CAR T-Cell Therapy

Jack Hinkle

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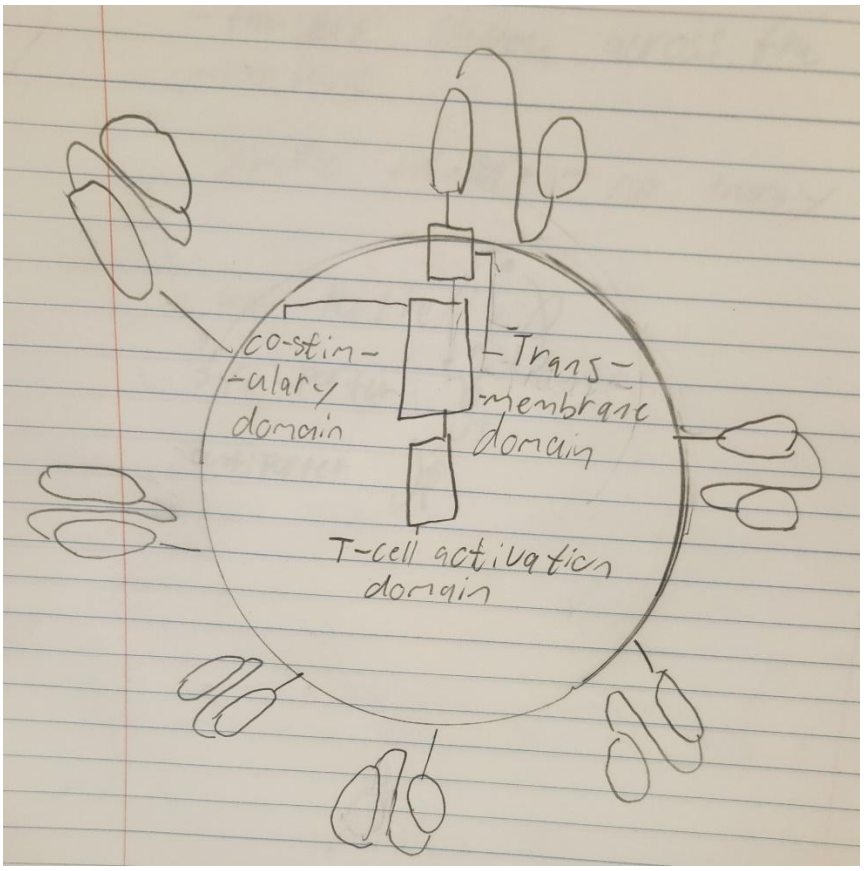
Dr. Wright

This paper is meant to describe the use of Chimeric antigen receptor (CAR) T-Cells (6) in the treatment of many leukemias and lymphomas (8). Leukemias and lymphomas are "neoplasms originating from B or T lymphocytes" (7). Meaning that they are cancers relating to or coming from the white blood cells. These cancers are highly aggressive and has quickly become the 5th most widespread cancer within the use, with roughly 1 in 41 men, and 1 in 52 women having some kind of lymphoma during their lives (7). These cancers are extremely dangerous, and can cause things such as low blood pressure, extreme nausea, and even heart problems (8). This extreme prevalence and danger has led to the research and development of many different treatments to try and cure, or at least lessen the effects of, these cancers. There has been some success in this, and over the last few years, one of the more talked about treatments has been CAR T-Cell Therapy. These cells (T-Cells) are immune cells found within the blood (6) and are used in CAR T-Cell Therapy as a means of transporting a certain antigen to a lymphocytic neoplasm which causes cell death within the cancer. This method had some very intriguing successes during its clinical trials, leading to a swift approval via the FDA in 2017 (6). During one clinical trial in 2010, there were "two patients with chronic lymphocytic leukemia" (9) who after undergoing CAR T-Cell Therapy had full remission of their cancer. Because of this, and other clinical trials like it, this method of treatment has quickly grown in popularity.



The CAR T-Cell works by taking a persons T-Cells from their blood and changing the antigen receptor present in the cell (6). First, blood must be drawn from a patient, and from that blood, T-Cells must be collected. After the T-Cells are collected the antigen receptor is then changed to be a Chimeric antigen receptor. This is the antigen receptor shown in the diagram above. The Cells are then injected back into the patients' blood stream, and they begin to circulate the patient's body until it comes into contact with the neoplasm at which point the CAR antigen will bond with a CD-19 antigen, which is a surface antigen of the cancer cells, and will cause cell death within the cancer. This system has been extremely successful over the past few years, and it continues to gain popularity. This treatment; however, is not without its drawbacks. In causing the cell death within the cancer, the CAR T-Cell releases kinases into the blood

stream. These kinases then make their way into both the heart and the brain, and they can cause neurotoxicity, and cardiovascular issues (1).

This new kind of cellular therapy is extremely exciting and has had many successes over the past few years. That being said, this treatment is going to continue to undergo much more research, and the CAR T-Cell itself may also undergo changes. All in all, this treatment seems to be a great thing and will be quite exciting to watch develop over the coming years.

References

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