Take up of Boronophenylalanine by glioma stem like cells in vitro and vivo

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Introduction; Because glioma stem cells are chemo- and radio-resistant, they could be the origins of recurrent malignant glioma. Boron neutron capture therapy (BNCT) is a tumor-selective particle radiation therapy. $^{10}B(n,\alpha)^{7}Li$ capture reaction produces alpha particles whose short paths (5–9 μm) lead to selective killing of tumor cells. P-boronophenylalanine (BPA) is a chemical compound used in clinical trials for BNCT. We investigate whether glioma stem like cells (GSLCs) take up BPA or not *in vitro* and *in vivo*.

Materials and Method; We used patient-derived GSLCs, and cells differentiated from GSLCs by fetal bovine serum. After exposure to BPA for 24 hours at 25 ppm in 5% CO2 incubator, we immune-stained them with twenty stem-cell markers, two differentiated markers (Glial Fibrillary Acidic Protein (GFAP) and Neuron-specific beta-III Tubulin), anti-Ki-67, anti-BPA and anti-CD98 (heterodimer that forms the large BPA transporter) antibody and analyzed them with mass cytometry (Cytof). Next, we generated a mouse brain tumor model by transplantation of GSLCs into the brain of nude mice. For Immunohistochemistry, frozen tissue was sectioned onto slide glasses and immune-stained with anti-Sox2 antibody as a stem-cell marker, anti-LAT1 antibody and BPA antibody for BPA uptake and anti-GFAP antibody.

Results; The percentage of BPA+ or CD98+ cells with stem-cell markers (Oct3/4, Nestin, Sox2, Musashi-1, PDGFRα, Notch2, Nanog, Stat3 or C-myc) was 2–4 times larger among GSLCs than among differentiated cells in *in vitro* study. Immunohistochemistry is still in progress.

Conclusion; GSLCs may take up BPA and could be targeted by BNCT.