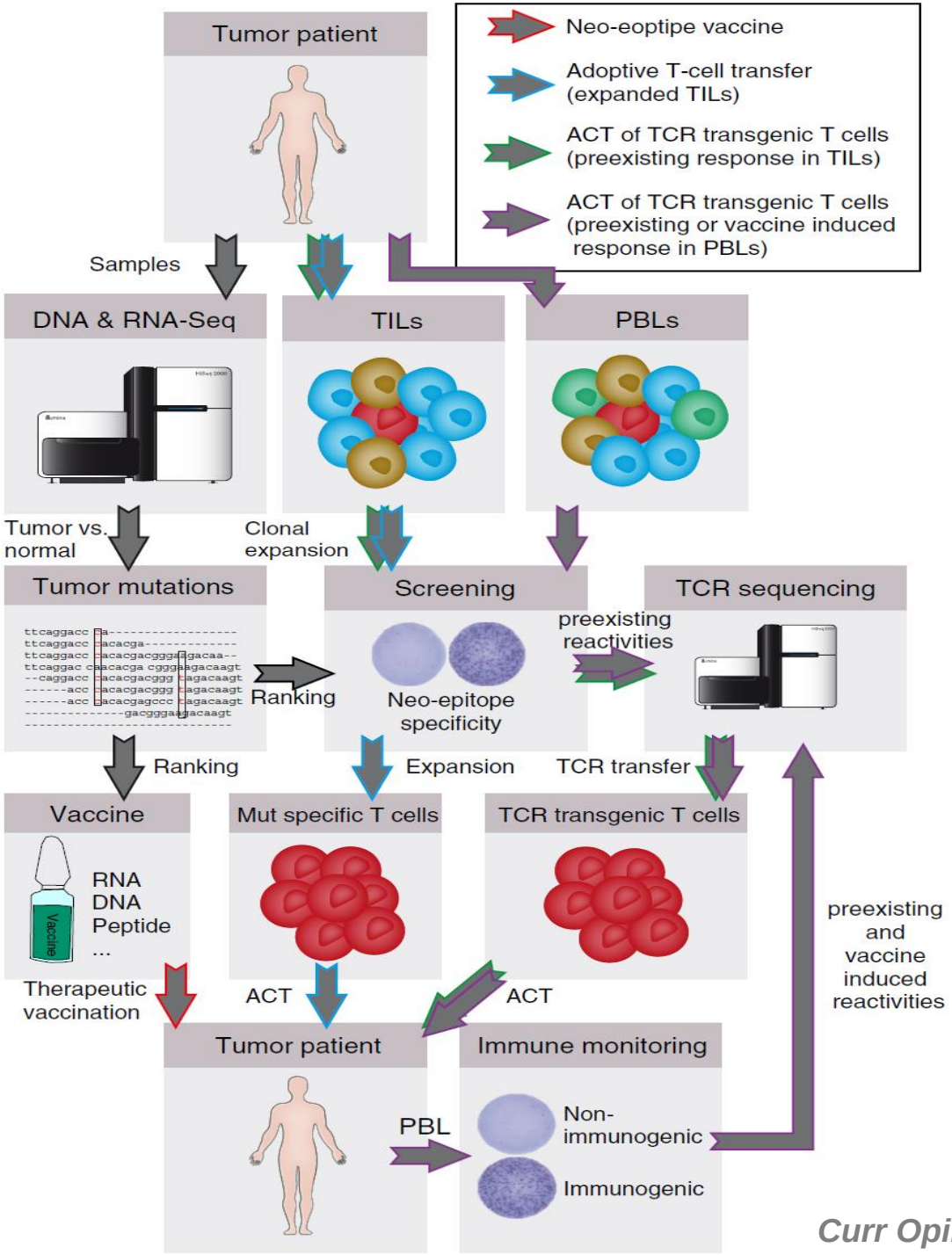
Personalized RNA mutanome vaccines mobilize poly-specific therapeutic immunity aga

An immunogenic personal neoantigen v patients with melanoma

Making It Personal: Neoantigen V in Metastatic Melanoma



Nature 547:222; Nature 547:217; Immunity 47:221 (2017)



Curr Opin Immunol 2016, 39:14

Immuno-Oncology: Future

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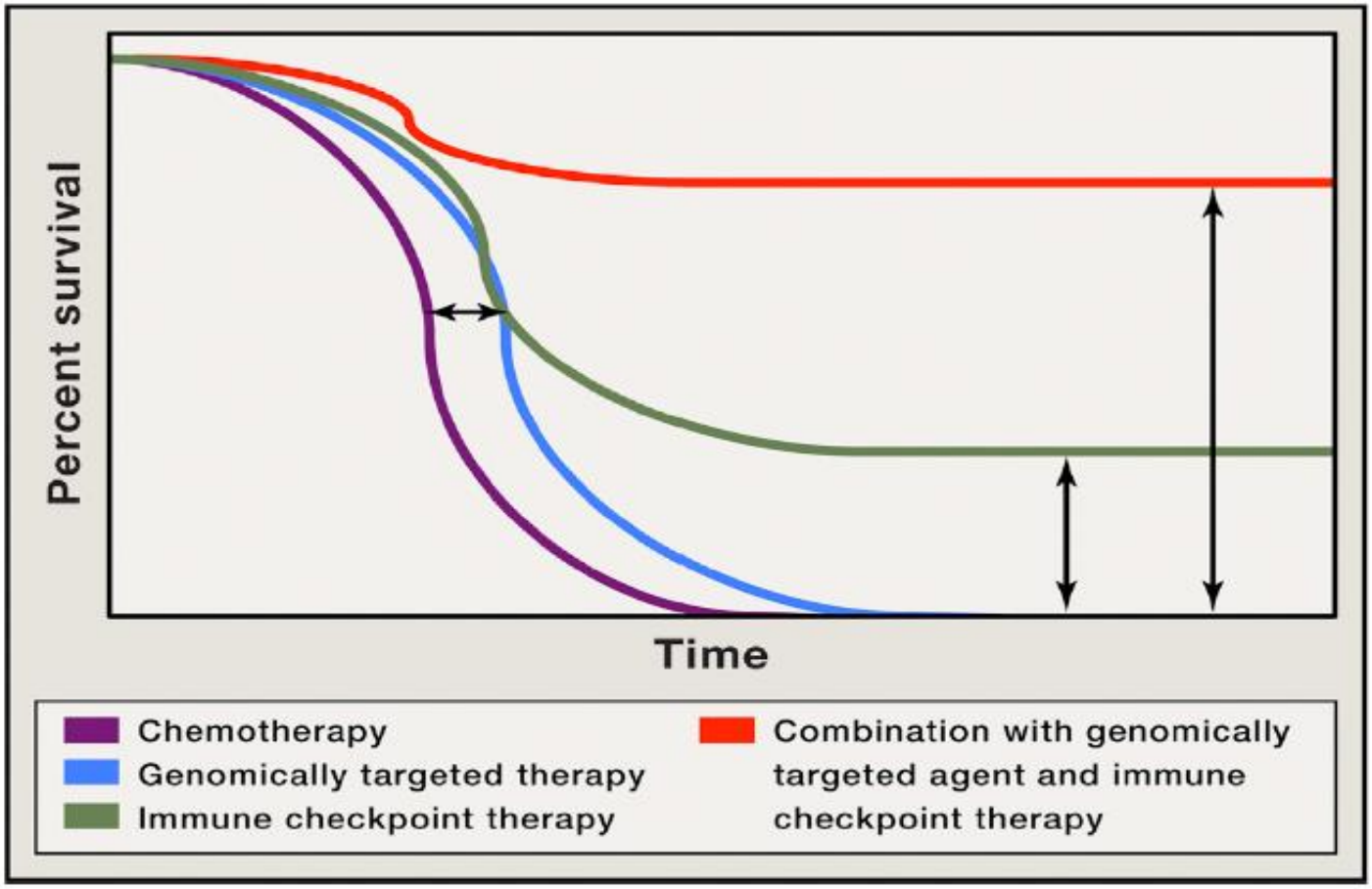
Response to Immune Checkpoint Inhibitors



- **Broad bioactivity across many tumor types**
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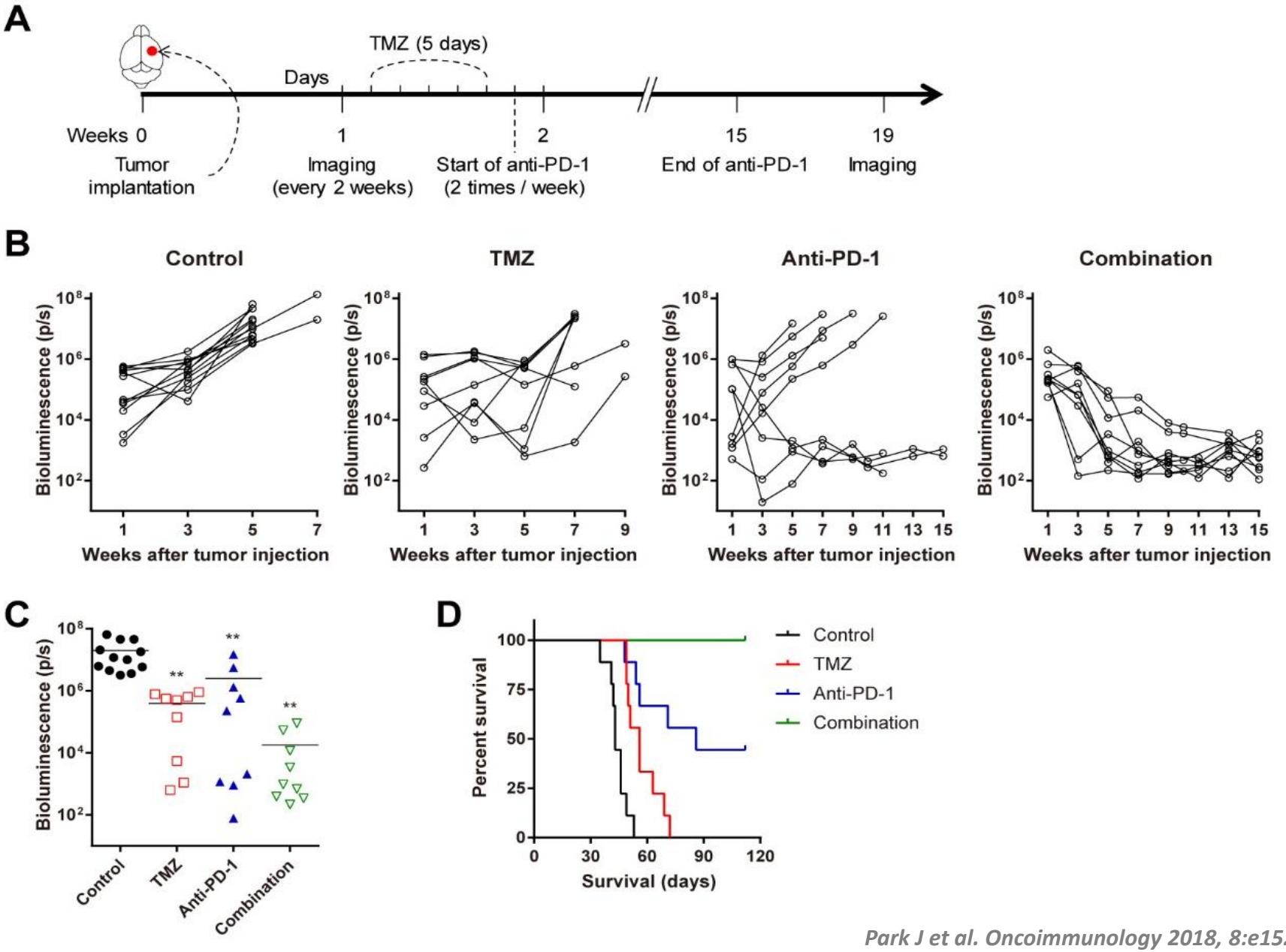
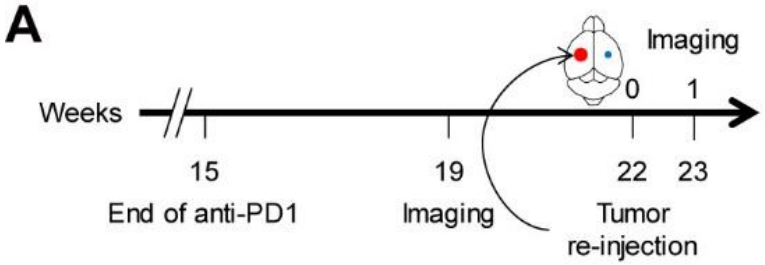
Cell 2015, 161:205

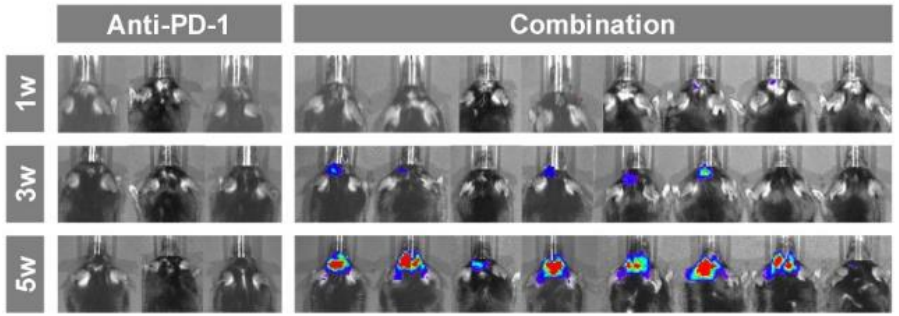
Anti-PD-1 alone and in combination with TMZ exerts antitumor effects in an orthotopic murine GBM model

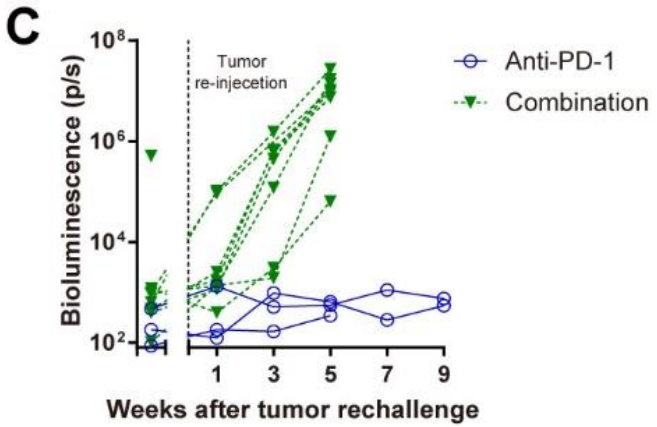


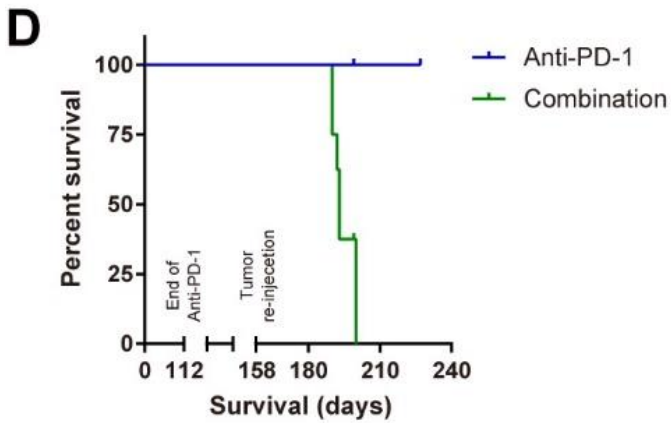
Park J et al. Oncoimmunology 2018, 8:e1525243

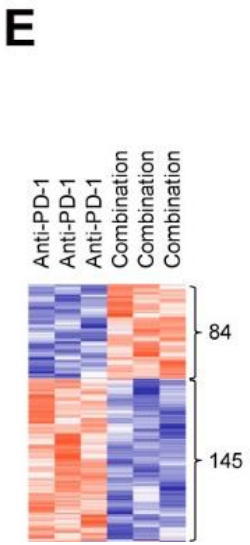
Anti-PD-1 monotherapy, but not combined treatment, generates antitumor immune memory

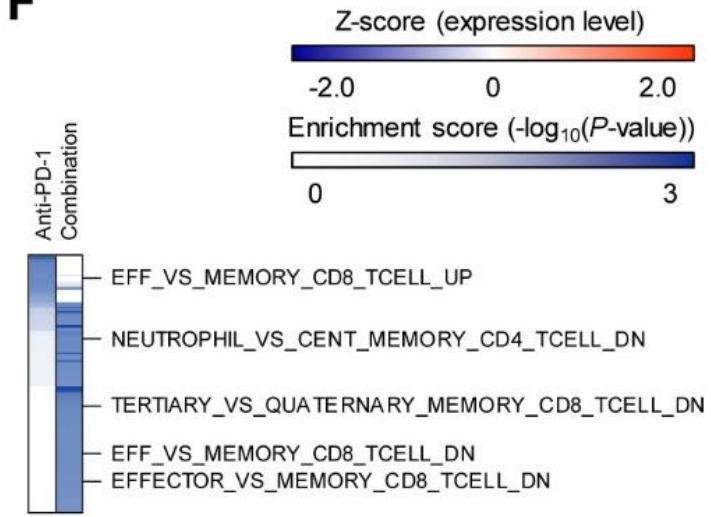












Park J et al. Oncoimmunology 2018, 8:e1525243

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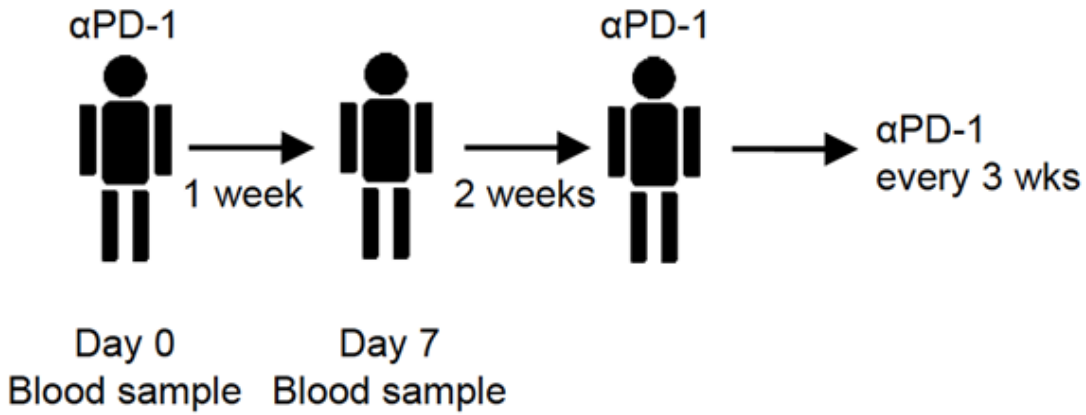
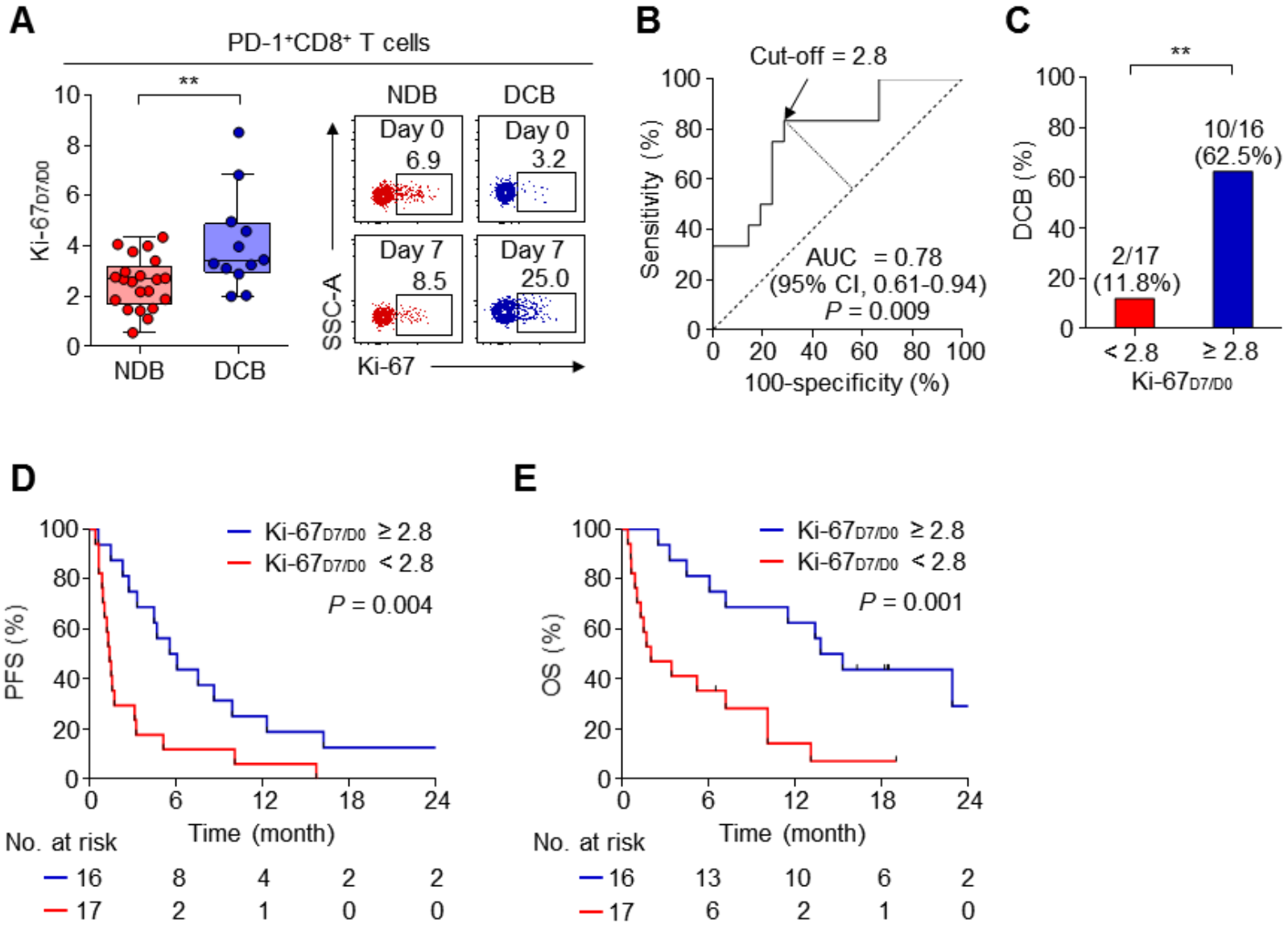
Study Design: Dynamic Biomarkers



- **Discovery: Thymic ca. patients (n=31)**
- **Discovery: NSCLC patients (n=33)**
- **Validation: NSCLC patients (n=46)**

Collaboration with Prof. Myung-Ju Ahn (Dept. of Medicine, Samsung Medical Center, Sungkyunkwan Univ.)

$Ki\text{-}67_{D7/D0}$ (fold change of Ki-67 expression in $PD\text{-}1^{+}CD8^{+}$ T cells) predicts tumor response and survival



Kim KH et al. Clin Cancer Res 2019, 25:2144

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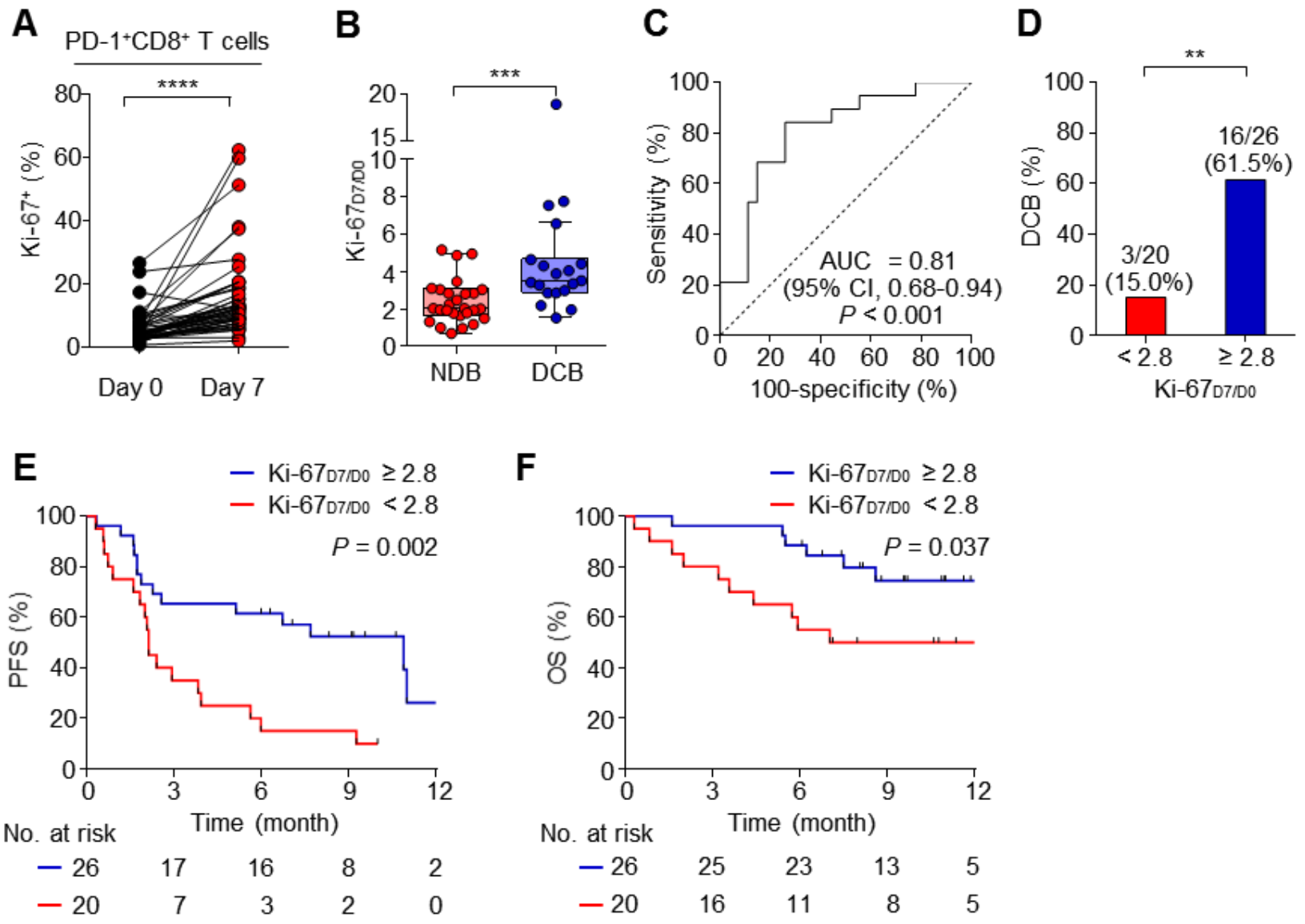

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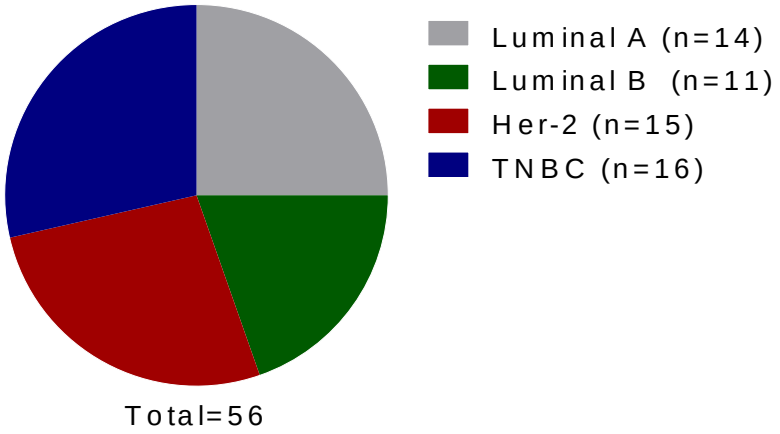
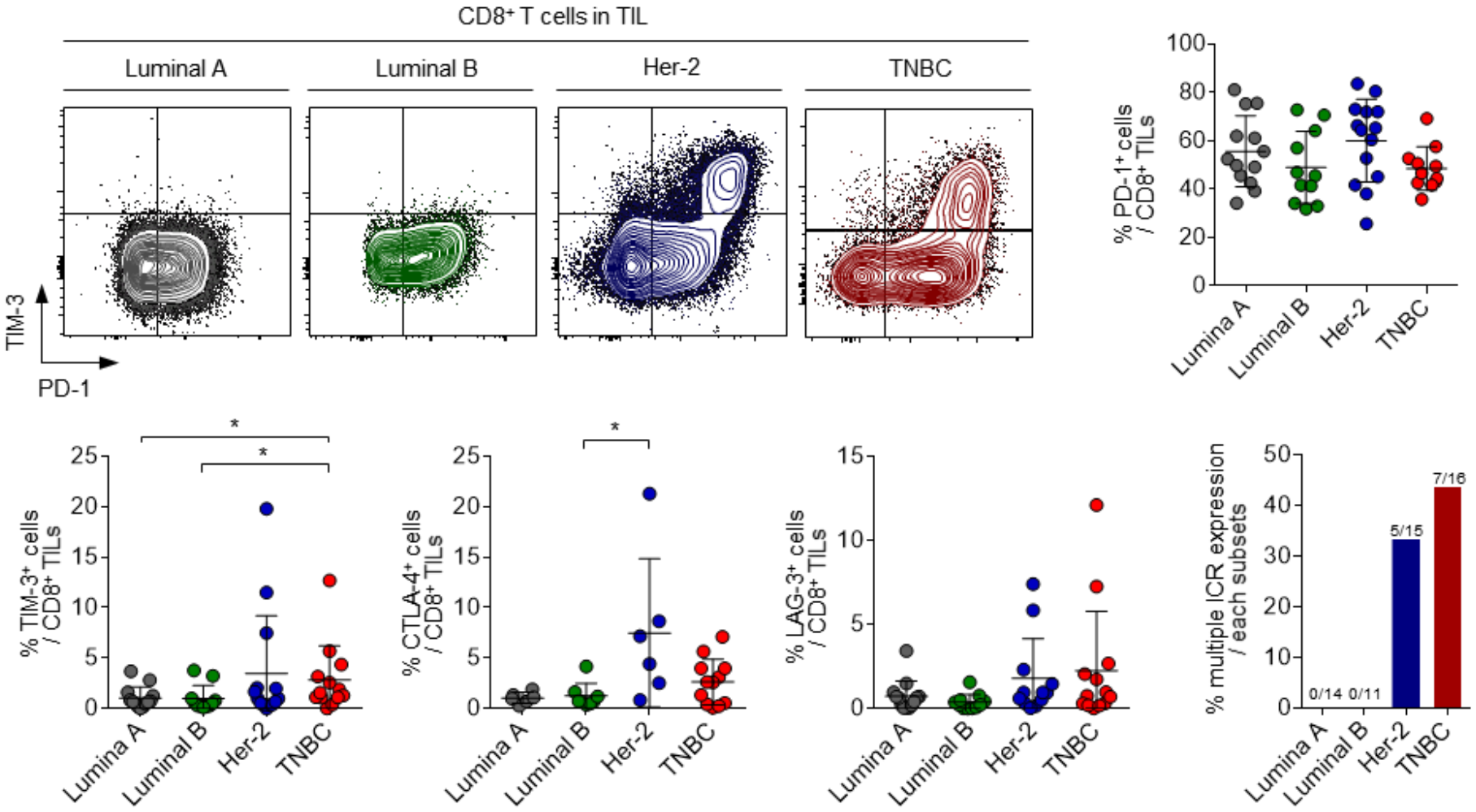
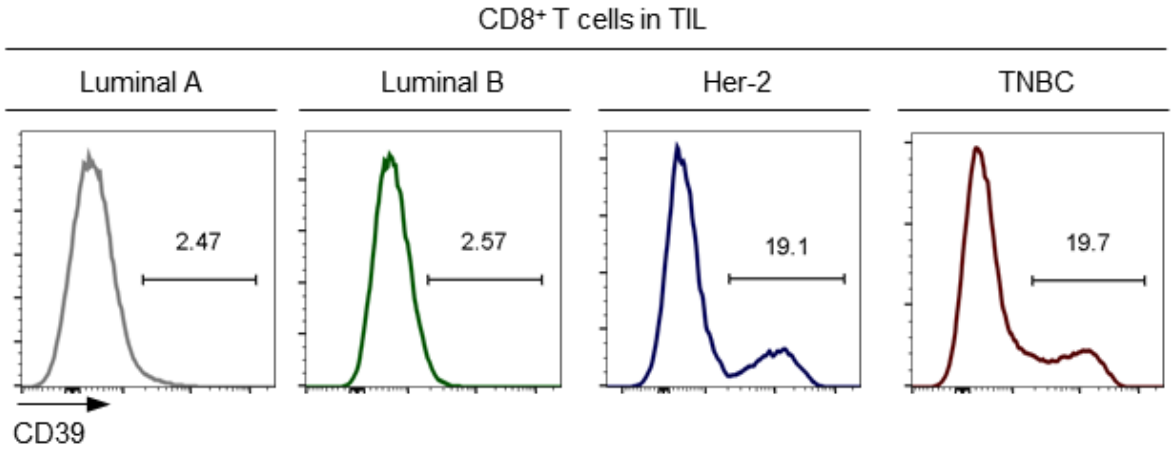


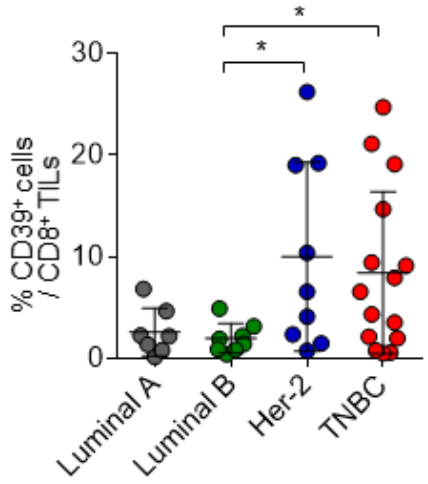
Multiple Immune Checkpoint Receptor Expression in CD8⁺ TILs from Her-2(+) BC and TNBC

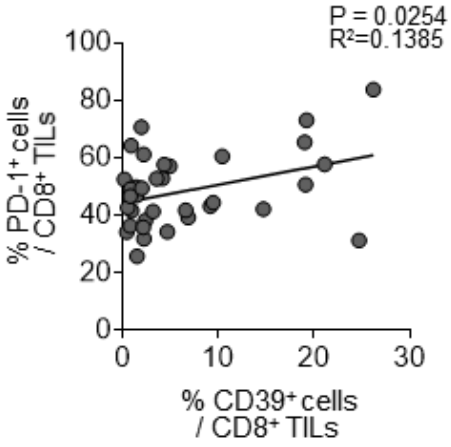


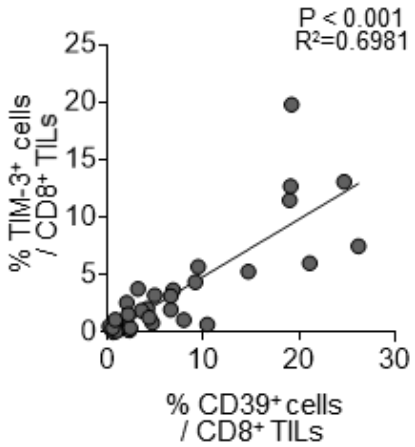
Unpublished data

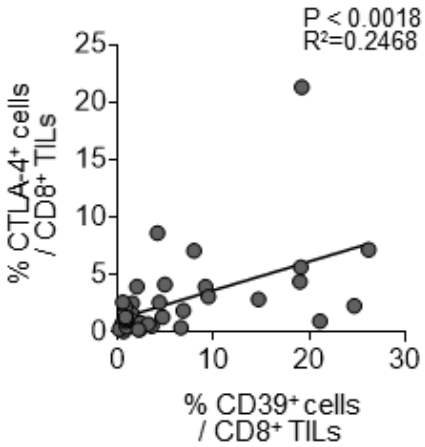
Terminally Exhausted Phenotypes in CD8+ TILs from Her-2(+) BC and TNBC

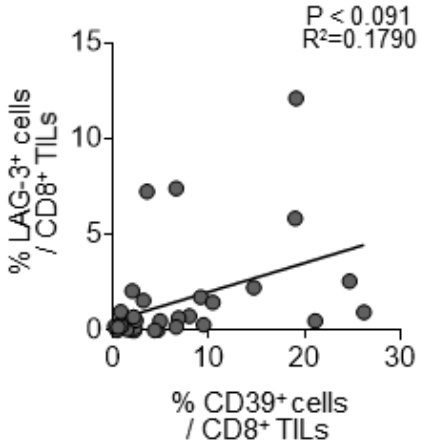






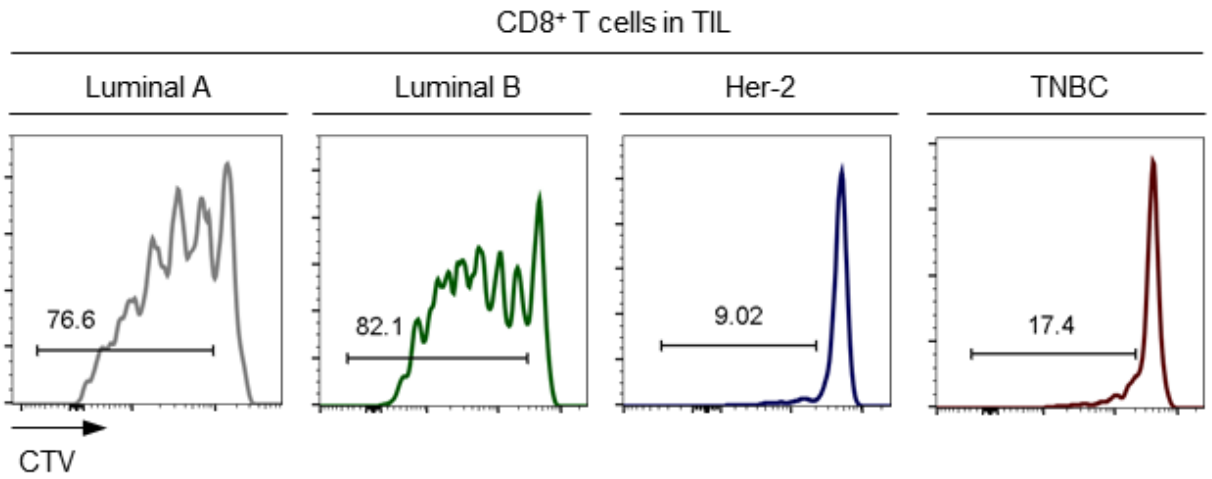


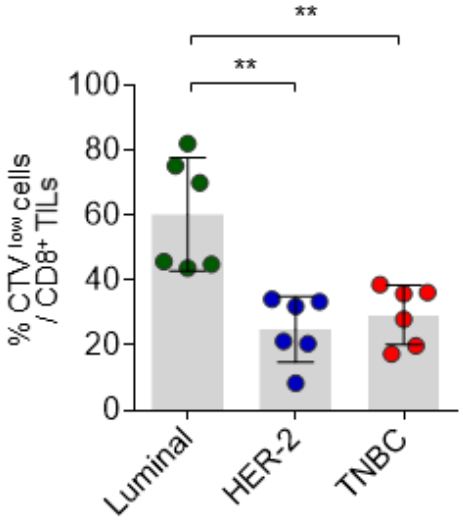




Unpublished data

Functional Exhaustion of CD8^{+} TILs from Her-2(+) BC and TNBC





Unpublished data

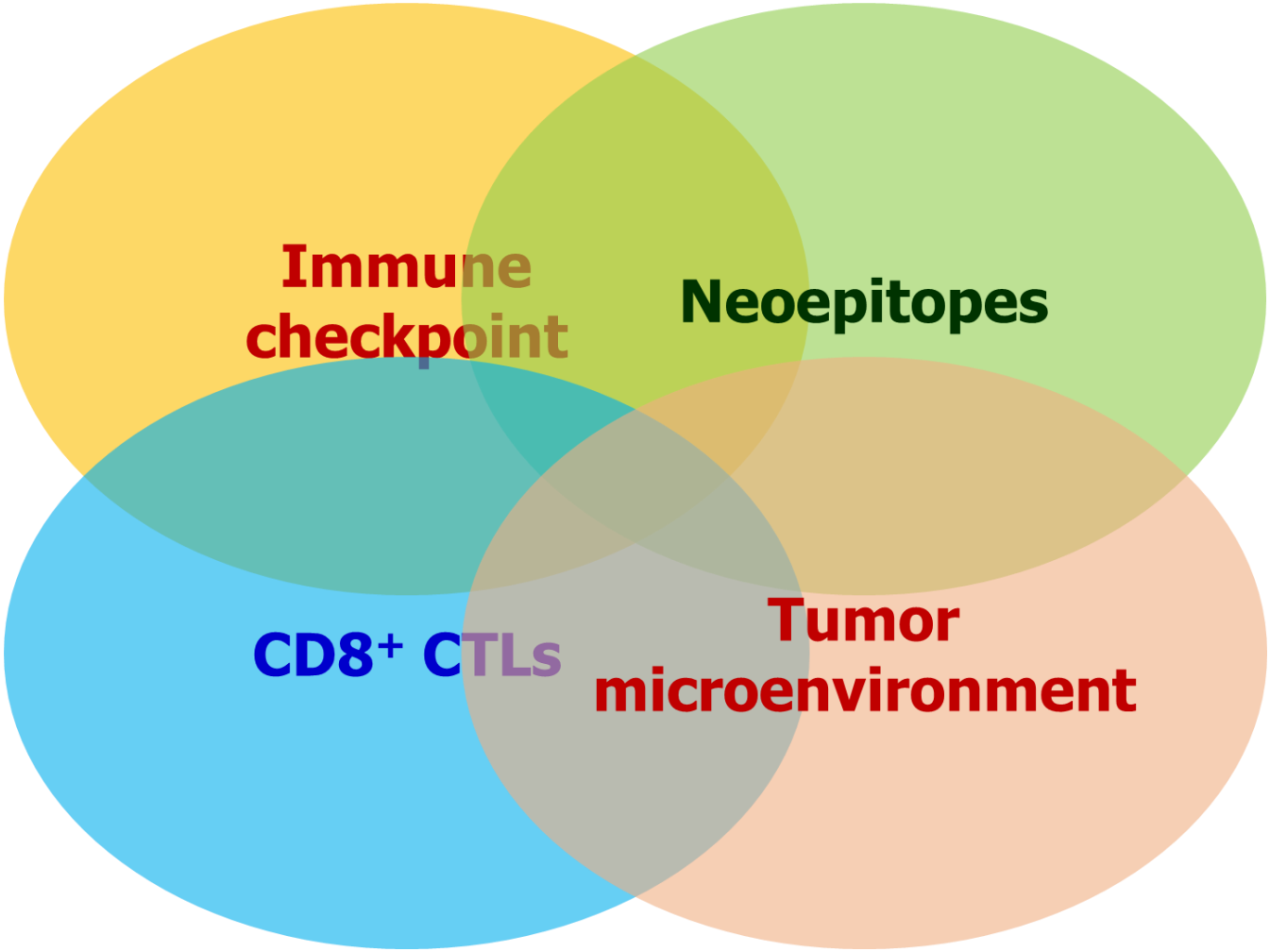
Pembrolizumab in Patients With Advanced Triple-Negative Breast Cancer: Phase Ib KEYNOTE-012 Study

Rita Nanda, Laura Q.M. Chow, E. Claire Dees, Raanan Berger, Shilpa Gupta, Ravit Geva, Lajos Pusztai, Kumudu Pathiraja, Gursel Aktan, Jonathan D. Cheng, Vassiliki Karantza, and Laurence Buisseret

Atezolizumab and Nab-Paclitaxel in Advanced Triple-Negative Breast Cancer

P. Schmid, S. Adams, H.S. Rugo, A. Schneeweiss, C.H. Barrios, H. Iwata, V. Diéras, R. Hegg, S.-A. Im, G. Shaw Wright, V. Henschel, L. Molinero, S.Y. Chui, R. Funke, A. Husain, E.P. Winer, S. Loi, and L.A. Emens, for the IMpassion130 Trial Investigators*

JCO 2016, 34:2460 & NEJM 2018, 379:22

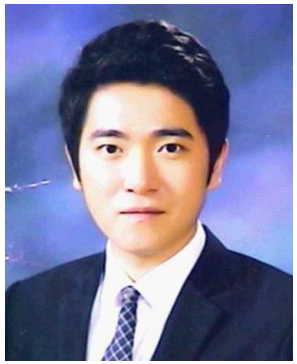

Immune checkpoint
Neoepitopes
CD8+ CTLs
Tumor microenvironment

Acknowledgments

**Graduate School of Medical Science and Engineering (GSMSE),
Korea Institute of Science and Technology (KAIST), Daejeon, Korea**

Yong Joon Lee
Minsuk Kwon
Su-Hyung Park

**[1]Dept of Surgery, and [2]Severance Biomedical Science Institute,
Yonsei University College of Medicine, Seoul, Korea**



Jee Ye Kim[1]
Sung Mook Lim[1]
Joo Heung Kim[1]
Hyung Seok Park[1]
Seho Park[1]
Young Up Cho[1]
Seung Il Kim[1]
Soonmyung Paik[2]


Thank you very much.
Gustave Courbet
Le Bord de mer à Palavas, 1854
G. Courbet