Musashi-1

RNA-binding protein Musashi homolog 1 also known as Musashi-1 is a protein that in humans is encoded by the MSI1 gene.

MSI1 is highly expressed in neural progenitor cells and is required for normal development of the brain. A mutation in these gene is responsible for autosomal recessive primary microcephaly. MSI1 also interacts with the Zika virus genome and may explain why these cells are highly susceptible to Zika virus infection

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Musashi-1 (MSI1), a neural RNA-binding protein (RBP), regulates Glioblastoma motility and invasion, maintains stem cell populations in Glioblastoma, and promotes drug-resistant Glioblastoma phenotypes by stimulating necessary oncogenic signaling pathways through binding and regulating mRNA stability. Importantly, these necessary oncogenic signaling pathways have a close connection with TGF-β, ECM, and Akt. Thus, it appears promising to find MSI-specific inhibitors or RNA interference-based treatments to prevent the actions of these molecules despite using RBPs, which are known as hard therapeutic targets. [1)].

Yang et al. aimed to investigate the molecular interplay between MSI1 and tumor-associated macrophage (TAMs) in contributing to Glioblastoma tumorigenesis. Data revealed that the secretion of macrophage inhibitory factor 1 (MIF1) is significantly upregulated by MSI1 overexpression in vitro. Importantly, M2 surface markers of THP-1-derived macrophages were induced by recombinant MIF1 and reduced by using MIF1 inhibitor (S,R)-3-(4-hHydroxyphenyl)-4,5-dihydro-5-isoxazole acetic acid (ISO-1). Furthermore, Glioblastoma tumor model data suggested that the tumor growth, MIF1 expression and M2 macrophage population were significantly downregulated when MSI1 expression was silenced in vivo. Collectively, this findings identified a novel role of MSI1 in the secretion of MIF1 and the consequent polarization of macrophages into the M2 phenotype in promoting Glioblastoma tumor progression [2)].

Yarmishyn et al. investigated the expression of five YTH family proteins in different Glioblastoma microarray datasets from the Oncomine database, and identified YTHDF1 as the most highly overexpressed member of this family in Glioblastoma. By performing the knockdown of YTHDF1 in a Glioblastoma cell line, we found that it positively regulates proliferation, chemoresistance and cancer stem cell-like properties. Musashi-1 (MSI1) is a postranscriptional gene expression regulator associated with high oncogenicity in Glioblastoma. By knocking down and overexpressing MSI1, we found that it positively regulates YTHDF1 expression. The inhibitory effects imposed on the processes of proliferation and migration by YTHDF1 knockdown were shown to be partially rescued by concomitant overexpression of MSI1. MSI1 and YTHDF1 were shown to be positively correlated in clinical glioma samples, and their concomitant upregulation was associated with decreased survival of glioma patients. We identified the direct regulation of YTHDF1 by MSI1 [3)].

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2)
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