

Figure S1. Expression levels of VEGF-Areceptors in GB. (A and B) Transcriptional levels of *Flt-1* and *Flk-1* in various grades of brain tumors analyzed using the Gene Expression Omnibus database (G indicates the tumor grade, n=3; Tukey's post hoc test was applied to significant group effects in ANOVA,  $P < 0.0001$ ; P-value evaluated with Student's t-test according to G2 vs. G3 and G3 vs. G4; \* $P < 0.05$ , \*\* $P < 0.01$  and \*\*\* $P < 0.001$ , G2; n=24, G3; n=85, G4; n=159). VEGF, vascular endothelial growth factor; GB, glioblastoma; Flt-1, FMS related receptor tyrosine kinase 1; Flk-1, fetal liver kinase 1; n.s., not significant.

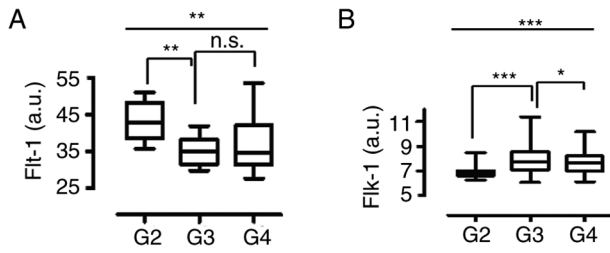


Figure S2. Intracellular signaling of VEGF-A-resistant GB. (A) LN215-MG cells incubated with SU1498 (10  $\mu$ mole/l) for varying time-points, after which the cell lysates were subjected to western blot analysis using antibodies specific for total phosphotyrosine kinase, 4G10. (B) LN215-MG cells incubated with SU1498 (10  $\mu$ mole/l) for varying time-points, after which the cell lysates were subjected to western blot analysis using antibodies specific for p-Flt-1 (Y1213), total Flt-1, p-Flk-1 (Y951), total Flk-1, p-FAK (Y397), total FAK, p-AKT (S473), total AKT, and GAPDH. Data is representative of three individual experiments. VEGF-A, vascular endothelial growth factor-A; GB, glioblastoma; p-, phosphorylated; Flt-1, FMS related receptor tyrosine kinase 1; Flk-1, fetal liver kinase 1.

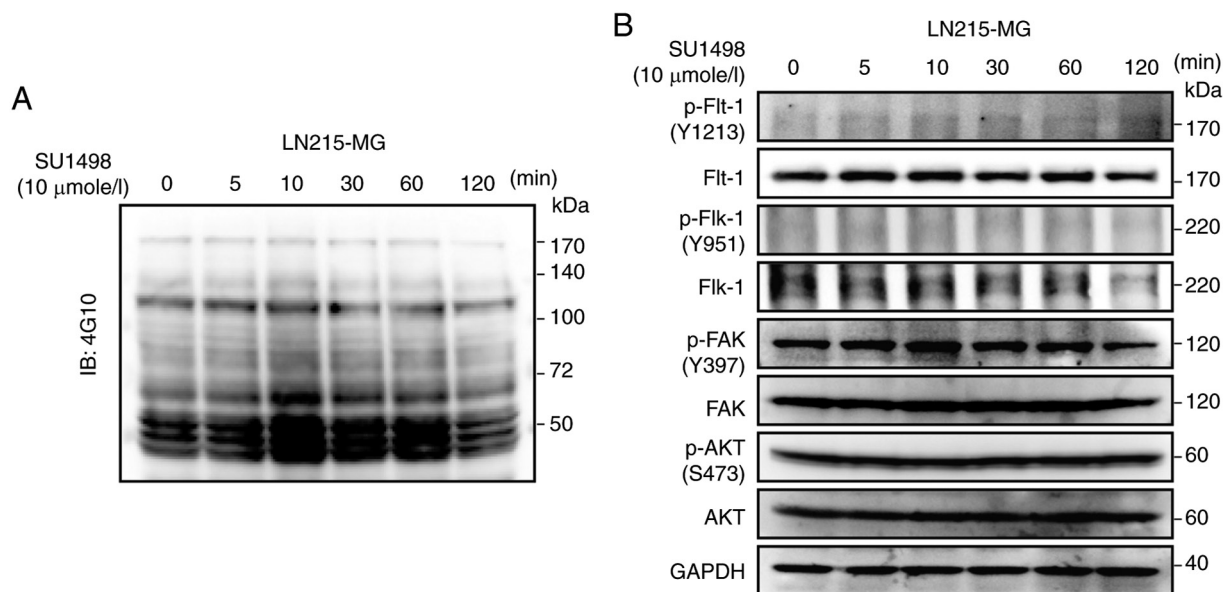


Figure S3. Association between chondroitin sulfate expression and overall survival in patients with GB. Survival analysis of 19 patients with GB performed by integrating the clinical data of patients with chondroitin sulfate expression levels; the results showed no statistical difference between the low- and high-expression groups ( $P < 0.53$ ). GB, glioblastoma.

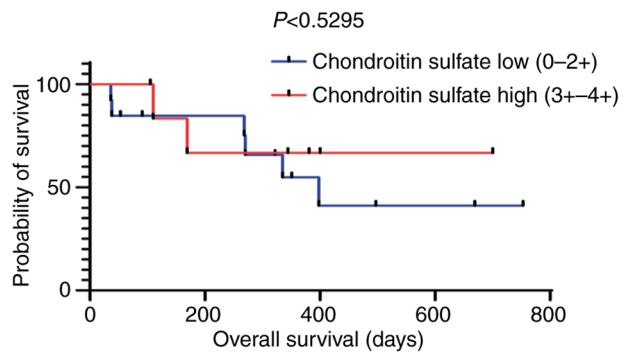


Figure S4. Soluble NRP-1 levels in cultured supernatants of GB cells. (A) Soluble wild-type or chondroitin sulfated NRP-1 analyzed by precipitation using 100% pre-chilled acetone or (B) anti-NRP-1 antibody in the cultured supernatants of U251-MG and LN215-MG GB cells. GAPDH was used as a control. (C) Concentrations of soluble wild-type or chondroitin sulfated NRP-1 in the cultured supernatants of U251-MG and LN215-MG cells measured by ELISAs using anti-soluble NRP-1 polyclonal antibody and (D) anti-chondroitin sulfate polyclonal antibody. (E) Soluble wild-type or chondroitin sulfated NRP-1 assessed by ELISA in the cultured supernatants of SNU-626, U251-MG, U373-MG, CRT-MG, LN215-MG, and SNU-466 cells. NRP-1, neuropilin-1; GB, glioblastoma; ELISA, enzyme-linked immunosorbent assay; IP, immunoprecipitation; a.u., arbitrary units.

