Unlike in Classical tumors, TP53 is significantly mutated in Proneural tumors (54 percent). Proneural tumors are also characterized by having the most frequent mutations in the IDH1 gene. IDH1, when mutated, codes for a protein that can contribute to abnormal cell growth. Another gene, PDGFRA, was mutated and expressed in abnormally high amounts only in the Proneural tumors and not in any other subgroups. When PDGFRA is altered, too much of its protein can be produced, leading to uncontrolled tumor growth. Unlike the other groups, whose patients were similar in age on average, the Proneural subgroup was significantly younger. They also tended to survive longer. However, patients in the Proneural group who received aggressive treatment did not survive significantly longer than Proneural patients who did not receive aggressive treatment. Clinicians may be able to use this information in the future to avoid unnecessary treatment regimens for patients in the Proneural subgroups.

The Mesenchymal subgroup contains the most frequent number of mutations in the NF1 tumor suppressor gene (37 percent). Frequent mutations in the PTEN and TP53 tumor suppressor genes also occurred in the group. Patients in the Mesenchymal group had significant increases in survival after aggressive treatment, unlike those in the Proneural, and to an extent, in the Neural subgroups.

see Proneural glioblastoma.