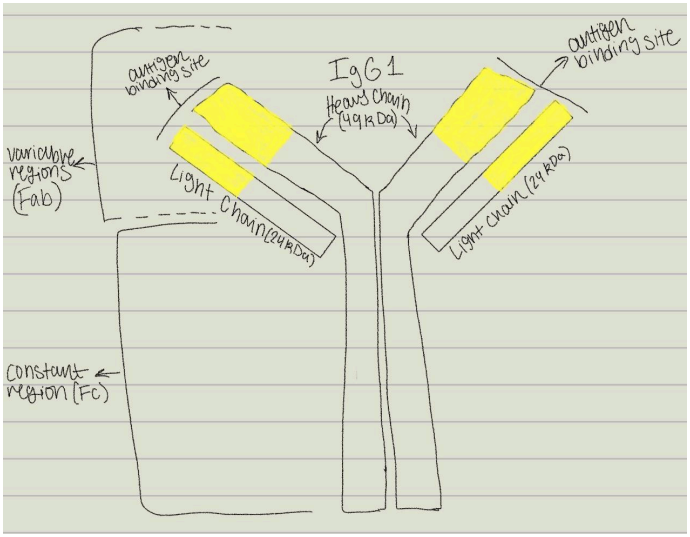
The monoclonal antibody that I chose for this assignment was adalimumab also known as Humira. It is a subcutaneous injection that uses an autoinjector syringe, which allows patients to quickly and efficiently administer the drug themselves. Adalimumab is specifically a recombinant IgG1 antibody consisting of approximately 1330 amino acids and has a molecular weight of 148kDa. Additionally, its structure and function is identical to the IgG1 present in humans which leads to it having a high affinity for TNF-alpha cells and low immunogenetic potential. Furthermore, adalimumab aids in the effectiveness in treating many types of arthritis due to its osteogenic properties, which means that it has the ability to regenerate bone cells forming new bone. To add, adalimumab inhibits TNF receptor 1 and TNF receptor 2 present in immune cells to calm the overactive immune system, hence why it is mainly used to treat the symptoms caused by autoimmune diseases such as rheumatoid arthritis, which is an autoimmune disorder due to the immune system mistaking your body as foreign material causing it to attack the joints, creating inflammation to said joints. The symptoms include joint stiffness and pain alongside swollen joints. Humira also treats other autoimmune diseases such as psoriatic arthritis is arthritis present in individuals who have psoriasis meaning that they develop itchy, scaly patches on the skin. Lastly, adalimumab aids in managing the symptoms in Crohn's disease which is an inflammatory bowel disease, caused by inflammation to the digestive tract, mainly within the small and large intestine. This condition creates abdominal pain, chronic diarrhea, and mouth ulcers within the gums or pain within the mouth.



Adalimumab's main way of targeting these cells is through the inflammation pathway. The pathway of inflammation occurs when inflammatory condition increases due to one of the autoimmune diseases mentioned prior. In these conditions, the immune system becomes overactive and begins to produce excessive inflammatory signals. This leads to an increase in TNF-alpha cells, also known as tumor necrosis factor alpha cells. TNF-alpha cells are a type of cytokine that is pro-inflammatory and is produced by macrophages, which are immune cells responsible for detecting harmful pathogens within the body. To add, these TNF-alpha cells are able to bind to different immune cells such as fibroblasts, endothelial cells, and bone cells because these cells contain receptors specifically for TNF known as TNF receptor 1 (TNFR1) and TNF receptor 2 (TNFR2). Once TNF-alpha binds to these receptors, signaling

pathways inside the cell are activated. This activation induces cell death and stimulates the release of additional inflammatory signals leading to an increase of immune cell recruitment to try and aid the affected area. As a result, large amounts of inflammation occur in those areas, and if cell death persists it can also lead to further tissue damage. However, when Humira is given it acts like an inhibitor by binding to TNF-alpha which prevents it from interacting with TNF receptor 1 and receptor 2. This blocks the inflammatory signaling process leading to a reduction in cell death and immune cell recruitment, ultimately preventing calming down the overactive immune response and limiting any further tissue damage.

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