

Presenting Author Name

Sheikh Faisal Asadullah Mahdi

Phonetic spelling of your (full) name

Shek Foy-sal As-sa-dul-lah Mah-di

Presenting Author Category

Masters Student

Supervisor Name

Eric Hall

Research Category

Clinical

Abstract Title

Cytoneme-Mediated Morphogen Transport Drives Diffuse Midline Glioma of the Pons

Authors

Name	Role	Profession
Sheikh Faisal Asadullah Mahdi	Presenting Author	Graduate Student
Shakila Sultana	Co Author	Lab technician
Magimairajan Issai Vanan	Co Author	Pediatric Neuro-Oncologist
Eric Hall	Co Author	Assistant Professor

Background

Diffuse midline glioma of the pons (DMG-P) is an aggressive pediatric brain tumor with a five-year survival rate of less than 1%. Because of its location in the brainstem, surgical resection is not possible, and treatment is limited by the tumor's ability to maintain an intact blood–brain barrier (BBB), which restricts drug delivery. Sonic hedgehog (SHH) produced by DMG-P cells may promote BBB integrity and contribute to therapeutic resistance, but the mechanism of SHH transfer between tumor cells and the BBB is not well understood. Cytonemes are long, specialized filopodia that mediate morphogen signaling during development and we think may play a role in DMG-p.

Objective

We hypothesize that cytonemes mediate intercellular communication between DMG-P brain cancer cells and the surrounding blood-brain barrier stromal microenvironment, promoting tumor growth, and resistance to therapy.

Methods

Using advanced imaging and specialized fixation protocols, we visualize and quantify cytonemes and

morphogen presence in cytonemes in multiple pediatric brain cancer cell lines, including DMG-P cells (SF8628, SF7761) and BBB endothelial cells (hCMEC/D3). To investigate cytoneme function, CRISPR/Cas9-mediated knockout of Myo10, an essential cytoneme gene, and treatment with the ML141 will be used to disrupt cytoneme formation. The functional impact of cytoneme disruption will be assessed in co-culture and transwell assays by measuring SHH signaling activation in BBB cells

Results

We have identified cytonemes in multiple pediatric brain cancer cell lines, including DMG-P cells and BBB cells. We also detected SHH trafficking along DMG-P cytonemes toward nearby cells. In addition, ML141 effectively reduced cytoneme formation in DMG-P cells and decreased SHH signaling. These findings establish a foundation for further experiments to define the role of cytonemes in tumor–BBB communication

Conclusion

By determining whether cytonemes facilitate tumor microenvironment communication and BBB maintenance, this work may identify cytonemes as a novel therapeutic target in DMG-P and other pediatric brain tumors.