## Machine Learning Prediction Report

### Glioma IDH Classification

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| **Patient ID:** | UCSF-PDGM-0535 | **Patient Age:** | 19.0 |
| **Report Date:** | 2025-11-13 18:16:23 | **Model Used:** | GradientBoosting |

# Final Prediction: IDH-mutant

### Clinical Interpretation

Explanation:

The model predicted this patient to be IDH-mutant Several features influenced this prediction:

**The patient's young age (19 years) strongly decreased the prediction score;** IDH-mutant glioblastomas are characterized as secondary tumors that show evidence of progression from lower-grade tumors, a profile which contrasts with primary glioblastomas that present as advanced cancers at diagnosis [4]. **High tumor sphericity (0.8193) contributed negatively to the prediction;** a more spherical shape is associated with a lower surface area, a feature linked to a lower-risk prognostic score in glioblastoma, which aligns with the more favorable prognosis typically seen in IDH-mutant cases [4]. **A low surface-to-volume ratio (0.1621) also decreased the score;** this characteristic similarly reflects a more compact and less irregular tumor morphology, which is associated with a lower-risk radiomic signature for progression [4].

References: [1] Protein alterations associated with temozolomide resistance in subclones of human glioblastoma cell lines - Sun S [2] Notch intracellular domain regulates glioblastoma proliferation through the Notch1 signaling pathway - Wang Y [3] The PARP inhibitor ABT-888 potentiates dacarbazine-induced cell death in carcinoids - Somnay Y [4] Prediction of Prognosis in Glioblastoma Using Radiomics Features of Dynamic Contrast-Enhanced MRI - Pak E [5] Effect of Cumulative Dexamethasone Dose during Concomitant Chemoradiation on Lymphopenia in Patients with Newly Diagnosed Glioblastoma - Lee C

### Prediction Explanation (SHAP Analysis)

The following plot shows the features that contributed most to the model's prediction for this patient. Features pushing the prediction higher (towards IDH-wildtype) are in red, and those pushing it lower (towards IDH-mutant) are in blue.