USP22

USP22 is a member of “death-from-cancer” signature, which plays a key role in cancer progression. Although previous evidence has shown that USP22 is overexpressed and correlated with poor prognosis in glioma. The effect and mechanism of USP22 in glioma malignancy especially cancer stemness remain elusive.

Qiu et al., find USP22 is more enriched in stem-like tumorspheres than differentiated glioma cells. USP22 knockdown inhibits cancer stemness in glioma cell lines. With a cell-penetrating TAT-tag protein, BMI1, a robust glioma stem-cell marker, is found to mediate the effect of USP22 on glioma stemness. By immunofluorescence, USP22 and BMI1 are found to share similar intranuclear expression in glioma cells. By analysis with immunohistochemistry and bioinformatics, USP22 is found to positively correlated with BMI1 only in the post-translational level rather than transcriptional level. By immunoprecipitation and in vivo deubiquitination assay, USP22 is found to interact with and deubiquitinate BMI1 for protein stabilization. Microarray analysis reveals that USP22 and BMI1 mutually regulate a series of genes involved in glioma stemness such as POSTN, HEY2, PDGFRA and ATF3. In vivo study with nude mice confirms the role of USP22 in promoting glioma tumorigenesis by regulating BMI1. All these findings indicate USP22 as a novel deubiquitinase of BMI1 in glioma. We propose a working model of USP22-BMI1 axis, which promotes glioma stemness and tumorigenesis through oncogenic activation. Thus, targeting USP22 might be an effective strategy to treat glioma especially those with elevated BMI1 expression [1)].

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Qiu GZ, Mao XY, Ma Y, Gao XC, Wang Z, Jin MZ, Sun W, Zou YX, Lin J, Fu HL, Jin WL. USP22 acts as an oncoprotein to maintain glioma malignancy through deubiquitinating BMI1 for stabilization. Cancer Sci. 2018 May 22. doi: 10.1111/cas.13646. [Epub ahead of print] PubMed PMID: 29788550.