TRIM8

Glioblastoma (GBM) is the most malignant form of primary brain tumor and glioblastoma stem cells (GSCs) contribute to the rapid growth, therapeutic resistance and clinical recurrence of these fatal tumors. STAT3 signaling supports the maintenance and proliferation of glioblastoma stem cells (GSCs), yet regulatory mechanisms are not completely understood.

Zhang et al., report that tri-partite motif containing protein 8 (TRIM8) activates STAT3 signaling to maintain stemness and self-renewing capabilities of GSCs. TRIM8 (also known as “glioblastoma expressed ring finger protein”) is expressed equally in GBM and normal brain tissues, despite its hemizygous deletion in the large majority of GBMs, and its expression is highly correlated with stem cell markers. Experimental knockdown of TRIM8 reduced GSC self-renewal and expression of SOX2, NESTIN and p-STAT3, and promoted glial differentiation. Overexpression of TRIM8 led to higher expression of p-STAT3, c-MYC, SOX2, NESTIN and CD133, and enhanced GSC self-renewal.

Zhang et al., found that TRIM8 activates STAT3 by suppressing the expression of PIAS3, an inhibitor of STAT3, most likely through E3-mediatiated ubiquitination and proteasomal degradation. Interestingly, they also found that STAT3 activation upregulates TRIM8, providing a mechanism for normalized TRIM8 expression in the setting of hemizygous gene deletion. These data demonstrate that bidirectional TRIM8-STAT3 signaling regulates stemness in GSC [1].

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Zhang C, Mukherjee S, Tucker-Burden C, Ross JL, Chau MJ, Kong J, Brat DJ. TRIM8 regulates stemness in glioblastoma through PIAS3-STAT3. Mol Oncol. 2017 Jan 18. doi: 10.1002/1878-0261.12034. [Epub ahead of print] PubMed PMID: 28100038.