GENO-37. MOLECULAR PROFILING OF LONG-TERM SURVIVORS OF GLIOBLASTOMA
Ryan Youland1, Dioval Remonde1, Alissa Caron1, Ann Mladek1, Paul Decker1, 
Hughes Sicotte1, Daniel Lachance1, Benjamin Kipp1, Jeanette Eckel-Passow1, 
Jason Huse2, Caterina Giannini1, Robert Jenkins1, and Jann Sarkaria1; 1Mayo Clinic, Rochester, MN, USA; 2Memorial Sloan-Kettering Cancer Center, New York, NY, USA

Few patients with glioblastoma survive beyond 5 years. In this project, the molecular features associated with these exceptional long term survivors (LTS) were evaluated. Patients diagnosed with glioblastoma within the past 30 years surviving >= 5 years were identified from the Mayo tumor registry. Of 1176 patients with glioblastoma in the registry, 40 were LTS (median age 50.4 years; median survival 7.8 years). Pathology was reviewed and diagnosis confirmed by a certified neuropathologist (CG). Histology was fibrillary in 30 (75%) patients. Most (23, 58%) tumors were located in the frontal lobes. Gross total resection was achieved in 26 (65%). Adjuvant radiotherapy was delivered in 35 (>= 60 Gy in 31). Temozolomide was given in 20 (50%) and BCNU in 12 (30%). In the 22 patients with tissue available for analysis (median age 49.2 years; median survival 7.0 years), TCGA molecular subtype breakdown from RNA extracts analyzed by Nanostring was: proneural 11, neural 0, classical 6, mesenchymal 2, and unknown 3 (insufficient RNA). Next-generation sequencing revealed the following mutations: 12 TERT, 12 ATRX, 12 TP53, 10 IDH, 8 PIK3CA/PIK3R1, 8 PTEN, 4 RB1, and 3 EGFR. 1p19q codeletion (determined via OncoScan assay), TERT, and IDH mutations were used to stratify patients into risk categories: 9 TERT-mutation only, 8 IDH-mutation only, 2 triple positive, and 3 triple negative. The frequency of IDH mutation in LTS (8/22) was significantly higher than observed in a contemporaneous cohort of short-surviving glioblastoma (32/470, p < 0.0001). All IDH mutations were in TCGA proneural patients. Long-term glioblastoma survival is enriched for patients with IDH-mutation only gliomas, although approximately half of tumors have molecular features associated with a more typical aggressive clinical course. Future studies are focused on understanding the mechanisms associated with prolonged survival in the TERT-mutation only tumors.