Treating Cancer with Ivonescimab

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Cancer is one of the leading causes of death in the world and its treatment has always been limited. Today, new drugs and treatment options offer hope in the process of slowly beating cancer. Non-small cell lung cancer (NSCLC), caused primarily by smoking, accounts for around 85% of lung cancers. NSCLC treatments include surgery if detected early, radiation therapy, chemotherapy, targeted therapy, and immunotherapy (Yale Medicine, n.d.). A possible treatment option in the future is Ivonescimab, currently approved only as an experimental therapy by China's National Medical Products Administration. Ivonescimab is an antibody that blocks specific proteins with the goal of helping the immune system fight cancer cells and tumors with greater effectiveness (NCI, n.d.).

The molecular workings of how Ivonescimab operates is fascinating. Administered with an IV infusion, the drug goes into the bloodstream straight away and "steer towards and accumulate in" the tumor site (Summit Therapeutics, 2024). Here, it blocks the PD-1 protein and VEGF protein by binding to them and preventing them from binding to each other. The PD-1 protein's primary purpose is to regulate the immune system and prevent it from getting out of control. It is found in irregularly high amounts in immune cells – specifically T cells – and binds to PD-L1 proteins, which are found in unusually large amounts in certain cancer cells (American Lung Association, 2024). Cancer cells exploit this regulatory function to evade the immune system, as the binding of PD-1 to PD-L1 signals T cells to inhibit their attack on the cancer cells (National Cancer Institute, 2022). Essentially, when both PD-L1 and PD-1 are present, they can bind and keep cancer cells alive. However, prohibiting the function of PD-1 would allow the immune system to kill the cancer cells. Ivonescimab achieves this by attaching to PD-1 proteins, preventing it from binding to PD-L1 proteins and allowing T cells to properly kill the cancer cells. Additionally, by blocking VEGF, Ivonescimab inhibits VEGF from allowing blood vessels to grow in tumors. Blocking VEGF is important in preventing tumors from growing new blood vessels (Duffy et al., 2013.).

In the clinical trial that utilized Ivonescimab, there were two groups of patients. Patients in one group received Ivonescimab in addition to chemotherapy. In the other group, patients received a placebo in addition to chemotherapy. The results of this trial measured median progression-free survival, or the time during and after treatment in which the cancer did not get worse. The median progression-free survival for people in the group treated with Ivonescimab was 7.1 months while the median progression-free survival for the placebo group was 4.8 months. Overall, patients in the Ivonescimab group had better progression free survival than the placebo group. However, adverse events were more common in the Ivonescimab group than in the placebo group; these events included immune related, chemotherapy related, and vascular endothelial growth factor-related events. 160 adverse events occurred in the Ivonescimab group, which accounts for 99.4% of the group. Meanwhile, 157 adverse events occurred in the placebo group, which is 97.5% of the group. Of these adverse events, the more serious ones were relatively much higher in the Ivonescimab group.

The future of treating cancer is promising, especially with emerging treatments like Ivonescimab and the improvement of existing treatments. What occurs on a molecular level when using these treatments is truly captivating, and the beauty of how these treatments function on the small scale seems to be commonly overlooked. Understanding the complexities of our current progress in treating cancer and other diseases holds the utmost importance when it comes to appreciating how far treatments have come and recognizing the path yet to go.

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