FIGURE 18 GOING DEEP WITH CHECKPOINT INHIBITORS

FDA-Approved as of July 31, 2020

Hodgkin lymphoma: nivolumab and pembrolizumab

Non-Hodgkin lymphoma: pembrolizumab

Esophageal cancer: nivolumab and pembrolizumab

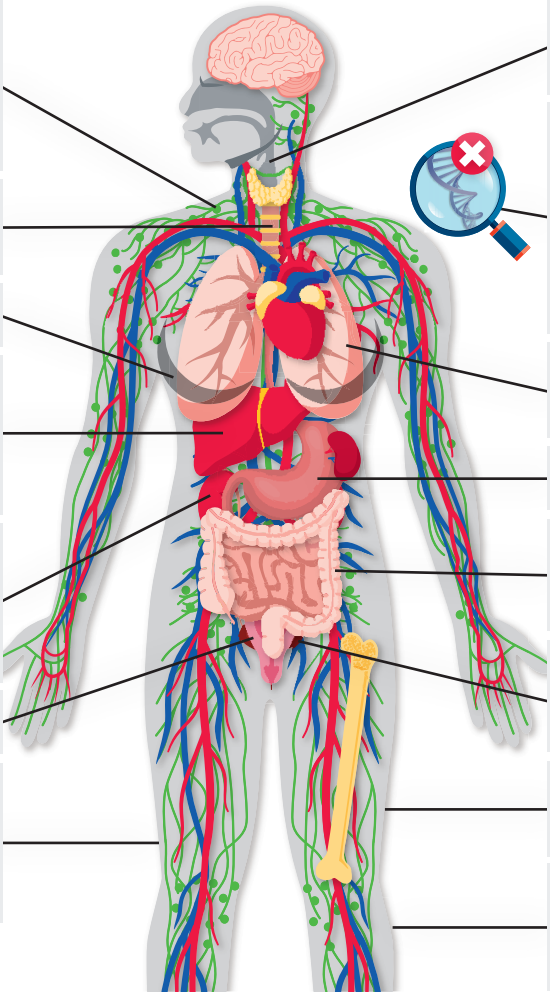
Breast cancer: atezolizumab

Liver cancer: Atezolizumab, nivolumab, pembrolizumab and combination of ipilimumab and nivolumab

Kidney cancer: avelumab, nivolumab, pembrolizumab, and combination of ipilimumab and nivolumab

Cervical cancer: pembrolizumab

Melanoma: Atezolizumab, ipilimumab, nivolumab, pembrolizumab, and combination of ipilimumab and nivolumab



Head and neck cancer: nivolumab and pembrolizumab

Solid tumors that are microsatellite instability–high or mismatch repair–deficient: pembrolizumab

Solid tumors that are tumor mutational burden-high: pembrolizumab

Lung cancer: atezolizumab, durvalumab, nivolumab, pembrolizumab and combination of ipilimumab and nivolumab

Gastric cancer: pembrolizumab

Colorectal cancer: nivolumab and combination of ipilimumab and nivolumab

Bladder cancer: atezolizumab, avelumab, durvalumab, nivolumab, and pembrolizumab

Merkel cell carcinoma: avelumab and pembrolizumab

Cutaneous squamous cell carcinoma: cemiplimab-rwlc and pembrolizumab

Checkpoint inhibitors are cancer immunotherapeutics that work by releasing "brakes" on the surface of immune cells called T cells, which are naturally capable of destroying cancer cells. The first checkpoint inhibitor to be approved by the U.S. Food and Drug Administration (FDA) was ipilimumab (Yervoy), in March 2011, for metastatic melanoma. Three and a half years passed before another checkpoint inhibitor was approved, pembrolizumab (Keytruda), again for metastatic melanoma. Since then, another five checkpoint inhibitors have been approved by the FDA, atezolizumab (Tecentriq), avelumab (Bavencio), cemiplimab-rwlc (Libtayo), durvalumab (Imfinzi), and nivolumab (Opdivo). In addition, the FDA has expanded the number of cancer types for which there is at least one checkpoint inhibitor approved. The broad utility of these groundbreaking immunotherapeutics is highlighted by the fact that as of July 31, 2020, one or more checkpoint inhibitors were approved for treating 16 types of cancer and for treating any type of solid tumor characterized by the presence of certain molecular characteristics, microsatellite instability–high, DNA mismatch–repair deficiency, and tumor mutational burden–high. In addition, with all the checkpoint inhibitors approved for treating multiple types of cancer, there are several cancer types for which there is a deep selection of checkpoint inhibitors available as treatment options.