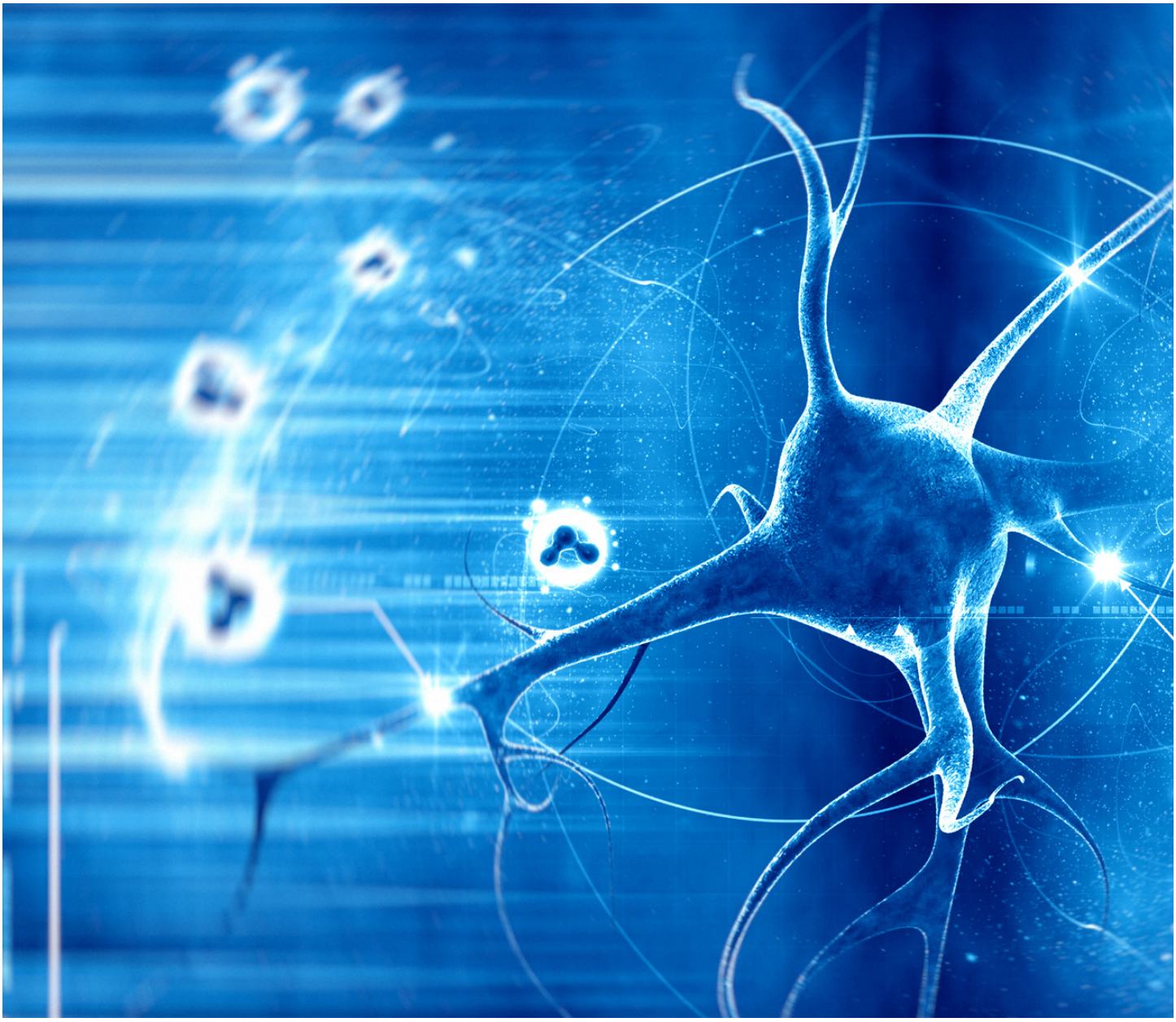
MAYO CLINIC
LABORATORIES

NEURO-ONCOLOGY

SUPPORTING PATIENT CARE THROUGH COMPREHENSIVE MOLECULAR AND CYTOGENETIC TESTING



DIAGNOSIS, PROGNOSIS, AND THERAPY SELECTION FOR NEURO-ONCOLOGY

At Mayo Clinic, we offer a comprehensive approach to testing that focuses on the best outcomes for the patient. Our testing method combines molecular and cytogenetic analysis (in addition to a standard morphological and histological assessment) to provide a clear picture of the diagnosis, prognosis, and treatment options. This approach maximizes the amount of information available, allowing for a tailored treatment plan.

COMPREHENSIVE TESTING

By performing immunohistochemical, molecular, and cytogenetic analysis on all patients, our testing approach provides a more complete assessment of the patient's diagnosis, prognosis, and therapy options.

EXPERT INTERPRETATION

Your results are interpreted by physicians with training and expertise in neuro-oncology. Each report integrates patient information along with supporting literature references to provide a patient-specific context and a better understanding of how the lab results impact patient care.

CLEAR PROGNOSIS

Prognosis is a key piece of information for patients with brain tumors. Some molecular markers are associated with patient prognosis, which can shape treatment decisions and timelines for therapy.

TREATMENT OPTIONS

In order to select the most appropriate treatment options, including standard therapies, off-label therapies, and clinical trials, broad molecular and cytogenetic information is needed for all patients.

NEUROPATHOLOGY CONSULTATIONS

(MAYO ID: PATHC)

Brain tumors are complex and relatively rare. For many pathologists and community hospitals, less than 5% of their surgical pathology cases include patients with brain tumors. Our consultations provide pathologists access to the expertise of Mayo Clinic neuropathologists, who can help guide the choice of the most appropriate molecular and cytogenetic testing. Further, our neuropathologists can help integrate the laboratory results with clinical and histopathological information, providing a comprehensive report with diagnostic, prognostic, and therapeutic information specific to the patient.

With more than 2,000 neuropathology consultations performed each year, Mayo Clinic offers the experience and expertise to assist with even the most complex and rare cases.

COMPREHENSIVE MOLECULAR AND CYTOGENETIC ANALYSIS: A SUMMARY OF FINDINGS AT MAYO CLINIC

Mayo Clinic is recognized worldwide for providing care for complex diseases including brain tumors. With rapid discovery and advancements in technology, the standard approach to genetic testing in these patients is evolving. In a clinical study of glioma patients, broad molecular and cytogenetic analysis on every patient has resulted in significant, and sometimes unexpected, patient impact. In a random sampling of consecutive glioma cases seen at Mayo Clinic, our data shows that nearly half of all patients tested will have results with diagnostic or actionable findings; findings that could not be obtained nor predicted by pathology alone.

45%
Broad genetic analysis resulted in clinically significant findings in an additional 45% of patients when compared to standard pathology alone.

30%
In 30% of cases, the genetic results were needed to confirm or clarify pathology

10%
In 10% of cases, genetic testing revealed a novel diagnostic or actionable alteration

20%
In 20% of cases, genetic testing uncovered co-deletion of 1p/19q

10%
In 10% of cases, genetic findings changed the tumor grade or diagnosis indicated by pathology

NEURO-ONCOLOGY EXPANDED PANEL WITH REARRANGEMENTS, TUMOR
(MAYO ID: NONCP)

Our next-generation sequencing panel evaluates mutations and rearrangements in 219 genes, including all abnormalities described for both adult and pediatric brain tumors by the World Health Organization 2016 classifications. NONCP includes assessment of mutations in 150 genes and rearrangements in 81 genes, including 104 fusions and 29 transcript variants.

CHROMOSOMAL MICROARRAY, TUMOR, FORMALIN-FIXED PARAFFIN-EMBEDDED
(MAYO ID: CMAPT)

Chromosomal microarray provides high-resolution assessment of copy number variations across the genome, including superior analysis of the 1p/19q deletion in gliomas. Copy-number variations can also further clarify or support diagnosis and provide information useful for therapy selection.

MGMT PROMOTER METHYLATION, TUMOR
(MAYO ID: MGMT)

MGMT promoter methylation status has prognostic value for glioblastoma patients and can assist in predicting response to therapy.

NEURO-ONCOLOGY EXPANDED PANEL WITH REARRANGEMENT, TUMOR (MAYO ID: NONCP)

DNA MUTATION PANEL (150 GENES)									
ACAN	*ACVR1*	*AKT1*	*AKT2*	*AKT3*	*AOX1*	*APC*	*ARID1A*	*ARID2*	*ATM*
ATRX	*BAP1*	*BCOR*	*BCORL1*	*BRAF*	*CACNG6**	*CBL*	*CDK6*	*CDKN2A*	*CDKN2B*
CDKN2C	*CHEK2*	*CIC*	*COL6A3*	*CREBZF*	*CSNK2B*	*CTDNEP1*	*CTNNB1*	*DAXX*	*DDX3X*
DNMT3A	*EEF1A1*	*EGFR*	*EZH2*	*F5*	*FGFR1*	*FGFR2*	*FGFR3*	*FUBP1*	*GABRA6*
GLI2	*GLI3*	*GNA11*	*GNAQ*	*GNAS*	*GPS2*	*H3F3A*	*HDAC2*	*HDAC9*	*HIST1H3B*
HIST1H3C	*HMCN1*	*IDH1*	*IDH2*	*IL4R*	*JAK2*	*KDM4D*	*KDM5A*	*KDM5B*	*KDM5C*
KDM6A	*KDM6B*	*KEL*	*KLF4*	*KMT2B*	*KMT2C*	*KMT2D*	*KRAS*	*LAMA4*	*LDB1*
LRP1B	*LZTR1*	*MAP2K1*	*MDM2*	*MLH1*	*MSH2*	*MSH3*	*MSH6*	*MUC17*	*MYB*
MYBL1	*MYC*	*MYCN*	*NF1*	*NF2*	*NIPBL*	*NOTCH1*	*NOTCH2*	*NRAS*	*NUP210L*
OTX2	*PARP1*	*PDGFRA*	*PIK3C2B*	*PIK3C2G*	*PIK3CA*	*PIK3R1*	*PIK3R2*	*PLCG1*	*PMS1*
POLE	*POLR2A*	*POT1*	*PPM1D*	*PRKAR1A*	*PTCH1*	*PTCH2*	*PTEN*	*PTPN11*	*PTPRD*
QKI	*RAF1*	*RB1*	*RELA*	*RPL5*	*SDHA*	*SDHB*	*SDHC*	*SDHD*	*SEMG1*
SETD2	*SHH*	*SHOC2*	*SMARCA4*	*SMARCB1*	*SMARCE1*	*SMO*	*SNCAIP*	*SOS1*	*STAG2*
STAT3	*SUFU*	*TCF12*	*TEP1*	*TERF1*	*TERT***	*TET1*	*TET2*	*TP53*	*TPTE2*
TRAF7	*TRIM28**	*TRPA1*	*TSC1*	*TSC2*	*WRN*	*WT1*	*YAP1*	*ZBTB20*	*ZMYM3*
RNA FUSION PANEL (81 GENES)									
AFAP1	*AGBL4*	*ATG7*	*BCAN*	*BEND2*	*BIRC5*	*BRAF*	*BTBD1*	*C11orf95*	*C8orf34*
CLCN6	*CLIP2*	*CXXC5*	*DDX31*	*DIP2C*	*EGFR*	*ELAVL3*	*ESR1*	*ETV6*	*EWSR1*
FAM118B	*FAM131B*	*FGFR1*	*FGFR3*	*FLI1*	*FOXR2*	*FXR1*	*FYCO1*	*GFI1*	*GFI1B*
GLI1	*GNAI1*	*JPX*	*KIAA1549*	*LOC550643*	*MACF1*	*MAMLD1*	*MET*	*MKRN1*	*MMP16*
MN1	*MST1R*	*MYB*	*MYBL1*	*MYC*	*NAB2*	*NACC2*	*NAV1*	*NDRG1*	*NELFE*
NFASC	*NRF1*	*NTRK1*	*NTRK2*	*NTRK3*	*PCDHGA1*	*PCSK5*	*PDGFRA*	*PKD1*	*PRKCA*
PTPRZ1	*PVT1*	*QKI*	*RAF1*	*RECK*	*RELA*	*RNF130*	*SEPT14*	*SLC44A1*	*SLIT1*
SRGAP3	*ST6GAL1*	*STAT6*	*TACC1*	*TACC3*	*TFG*	*TPM3*	*UBE2J2*	*VCL*	*WHSC1*
YAP1									

* Promoter only
** With promoter

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