Immunotherapy of Glioblastoma with Multi-functional NK Cells in Combination with Inhibition of Autophagy

A combination immunotherapy approach uses engineered NK cells and a small molecule inhibitor to overcome tumor heterogeneity and increase immune cell infiltration for enhanced glioblastoma treatment.

Researchers at Purdue University have developed an immunotherapy approach combining cell therapy and a small molecule inhibitor to treat glioblastoma. This devastating cancer is characterized by the heterogeneity of tumor antigens expressed on the surface of the tumor cells. This heterogeneity makes glioblastoma difficult to treat using mono-immunotherapeutic approaches, a treatment option that typically results in resistance to the therapy. Therefore there is a critical need to develop approaches to treat glioblastoma to overcome the heterogeneity of the disease.

The technology developed consists of genetically-engineered natural killer (NK) cells and a small molecule inhibitor. The NK cells target two glioblastoma antigens while also blocking adenosine mediated immunosuppression to increase immune cell infiltration in the tumor microenvironment. Along with the cell therapy small molecule based autophagy inhibition promotes intra-tumoral NK cell infiltration, further increasing the effectiveness of the therapy. The genetic construct has been successfully expressed in NK cells as seen by flow cytometry analysis. NK cells engineered with the construct display significant increases in the killing of a patient-derived glioblastoma cell line when compared to wild-type NK cells. This technology provides the first combination immunotherapy approach toward glioblastoma treatment providing the potential to drastically increase patient survival.

Advantages:

-Multi-Faceted Glioblastoma Treatment Option

-Increases Immune Cell Infiltration

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Category
Biotechnology & Life Sciences/Synthetic Biology & Genetic Engineering
Pharmaceuticals/Small Molecule Therapeutics

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Potential applications:

-Glioblastoma Therapy

-Combination Therapy

TRL: 3

Intellectual Property:

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