

Treating B-cell Lymphoma by targeting a cell surface receptor

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Technology description

Inhibition of CD19 decreases oncogene expression and correlates with survival probability in patients
Market Need

B-cell neoplasms, including lymphomas and acute lymphocytic leukemia (ALL), are cancers of the blood and bone marrow where cancerous expansion of white blood cells inhibits the production of other cell types and infiltrates into other organs. It is reported that the global treatment market for non-Hodgkin lymphoma will increase to over nine billion dollars by 2020 with a compound annual growth rate of 7.4%. Currently, the CD20 targeting antibody Rituxumab has been effective against non-Hodgkin lymphomas, but overcoming resistance is a challenge that faces the field. Other standard treatments include chemotherapy and radiation, which have undesirable side effects. Thus, there is a need for a specific and effective treatment for B-cell neoplasms that can be used alone or in combination with existing treatments.

Technology Overview

The Thomas-Tikonenko lab has discovered a method to treat B-cell lymphomas, involving the inhibition of CD19, a cell surface receptor specific to B-cells. The lab was the first to show that Pax5, a B-cell specific transcription factor, controls the oncogene c-MYC levels through CD19 and the PI3K-Akt-GSK3-beta axis. The group showed that bone marrow derived B-cells from CD19 knockout mice had decreased MYC expression compared to wildtype, suggesting that the expression of this oncogene is regulated by CD19 in these cells. They also showed that CD19 was regulating MYC expression through the PI3K-Akt-GSK3 pathway. As a proof of concept in vivo, the group showed that increasing CD19 expression in a tumor cell line increased tumor area when the cells were implanted in SCID mice as compared to wild type. Importantly, upon retrospective analysis of a cohort of Burkitt's and B-cell lymphoma patients separated into CD19 low and high expressing patients, the CD19 low group showed a markedly improved survival as compared to the CD19 high group. Thus, inhibition of CD19 specifically in B-cell lymphomas could provide an effective treatment with less side effects than chemotherapy and radiation.

Application area

- Treatment of B-cell neoplasms, such as lymphoma or acute lymphoblastic leukemia

Advantages

- Specifically targets B-cells
- Decreased side effects compared to radiation and chemotherapy

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