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Development of novel glioma stem cell-directed chemotherapy

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Malignant glioma remains one of the most devastating diseases despite recent advances in the current therapies. Emerging evidence has indicated that brain tumor stem cells (BTSC) are likely the specific target of therapy and their elimination may result in the growth arrest of the entire tumor mass. The current therapies, however, preferentially target non-stem tumor cells. To discovery the prospective compounds from a large number of candidates efficiently, we developed here the screening system for Brain Tumor Stem Cell-targeting chemotherapeutic agents. This system functions as a rational agent-prioritization process essential for future progress in developing effective novel cancer treatments.

We use our surgical specimens of malignant glioma, and several neural progenitor cultures derived from human fetal brains. Cultured tumor cells are enriched with clonogenic and multipotent stem-like tumor cells, and possess tumorigenic potential when implanted into immunodeficient mouse brains. To assess the effect of compounds, the initial step is to use in vitro clonogenic assay and cell survival and migration assays. Following these initial assays, potential compounds are then processed to the in vivo efficiency assays using BTSC-derived mouse brain tumor model. In this presentation, we describe the strengths and limitations of each of our assays and also our data with the leading compounds from the previous screening.

Considering the shortcomings of current therapies for malignant glioma with abstruse underlying mechanisms, it is crucial to identify the drugs directly targeting the culprit cells. Cell based screening system mentioned herewith provides means of identifying compounds directly targeting BTSC.

Biography

Dr. Ichiro Nakano has completed his residency in Neurosurgery and obtained a Ph.D in Neuroscience in Kyoto University Graduate School of Medicien. He then completed postdoctoral training at University of California, Los Angeles. Currently, Dr. Nakano is a clinically-active neurosurgeon at the Ohio State University and the director of the Neural Cancer Stem Cell Program. His lab focuses on therapy development for malignant glioma. He has published more than 20 papers in peer-reviewed journals and holds two patents in the field of neural stem cells and brain tumor stem cells.