Introduction to Immunotherapy for Cancer

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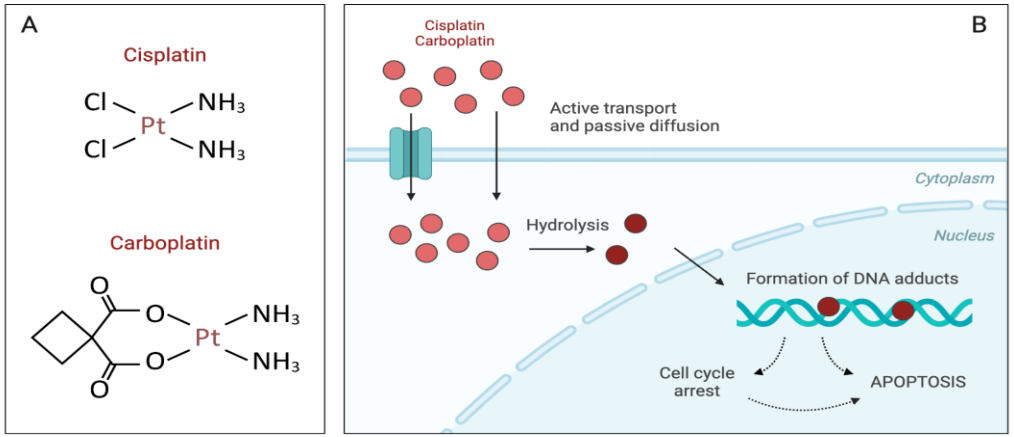
NEBRASKA CANCER SPECIALISTS

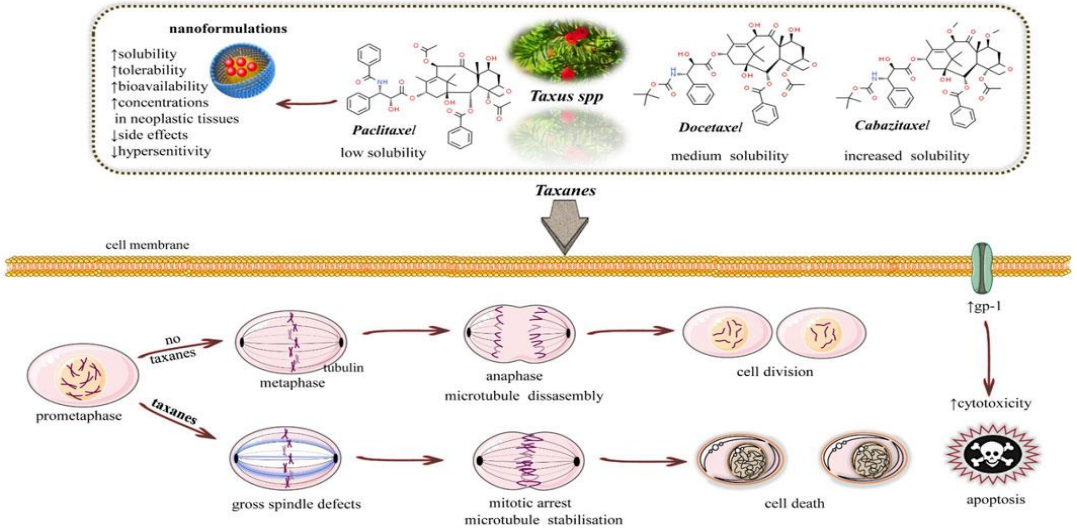
DISCLOSURES

None

Traditional Chemotherapy
Cisplatin and Paclitaxel



https://www.biorender.com/template/mechanism-of-action-of-platinum-based-drugs

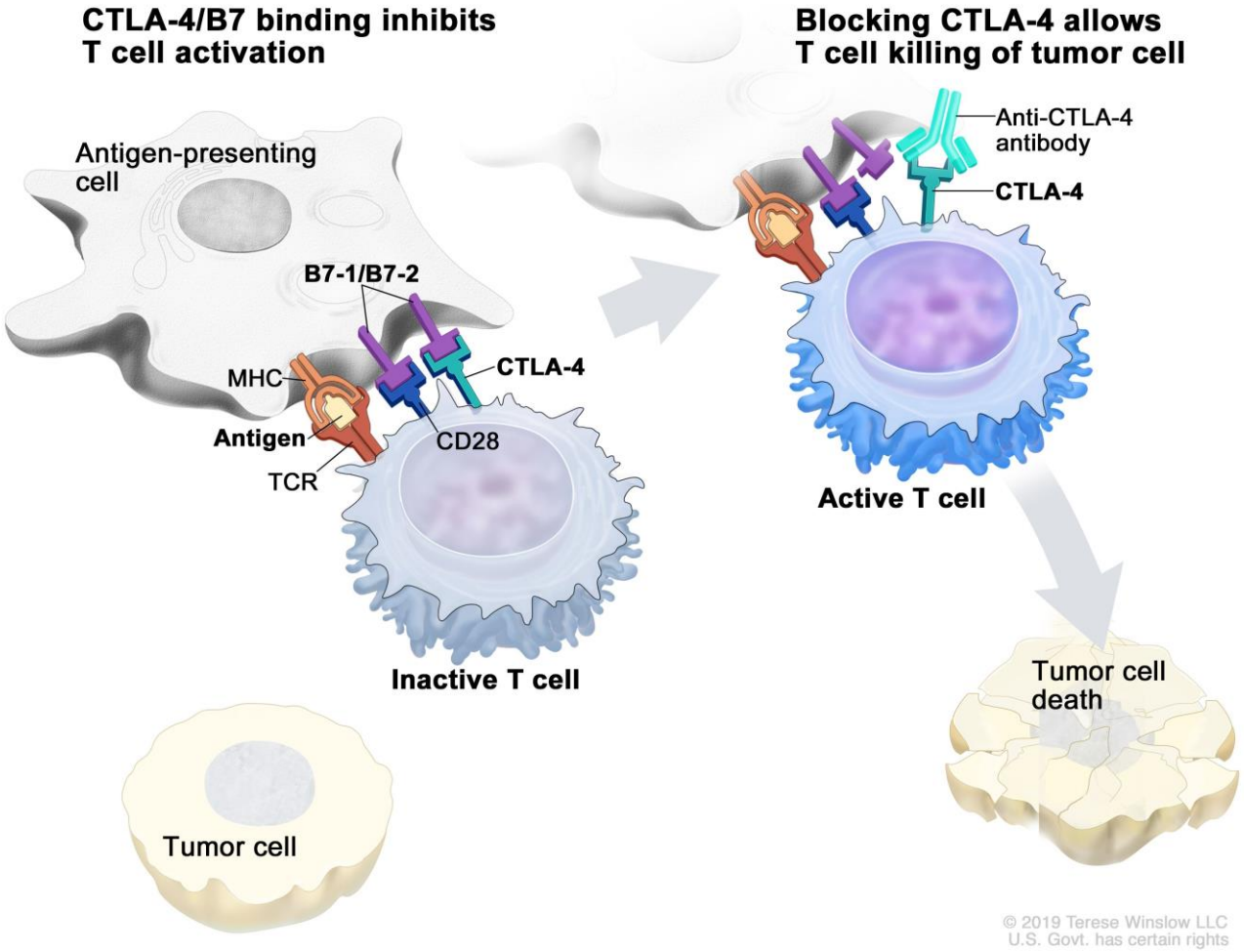


https://www.frontiersin.org/journals/pharmacology/articles/10.3389/fphar.2023.1157306/full

Immunotherapy

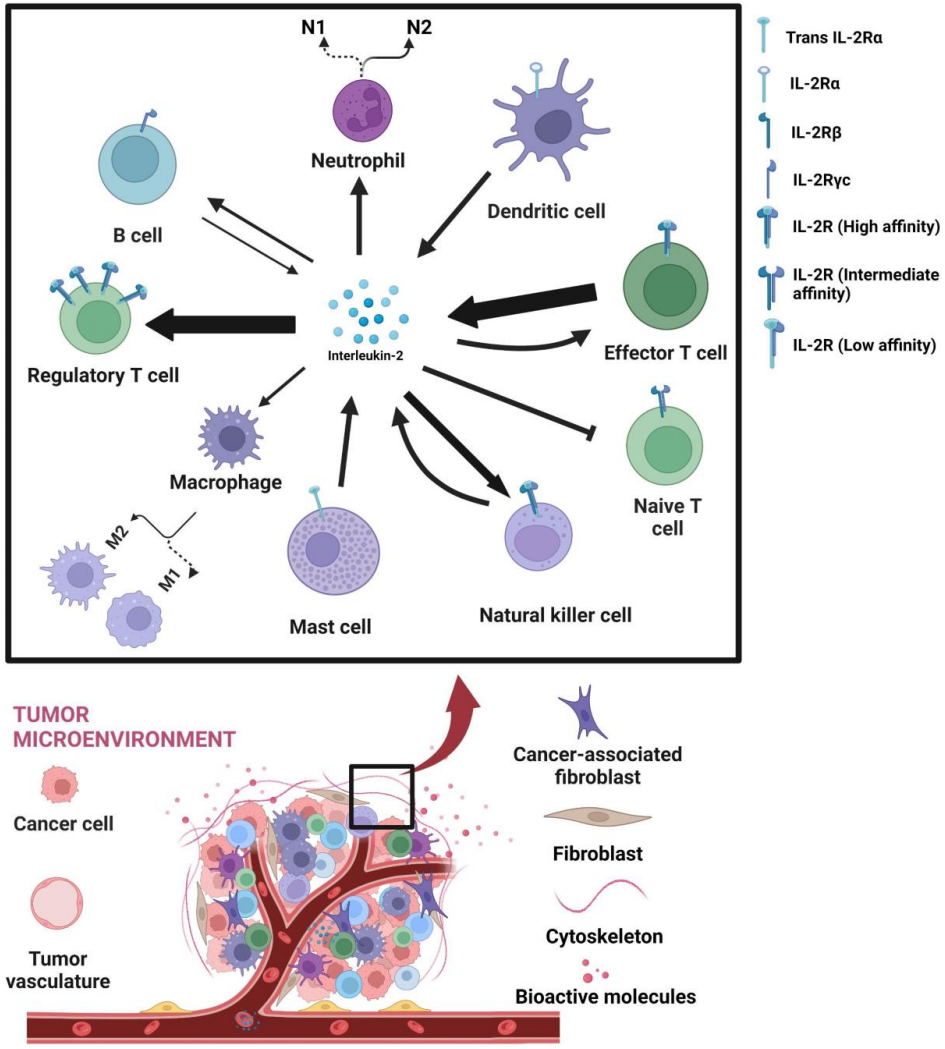
- Harnessing own immune system to kill cancer cells
- 3 most common types:
- Non-specific immune stimulation
  - High dose IL-2 melanoma
  - Inravesicular BCG bladder cancer
- T-cell transfer therapy
  - CAR T-cell therapy
- Immune Checkpoint Inihibitor therapy (ICI)
  - CTLA-4
  - PD-1
  - LAG-3

Native Immune System



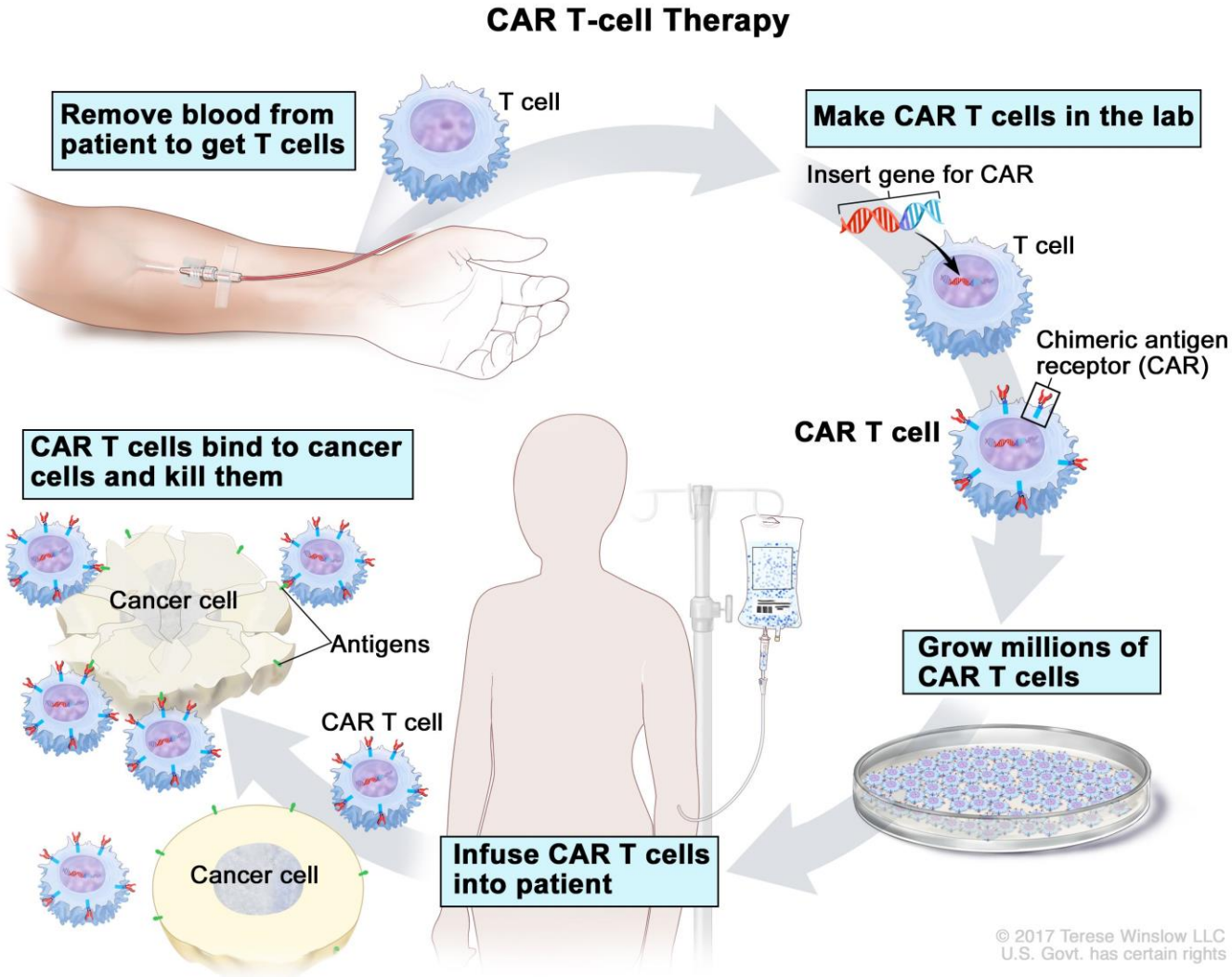
https://www.cancer.gov/publications/dictionaries/cancer-terms/def/immune-checkpoint-inhibitor

Non-specific Immune Stimulation



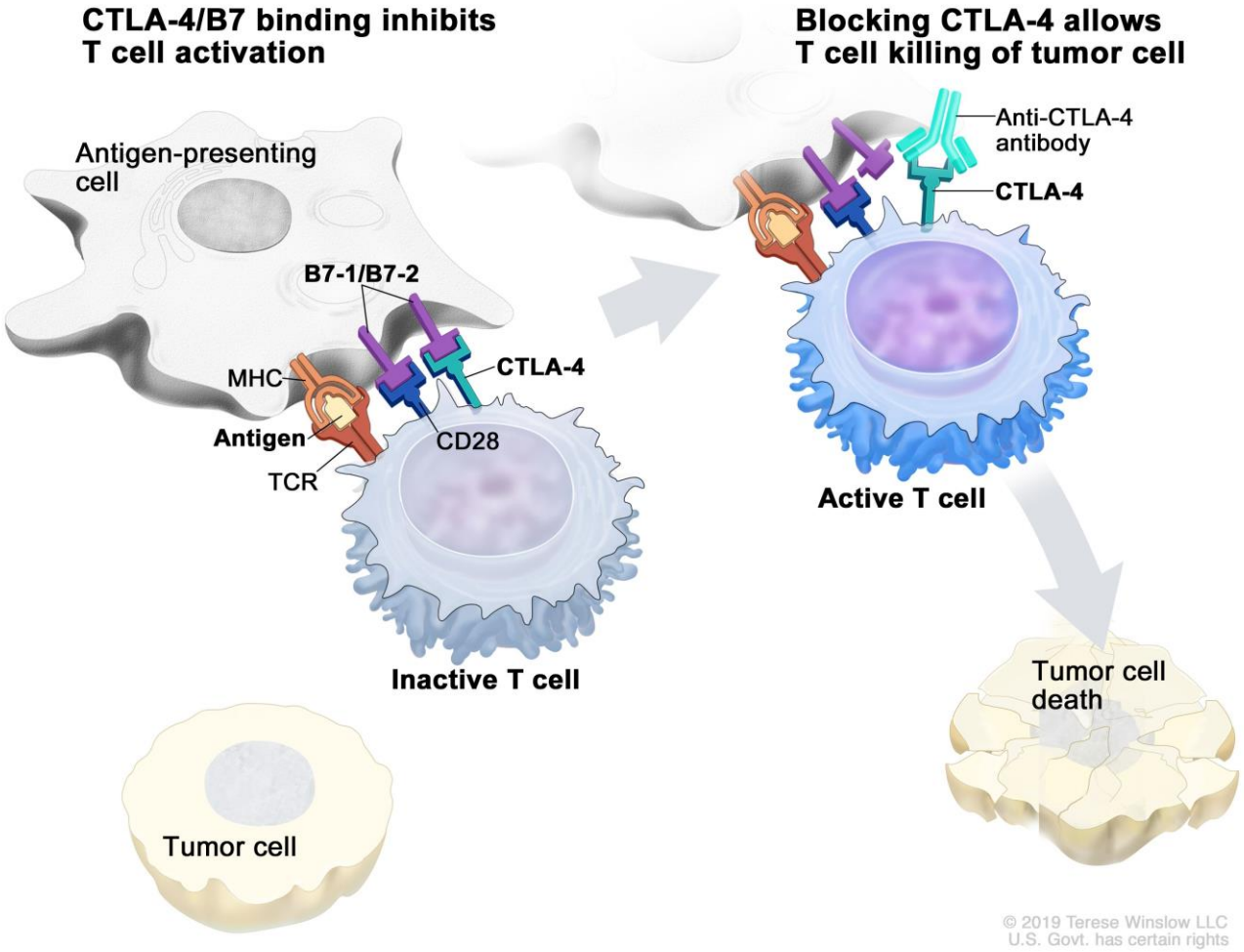
https://link.springer.com/article/10.1186/s12943-023-01826-7

CAR T-Cell Therapy



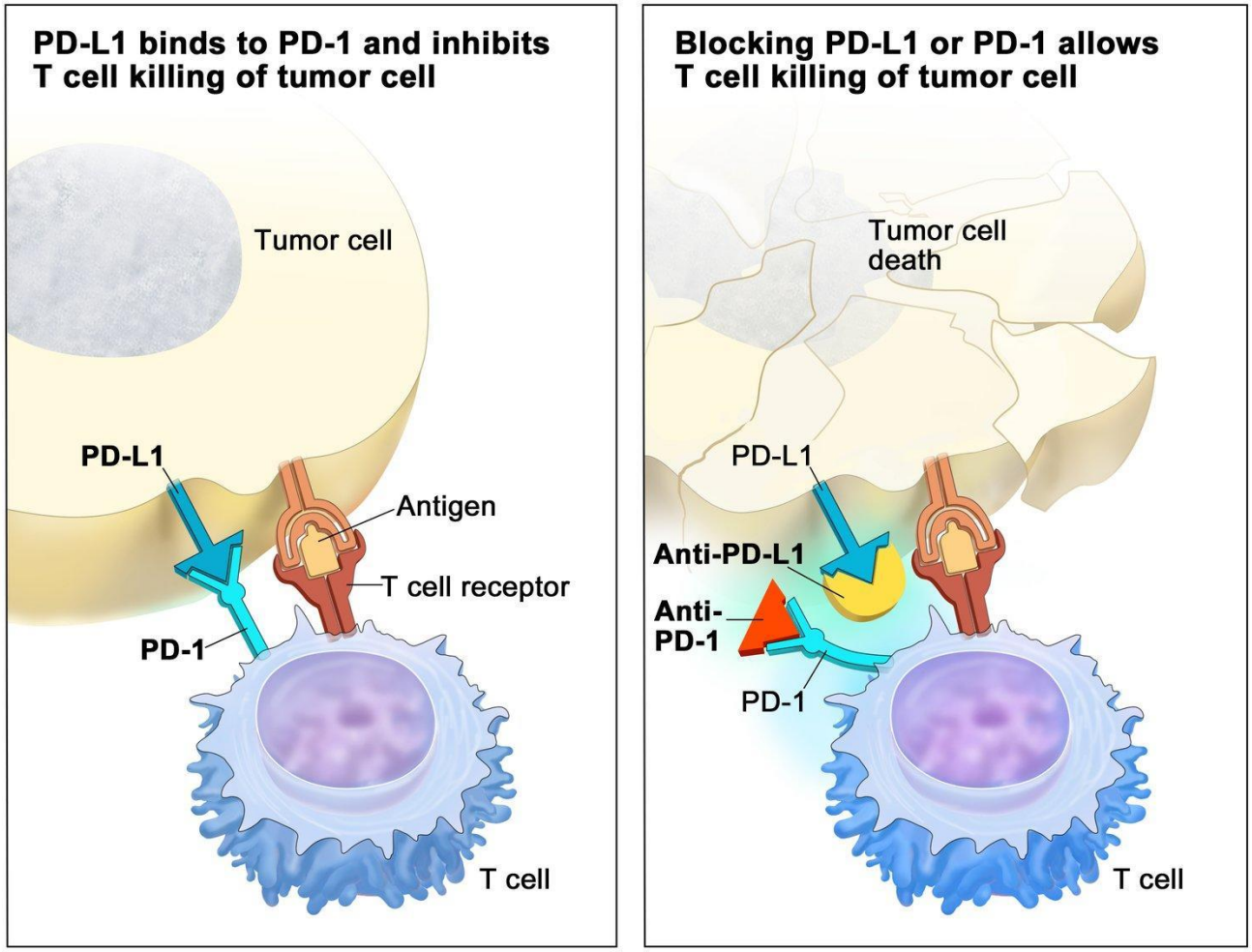
https://www.cancer.gov/publications/dictionaries/cancer-terms/def/car-t-cell-therapy

Immune Checkpoint Inhibitors



https://www.cancer.gov/publications/dictionaries/cancer-terms/def/immune-checkpoint-inhibitor

Immune Checkpoint Inhibitors

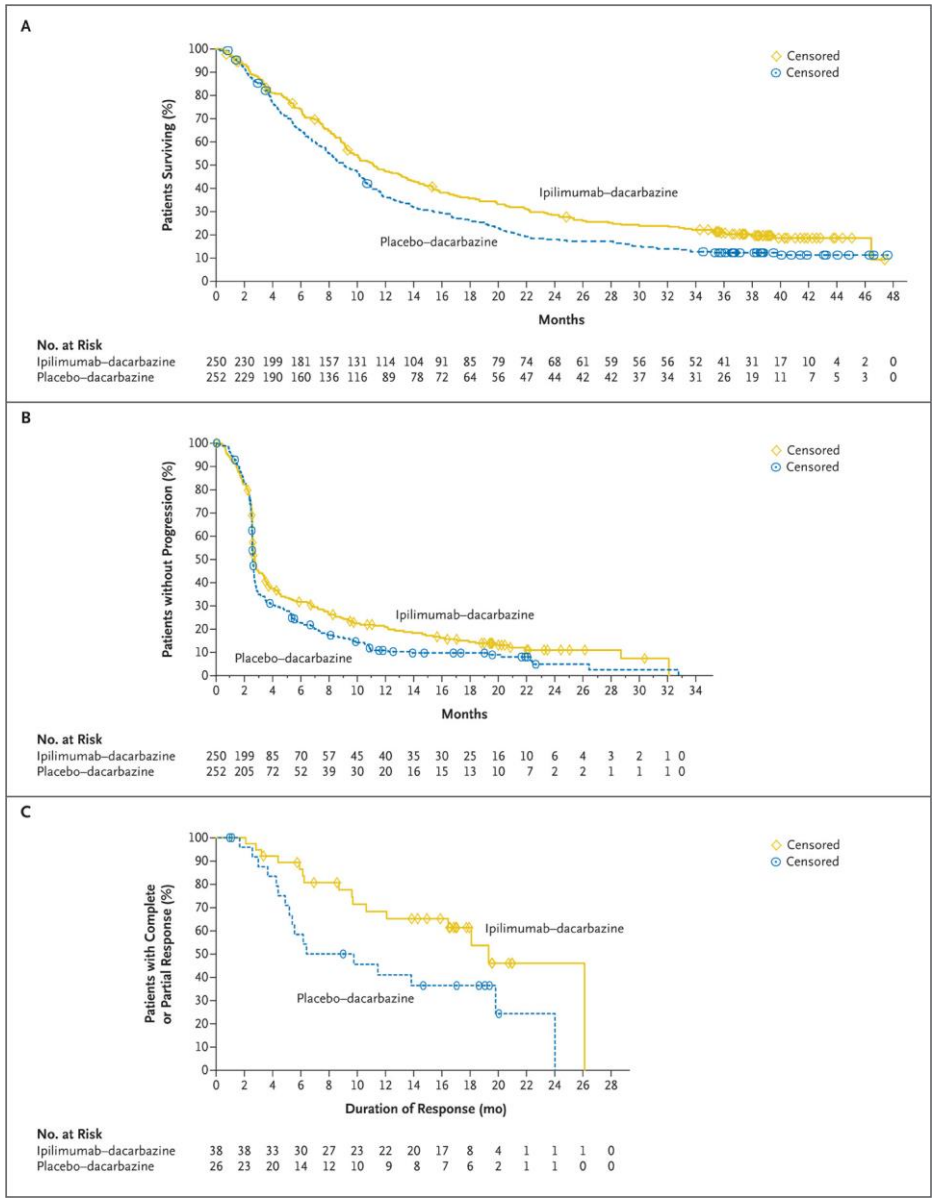


https://www.cancer.gov/publications/dictionaries/cancer-terms/def/immune-checkpoint-inhibitor

Immune Checkpoint Inhibitor Toxicity

- Multisystem immune-mediated toxicities
- 10-50% grade 3 or higher rate of toxicities depending on choice of agent, and single agent vs combination therapy
- Colon: diarrhea
- Liver: bilirubin, ALT/AST
- Kidney: creatinine
- Lung: pneumonitis
- Endocrine: hypothyroidism, adrenal insufficiency
- Cardiac: cardomyositis
- Neurologic: myasthenia gravis

Ipilimumab 2011: CA184-024



<u>Design:</u>

1st L: Dacarbazine + Ipi vs placebo

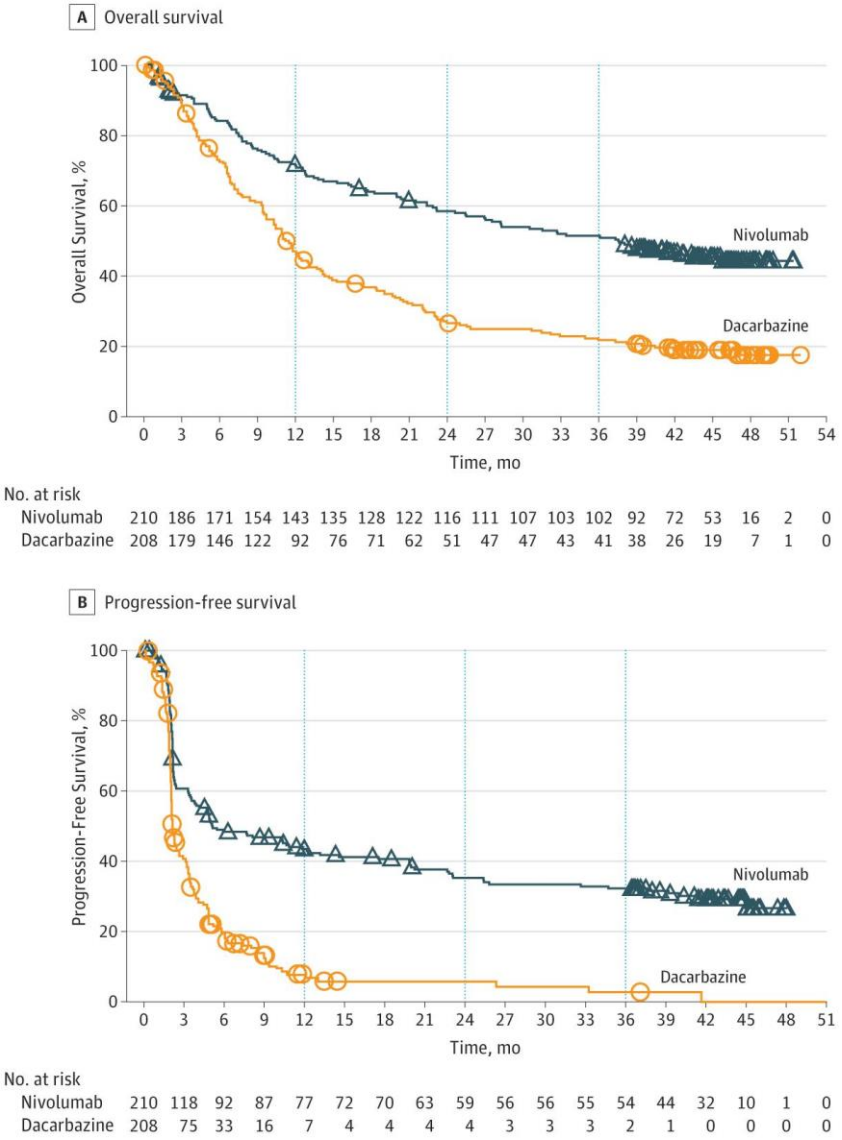
<u>3 yr Overall Survival:</u>

20 vs 12 % (HR 0.72)

NNT = 12

NEJM 2011;364(26):2517

Nivo 2014: CheckMate 066



<u>Design:</u>

1st L: Nivolumab vs Dacarbazine

<u>5 yr Overall Survival:</u>

39 vs 17 %

NNT = 4

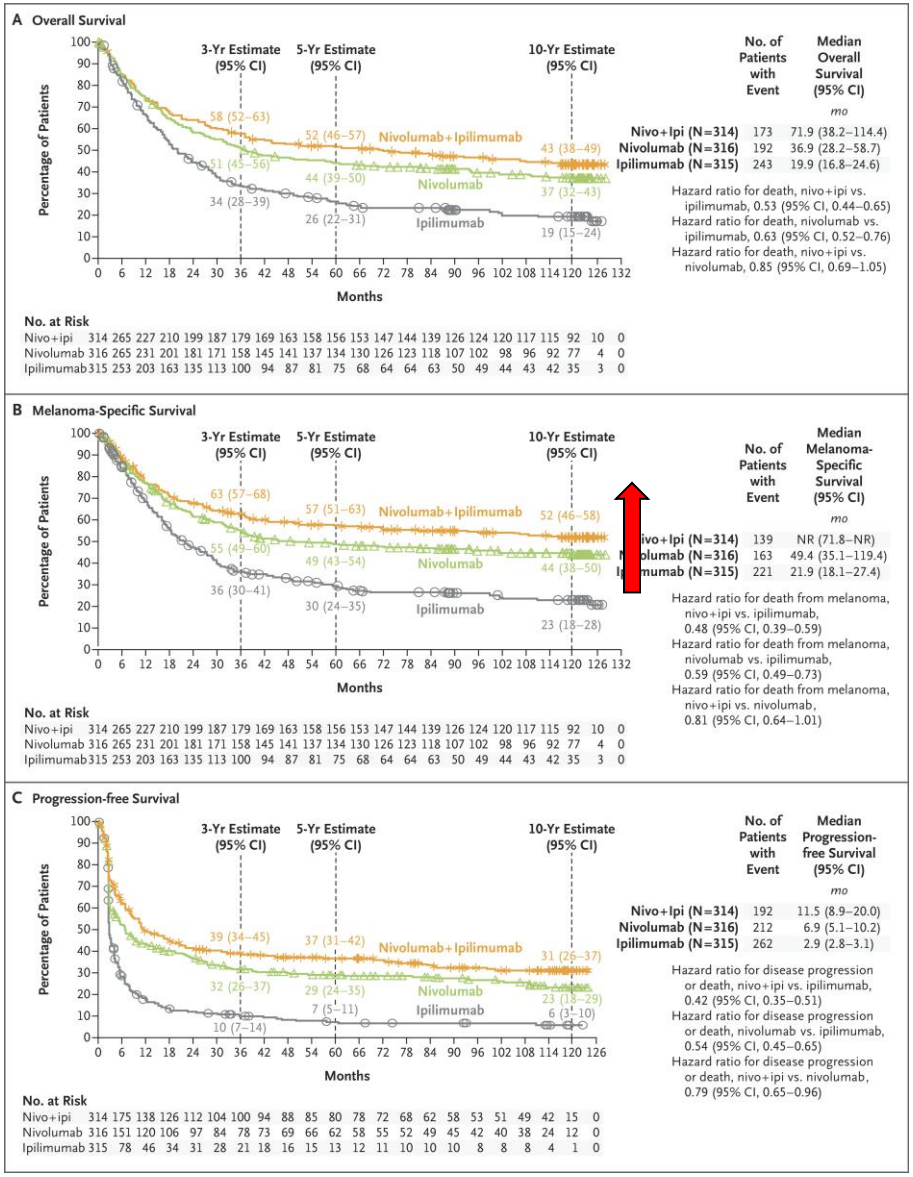
<u>5 yr Progression Free Survival:</u>

28 vs 3 %

NNT = 4

J Clin Oncol 2020; 38(33):3937

Ipi Nivo 2015: CheckMate 067



<u>Design:</u>

1st L: Ipi Nivo vs Nivo vs Ipi

<u>10 yr Overall Survival:</u>

43 vs 37 vs 19 %

(HR 0.85 Ipi Nivo vs Nivo)

NNT = 17

<u>10 yr Melanoma Specific Surv:</u>

52 vs 44 vs 23 %

(HR 0.81 Ipi Nivo vs Nivo)

NNT = 12

NEJM 2025;392(1):11

ICI FDA approved treatments

As of 2025:

12 AGENTS:
CTLA-4 inh (2): ipilimumab, tremelimumab
PD-1 inh (6): nivolumab, pembrolizumab, cemiplimab, doslarlimab, retifanlimab, toripalamab
PD-L1 inh (3): atezolizumab, avelumab, durvalumab
LAG-3 inh (1): relatlimab

23 DISEASES:
Melanoma, Head and neck squamous cell carcinoma, Nasopharynx cancer, Cutaneous squamous cell carcinoma, Basal cell carcinoma, Merkel cell carcinoma, Small cell lung cancer, Renal cell carcinoma, Bladder cancer, Hepatocellular carcinoma, Hodgkin's lymphoma, Colorectal cancer, Gastric cancer, Esophagus cancer, Cervix cancer, Endometrial cancer, Breast cancer, Pleural mesothelioma, Biliary tract cancer, Primary mediastinal large B-cell lymphoma, Anal squamous cell carcinoma, Alveolar soft part sarcoma

Focus today on H&N cancers

- ICI for Melanoma: Dr Angela Osmolak
- ICI for Cutaneous squamous cell carcinoma: Dr Andrew Holcomb
- ICI for Squamous cell carcinoma of the mouth, throat, voice box:
- Dr Andrew Coughlin
- Melanoma Injectable therapy: Dr Aru Panwar
- Cancer survivors
- CARES survivorship clinic: Jaki Kenney