

## FDA-Approved Checkpoint Inhibitors

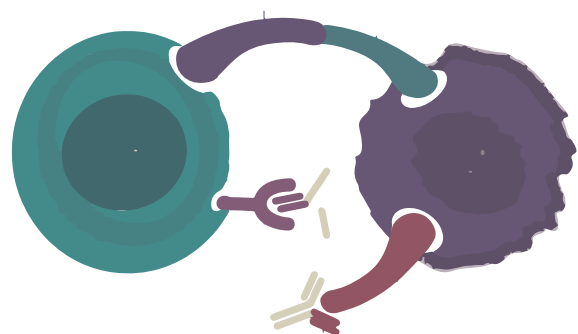
AGENT	CANCER
Ipilimumab	Melanoma, RCC, MSI-H CRC
Nivolumab	Melanoma, NSCLC, SCLC, RCC, Hodgkin lymphoma, urothelial carcinoma, MSI-H CRC, HCC
Pembrolizumab	Melanoma, NSCLC, head and neck squamous cell carcinoma, Hodgkin lymphoma, MSI-H CRC, bladder cancer, gastric cancer, cervical cancer, mediastinal B cell lymphoma, HCC, merkel cell carcinoma
Atezolizumab	Bladder cancer, breast cancer, NSCLC
Avelumab	Merkel cell carcinoma, urothelial carcinoma
Durvalumab	NSCLC, urothelial carcinoma
Cemiplimab	Cutaneous squamous cell carcinoma

Adapted from: Cummings AL, Garon EB. The ascent of immune checkpoint inhibitors: is the understudy ready for a leading role? *Cancer Biol Med.* 2017;15:341-347.

### Early Report of Responses to PD-1 Blockade

Cumulative response rates:

18% in non-small cell lung cancer  
27% in renal cell cancer  
28% in melanoma

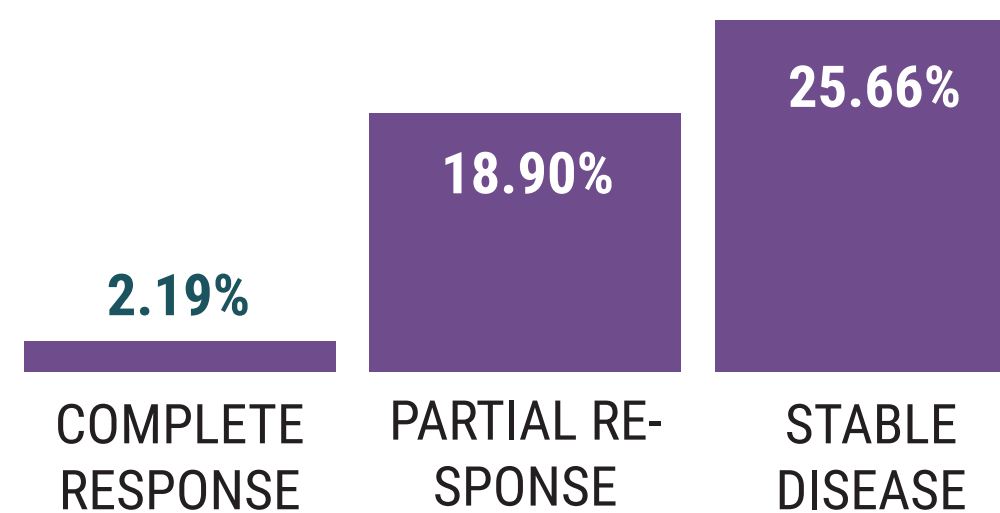


20 of 31 responses lasted 1 year or more in patients with 1 year or more of follow-up

Source: Topalian SL, Hodi FS, Bramer JR, et al. Safety, activity, and immune correlates of anti-PD-1 antibody in cancer. *N Engl J Med.* 2012;366:2443-2454.

### Response of PD-1/PD-L1 Blockade in Solid Tumors

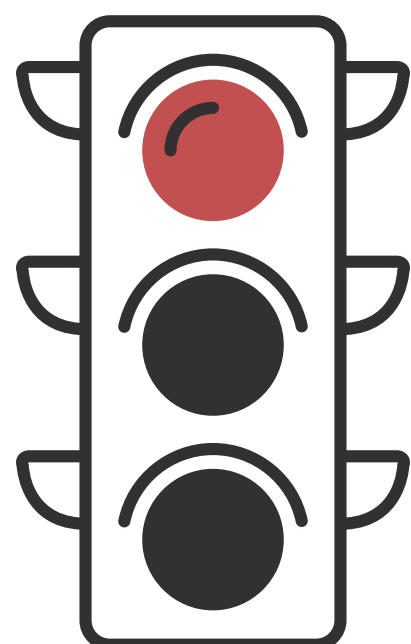
In a meta-analysis of 12 studies accounting for 6,700 patients:



Source: Carretero-González A, Lora D, Ghanem I, et al. Analysis of response rate with ANTI PD1/PD-L1 monoclonal antibodies in advanced solid tumors: a meta-analysis of randomized clinical trials. *Oncotarget.* 2018;9:8706-8715.

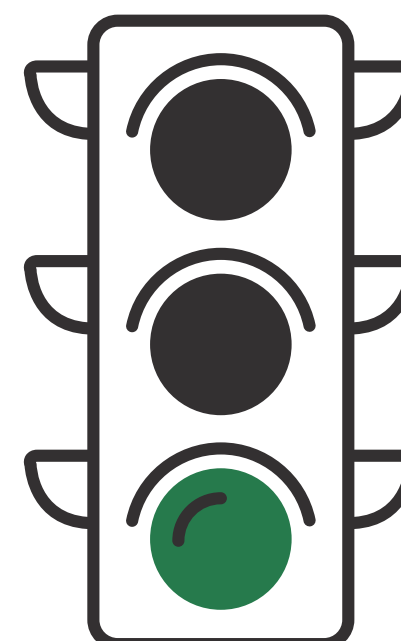
### New Immune Checkpoint Receptors: Potential Therapeutic Targets?

Inhibitory Checkpoints



CTLA-4  
PD-1  
LAG3  
TIM3  
BTLA  
TIGIT and CD96  
VISTA/PD-1H

Stimulatory Checkpoints



OX40  
CD40  
41BB  
GITR

Source: Zahavi DJ, Weiner LM. Targeting multiple receptors to increase checkpoint blockade efficacy. *Int J Mol Sci.* 2019; 20:158