

# “CANCER AND THE IMMUNE SYSTEM”

## The use of medical animation to educate on immuno-oncology and immune-related adverse events

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### Introduction

Advances in tumor immunology and cancer immunotherapy have generated significant interest in immuno-oncology, increasing the need to educate healthcare professionals who will support ongoing research efforts in this field. All these professionals must learn a considerable quantity of information in a limited time. Animations, consisting of a series of dynamic, graphical elements that represent real-world phenomena, present a complex concept efficiently by substituting long textual descriptions with images in motion. The video “Cancer and the Immune System” was developed following the recommended learning principles to educate on essential concepts in immuno-oncology.

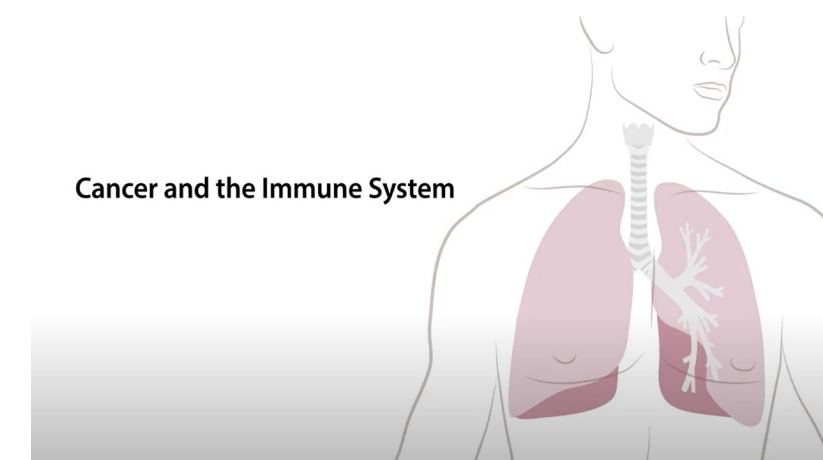
### Conclusion

“Cancer and the Immune System” introduces evidence-based concepts in immunology, cancer biology, anti-tumor immune regulation, and immune-related adverse events in a visually appealing and concise format. Although initially labor-intensive and time-consuming to develop, it has been effortlessly incorporated into various educational settings and configurations, including PowerPoint presentations, texts and email attachments, asynchronous learning, and case-based learning.

### Methodology

The evidence-based storyboard for the video clip “Cancer and the Immune System” was developed and narrated by an Onco-Hospitalist at MD Anderson Cancer Center (MDACC), and a medical and scientific illustrator created the animation; it took between five and six months to complete. The video describes the evasion of immune destruction by cancerous cells as one of the Hallmarks of Cancer and T-cell activation. It also highlights the postulated mechanisms and the role of the immune-checkpoint molecules in promoting an immune-tolerant microenvironment and T-cell exhaustion, leading to tumor evasion from immune surveillance.

Cancer and the Immune System



### Results

The three-minute twenty-nine-second video has been incorporated into various lectures and educational activities at MDACC, including a quality improvement initiative on immune-checkpoint inhibitor-related pneumonitis, didactics to Internal Medicine Residents, Onco-Hospitalist Fellows, Faculty at multiple Departments, and at the MDACC Toxicity Working Group Educational Lecture Series. The medical animation has been well received across the board.

### Methodology

The **cytotoxic T-lymphocyte-associated antigen four** or CTLA-4 molecule (expressed on the surface of regulatory T cells), the **programmed-death one** or PD-1 molecule (expressed on the surface of cytotoxic T-lymphocytes) and its ligand, the **programmed-death-ligand one** or PD-L1 (expressed in the tumor surface) are immune-checkpoint molecules. The **immune-checkpoint inhibitors** (ICI) block the inhibitory effects of these molecules, unleashing the immune response against tumor cells, with the development of immune-related adverse events (irAEs) as collateral damage.

Immune Checkpoint Inhibitors Monoclonal Antibodies

