Alana Canty
Steel C.
16 February 2024
Immunology Bio 302

The monoclonal antibody drug Ipilimumab (Yervoy) is and IgG monoclonal antibody that treats melanoma, a type of skin cancer that can spread to other organs (American Cancer Society, 2023). This cancer is characterized by the uncontrolled growth of pigment-producing cells, called melanocytes. Melanocytes are located in the bottom layer of the epidermis, the outermost layer of skin. Unlike some other forms of skin cancer that are often limited to the surface of the skin, melanoma has the potential to invade deeper tissues and spread to other parts of the body through the lymphatic system or bloodstream. Melanoma can develop in various shapes and sizes, from small, irregularly shaped moles to larger, dark patches on the skin. The most common change in melanoma cells is a mutation in the BRAF oncogene, which is found in about half of all melanomas (American Cancer Society, 2023). Some common signs and symptoms include changes in the appearance of existing moles, such as size, shape, color, or bleeding. The primary risk factor for melanoma is excessive exposure to ultraviolet (UV) radiation from the sun or tanning beds. People who have fair skin or skin that easily burns, lighter hair, red hair, or blue or green colored eyes, are at an increased risk of developing melanoma.

Ipilimumab works by targeting the protein CTLA-4, which is expressed on the surface of T cells. Normally, CTLA-4 helps regulate the immune response, but in the case of melanoma, it can prevent T cells from recognizing and attacking cancer cells effectively. By binding to CTLA-4, Ipilimumab blocks its function, allowing T cells to recognize and destroy melanoma cells more efficiently. This treatment is typically used for melanomas that have spread to other parts of the body. It can also be used as a post-surgery treatment to prevent the cancer from returning. Treatment using this therapy can lead to serious side effects, especially if done in combination with other therapies. Alone, treatment with Ipilimumab has shown to have cause immune-related adverse events, or irAEs. These events are results of the therapy altering the balance of the immune system. Ipilimumab is an IgG1 antibody. IgG1 antibodies make up about 75% of the antibodies in the blood. The structure of an IgG1 antibody includes two heavy chains and two light chains, each of which has a constant region and a variable region. The variable regions are responsible for the specific antigen binding, in this case, CTLA-4. The structure allows for the Y-shaped molecule to fit into the "notch" on the surface of a B cell and inhibit the activation of CTLA-4.

Alana Canty
Steel C.
16 February 2024
Immunology Bio 302

**References**

*Della Vittoria Scarpati, G., Fusciello, C., Perri, F., Sabbatino, F., Ferrone, S., Carlomagno, C., & Pepe, S. (2014). Ipilimumab in the treatment of metastatic melanoma: management of adverse events. OncoTargets and therapy, 7, 203–209. https://doi.org/10.2147/OTT.S57335*

*Melanoma Skin Cancer Immunotherapy | Skin Cancer Immunotherapy*. (2023, October 27). American Cancer Society. Retrieved February 16, 2024, from https://www.cancer.org/cancer/types/melanoma-skin-cancer/treating/immunotherapy.html

*Melanoma Skin Cancer Risk Factors | Melanoma Risk Factors*. (2023, October 27). American Cancer Society. Retrieved February 16, 2024, from https://www.cancer.org/cancer/types/melanoma-skin-cancer/causes-risks-prevention/risk-factors.html

*Patel, S. P., & Woodman, S. E. (2011)*. Profile of ipilimumab and its role in the treatment of metastatic melanoma. *Drug design, development and therapy*, *5*, 489–495. https://doi.org/10.2147/DDDT.S10945

*What Causes Melanoma? | Causes of Melanoma Skin Cancer*. (2023, October 27). American Cancer Society. Retrieved February 16, 2024, from https://www.cancer.org/cancer/types/melanoma-skin-cancer/causes-risks-prevention/what-causes.html

*What Is Melanoma Skin Cancer? | What Is Melanoma?* (2023, October 27). American Cancer Society. Retrieved February 16, 2024, from https://www.cancer.org/cancer/types/melanoma-skin-cancer/about/what-is-melanoma.html

Alana Canty
Steel C.
16 February 2024
Immunology Bio 302