CANCER PREVENTION & RESEARCH INSTITUTE OF TEXAS

Award ID:
RP160192

Project Title:
Decoding Cellular Heterogeneity of Malignant Glioma

Award Mechanism:
Individual Investigator

Principal Investigator:
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Entity:
Baylor College of Medicine

Lay Summary:

Malignant glioma is the most prevalent form of adult brain cancer, responsible for approximately 12,000 deaths/year, and is exceedingly difficult to manage with an average five-year progression-free survival of <5%. One feature that makes malignant glioma difficult to treat is the extraordinary cellular heterogeneity of the primary tumor mass. This extreme heterogeneity is compounded by the fact that the identities and properties of the diverse cell populations remain undefined. This lack of basic understanding of the cellular constituency of malignant glioma is a major hurdle in the development of new treatments for this mysterious, enigmatic, and deadly disease. Therefore, the goal of this study is to define the cellular constituency of malignant glioma and understand how these diverse populations promote tumorigenesis. To address this key question, we developed a novel mouse model that generates malignant gliomas in early post-natal mice, making it an ideal entry point in which to identify the diverse cell populations in malignant glioma. Combining this model with cell sorting technologies, we sub-divided our mouse gliomas into five distinct subpopulations. Cross comparison with multiple primary human glioma cell lines also revealed the presence of these subpopulations, indicating that these diverse populations are also present in human malignant glioma. To define the contributions of these novel sub-populations towards tumorigenesis and their relationship with key developmental regulators, we will comprehensively characterize their molecular, cellular, and developmental properties in our mouse and human glioma models. These studies will comprehensively define the cellular and functional heterogeneity of diverse cell populations in malignant glioma, paving the way for the generation of therapeutics that manipulates these critical populations.