

Chromosome 19

The molecular hallmark feature of [oligodendroglioma](#) is [codeletion](#) of the short arm of [chromosome 1](#) (1p) and the long arm of [chromosome 19](#) (19q) ¹⁾.

Complete [deletion](#) of both the short arm of [chromosome 1](#) (1p) and the long arm of [chromosome 19](#) (19q) is pathognomonic for [oligodendroglioma](#) ^{2) 3)} It is strongly associated with [IDH mutation](#) and is mutually exclusive of [ATRX](#) & [TP53 mutations](#).

The following are some of the genes located on chromosome 19:

A1BG: encoding protein Alpha-1-B glycoprotein

ACSBG2: encoding enzyme Long-chain-fatty-acid—CoA ligase

ANKRD24: encoding protein Ankyrin repeat domain-containing protein 24

ARMC6: encoding protein Armadillo repeat-containing protein 6

ATG4D: encoding protein Autophagy related 4D, cysteine peptidase

ATP5SL: encoding protein ATP synthase subunit s-like protein

ATPase ASNA1: encoding enzyme ATPase ASNA1 also known as arsenical pump-driving ATPase and arsenite-stimulated ATPase

BTBD14B: encoding protein Nucleus accumbens-associated protein 1

CACTIN: encoding protein Cactin

CCDC130: encoding protein Coiled-coil domain containing 130

CCDC151: encoding protein Coiled-coil domain containing 151

CCDC8: encoding protein Coiled-coil domain containing 8

CCDC94: encoding protein Coiled-coil domain containing 94 (CCDC94),

DNASE2: encoding protein Deoxyribonuclease II, lysosomal

EID2:

ETV2: encoding protein Ets variant 2

HCST: encoding protein Hematopoietic cell signal transducer

HRC: encoding protein Sarcoplasmic reticulum histidine-rich calcium-binding protein

IFI30: encoding enzyme Gamma-interferon-inducible lysosomal thiol reductase

IGFL3: encoding protein IGF like family member 3

KRTDAP: encoding protein Keratinocyte differentiation-associated protein

LIM2: encoding protein Lens fiber membrane intrinsic protein

LRG1: encoding protein Leucine-rich alpha-2-glycoprotein 1

LSM4: encoding protein U6 snRNA-associated Sm-like protein LSM4

LSR: encoding protein Lipolysis-stimulated lipoprotein receptor

LYPD5: encoding protein LY6/PLAUR domain containing 5

MB0AT7: encoding enzyme Lysophospholipid acyltransferase 7

MOBK2A: encoding enzyme Mps one binder kinase activator-like 2A
MZF1-AS1: encoding protein MZF1 antisense RNA 1
NCLN: encoding protein Nicalin
NFKBID: encoding protein Nuclear factor of kappa light polypeptide gene enhancer in B-cells inhibitor
NOSIP: encoding enzyme Nitric oxide synthase-interacting protein
NWD1: NACHT and WD repeat domain containing 1.
OLFM2: encoding protein Olfactomedin 2
OSCAR: encoding protein Osteoclast-associated immunoglobulin-like receptor
PALM: encoding protein Paralemmin
PDCD5: encoding protein Programmed cell death protein 5
PLIN4: encoding protein Perilipin 4
PEX11G: peroxisomal biogenesis factor 11 gamma
PLVAP: encoding protein Plasmalemma vesicle-associated protein
PRR12: encoding protein Proline-rich 12
KLK3: The Prostate-specific antigen (PSA)
PRX: Periaxin
PTOV1: encoding protein Prostate tumor overexpressed gene 1 protein
SBN02: encoding protein Strawberry notch homolog 2 (Drosophila)
SEPW1: encoding protein Selenoprotein W
SFRS14: encoding protein Putative splicing factor, arginine/serine-rich 14
SFRS16: encoding protein Splicing factor, arginine/serine-rich 16
SLC5A5: Solute carrier family 5 (sodium iodide symporter), member 5
STK11: Serine/threonine kinase 11 (Peutz-Jeghers syndrome)
TBCB: encoding protein Tubulin-folding cofactor B
TECR: encoding enzyme Trans-2,3-enoyl-CoA reductase
THOP1: encoding enzyme Thimet oligopeptidase
TIMM50: encoding enzyme Mitochondrial import inner membrane translocase subunit TIM50
TIP39: encoding protein Tuberoinfundibular peptide of 39 residues
TMED1: encoding protein Transmembrane emp24 domain-containing protein 1
TMEM160: encoding protein Transmembrane protein 160
TMEM205: encoding protein Transmembrane Protein 205
UBXN6: encoding protein UBX domain protein 6
UCA1: a long non-coding RNA Urothelial cancer associated 1
UPK1A: encoding protein Uroplakin-1a
USE1: encoding protein Uncharacterized hematopoietic stem/progenitor cells protein MDS032
Zfp82 zinc finger protein: encoding protein ZFP82 zinc finger protein
ZSCAN18: encoding protein Zinc finger and SCAN domain containing 18
ZNF112: encoding protein Zinc finger protein 112
ZNF134: encoding protein Zinc finger protein 134
ZNF160: encoding protein Zinc finger protein 160
ZNF180: encoding protein Zinc finger protein 180
ZNF208: encoding protein Zinc finger protein 208
ZNF224: encoding protein Zinc finger protein 224
ZNF225: encoding protein Zinc finger protein 225
ZNF226: encoding protein Zinc finger protein 226
ZNF229: encoding protein Zinc finger protein 229
ZNF257: encoding protein Zinc finger protein 257
ZNF264: encoding protein Zinc finger protein 264

ZNF266: encoding protein Zinc finger protein 266
 ZNF274: encoding protein Zinc finger protein 274
 ZNF331: encoding protein Zinc finger protein 331
 ZNF347: encoding protein Zinc finger protein 347
 ZNF426: encoding protein Zinc finger protein 426
 ZNF473: encoding protein Zinc finger protein 473
 ZNF506: encoding protein Zinc finger protein 506
 ZNF507: encoding protein Zinc finger protein 507
 ZNF536: encoding protein Zinc finger protein 536
 ZNF541: encoding protein Zinc finger protein 541
 ZNF557: encoding protein Zinc finger protein 557
 ZNF571: encoding protein Zinc finger protein 571
 ZNF576: encoding protein Zinc finger protein 576
 Zinc finger protein 613: encoding protein Zinc finger protein 613
 ZNF649: Transcriptional suppressor
 ZNF71: encoding protein Endothelial zinc finger protein induced by tumor necrosis factor alpha
 ZNF737: encoding protein Zinc finger protein 737
 ZNF749: encoding protein Zinc finger protein 749
 ZNF676: encoding protein Zinc finger protein 676
 ZNF772: encoding protein Zinc finger protein 772
 ZNF784: encoding protein Zinc finger protein 784
 ZNF8: encoding protein Zinc finger protein 8
 ZNF83: encoding protein Zinc finger protein 83
 ZNF878: encoding protein Zinc finger protein 878
 ZNF880: encoding protein Zinc finger protein 880

Short arm

CACNA1A: Calcium channel, voltage-dependent, P/Q type, alpha 1A subunit (Familial hemiplegic migraine Type I). Gene map locus 19p13
 COMP: Cartilage oligomeric matrix protein. Gene map locus 19p13.1
 NOTCH3: Notch homolog 3 (Drosophila): Gene map locus 19p13.1-p13.2
 GCDH: Glutaryl-Coenzyme A dehydrogenase. Gene map locus 19p13.2
 BSG: Basigin (Ok blood group)/Extracellular matrix metalloproteinase inducer/CD147. Gene map locus 19p13.3
 ICAM4: Landsteiner and Weiner glycoprotein. Gene map locus 19p13.3
 NRTN: Neurturin, associated with Hirschsprung's disease: Gene locus map 19p13.3
 HCL1: Hair Colour 1; Brown hair colour; BRHC. Gene map locus 19p13.1-q13.11 OMIM: 113750
 EYCL1: Eye Colour 1; Eye colour, green/blue; GEY. Gene map locus 19p13.1-q13.11 OMIM: 227240
 GTPBP3: GTP binding protein 3 19p13.11
 KLF2: Krüppel-like factor 2, also known as Lung Krüppel-like factor. Gene map locus 19p13.11 OMIM: 602016
 FAM32A: family with sequence similarity 32 member A 19q13.11
 DDX39: DExD-box helicase 39. Gene map locus 19p13.12

Long arm

GAPDHS: glyceraldehyde-3-phosphate dehydrogenase, spermatogenic 19q13.12

HAMP: Hepcidin antimicrobial peptide. Gene map locus 19q13.12

BCKDHA: Branched chain keto acid dehydrogenase E1, alpha polypeptide (maple syrup urine disease). Gene map location 19q13.1-q13.2

APOE: Apolipoprotein E, gene associated with Alzheimer's disease. Gene map locus 19q13.2

CIC: Capicua transcriptional repressor. Gene map locus 19q13.2

FCGBP: Fc fragment of IgG binding protein

SARS2: seryl-tRNA synthetase 2, mitochondrial. Gene map locus 19q13.2

[ATP1A3](#): ATPase. Gene map locus 19q13.31

DMWD: DM1 locus, WD repeat containing. Gene map locus 19q13.32

PNMA8A: paraneoplastic Ma antigen family member 8A 19q13.32

DMPK: Dystrophin myotonia-protein kinase. Gene map locus 19q13.32

GLTSCR2: Glioma tumor suppressor candidate region gene 2 protein 19q13.33

A1BG: Plasma glycoprotein, unknown function. Gene map locus 19q13.43

LRC: The Leukocyte Receptor Complex is a family of immunoreceptors expressed predominantly on monocytes and B cells and at lower levels on dendritic cells and natural killer (NK) cells. The LRC also includes the KIR locus. Gene map locus 19q13.4 OMIM: 604812

KPTN: Kaptin (actin binding protein) at the tips of stereocilia. Gene map locus 19q13.4[11]

FUT1: The H locus is located on chromosome 19 at 19q13.3. It contains three exons that span more than 5 kb of genomic DNA, and it encodes a fucosyltransferase that produces the H antigen on RBCs.[12]

FUT2: The Se locus is located on chromosome 19 at 19q13.3. It contains two exons that span about 25 kb of genomic DNA. The Se locus encodes a specific fucosyltransferase that is expressed in the epithelia of secretory tissues, such as salivary glands, the gastrointestinal tract, and the respiratory tract. The enzyme it encodes catalyzes the production of H antigen.[12]

MORT (Mortal Obligate RNA Transcript, lincRNA): Gene map locus 19q13.43

1)

Jenkins RB, Blair H, Ballman KV, Giannini C, Arusell RM, Law M, Flynn H, Passe S, Felten S, Brown PD, Shaw EG, Buckner JC. A t(1;19)(q10;p10) mediates the combined deletions of 1p and 19q and predicts a better prognosis of patients with oligodendroglioma. *Cancer Res.* 2006 Oct 15;66(20):9852-61. PubMed PMID: 17047046.

2)

Louis DN, Perry A, Reifenberger G, et al. The 2016 World Health Organization Classification of Tumors of the Central Nervous System: a summary. *Acta Neuropathol.* 2016; 131:803-820

3)

Stupp R, Brada M, van den Bent MJ, et al. High-grade glioma: ESMO Clinical Practice Guidelines for

diagnosis, treatment and follow-up. Ann Oncol. 2014; 25 Suppl 3:iii93-ii101

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