**A possibility of a stronger antibody to block tumor progression in the Glioma**

**Introduction**

Most cancer starts as low-grade gliomas (LGG) and end up as high-grade gliomas (HGG). It is not different for glioblastoma. Glioblastoma is a type of cancer which is one of the most common brain tumors in adults. Many people are not familiar with this term since brain tumor is not a common cancer type that is announced a lot. However, it is said that brain tumor usually simultaneously progresses with other types of cancer. For instance, if you have lung cancer you may have a brain tumor progressing. In this case, it is very hard to treat since the brain is a very fragile area in the body and barely heals if once damaged.

Through conducting different experiments, scientists found a possible treatment to block tumor progression in the brain. Certain proteins like Fibrinogen-Like Protein 2 (FGL2) boosts the tumor progression. It is shown that FGL2 degenerates low-grade glioma (LGG) into high-grade glioma (HGG) , which also means the glioma becomes more immunosuppressive and suppresses the immune system. Scientist then figured that blocking the FLG2 protein may lead to a new treatment for glioblastoma.

In the experiment, they modeled the mice to grow tumors in a specific part of the brain. Then they took the mice and divided them into two groups, the control and experimental group. The control group was injected with IgG antibodies, common antibodies, and the experimental group was injected with anti-FGL2 antibodies.

Through the experiment, the scientists noticed that CD44 receptors, commonly shown in cancer cells, showed more in the control group than the experimental group which helped them conclude that FGL2 proteins play a big part of tumor progression. Another variable the authors looked at were the Tregs which are T-cells that suppress the immune system and prevent autoimmunity. The more Tregs present, the faster the tumor is growing. The experiment showed that the control group showed more Tregs than the experimental group which also helped them conclude that FGL2 proteins help tumor progression. However, FGL2 is not the only protein that boosts tumor progression in the brain. There is a similar protein called Insulin-Like Growth Factor Binding Protein 2 (IGFBP2) associated with tumor progression.

(will add figures)

**The Experiment**

Using similar methods the scientists used finding FGL2 proteins, the aim is to determine the similarities or differences of FGL2 protein and IGFBP2 protein. The experiment will be looking at the CD44 receptors and the Tregs present in the tumor before and after injecting the anti-IGFBP2 antibodies.

In order to see how effective the IGFBP2 protein is, there will be two groups of mice. The control group and experimental group where the control group is injected with glioma cells and the experimental group injected with glioma cells and IGFBP2 protein. Then using a regular graph where the y-axis is survival percent and the x-axis is the days, the two groups will show a difference. It is expected that the experimental group has a shorter life span than the control group.

Once proving the effectiveness of IGFBP2 is done, we take the experimental group and divide that into two groups again. The control group where they are treated with IgG antibodies which is a common antibody used that is not specifically made to target the tumor but can still be used. The experimental group will be treated with anti-IGFBP2 antibodies.

After these two groups are separated the CD44 levels are compared using a regular microscope which magnification is set to 400x. It is expected that the experimental group will show less CD44 receptors than the control group.

For the Tregs, fluorescence-activated cell sorted and t-test is going to be used. The higher the P value, the more likely there are more Tregs present. It is expected for the experimental group to have fewer Tregs accumulated than the control group, although the difference is not that significant.

**Discussion**

The CD44 levels in the experimental group is expected to be lower since the experiment is blocking the tumor gaining the boost IGFBP2 protein provides whereas the control group is only blocking the general tumor which does work but will not show significant slowing down of the tumor.

The Tregs are expected to accumulate more in the control group for the same reason as the CD44 receptor comparison. However, since the difference is very slight it may be hard to tell if the antibody is effective or not when it comes to Treg accumulation in the tumor.

**Reference**

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