LIST OF ABBREVIATIONS FOR ALS/MND

Entries marked with an asterisk (*) are known to cause familial ALS/MND when mutated. Mutated TAU can cause frontotemporal dementia (FTD), and approximately 40% of FTD patients show signs of motor neuron involvement, but it is still a moot point whether you can class mutated TAU as a cause of ALS/MND.

Every entry may not necessarily be fully related to the cause of ALS/MND, but the entries can be found in scientific research papers on ALS/MND.

If you amend or alter the stored copy of this list, make sure the researched relied upon is conducted in the pre-G1 phase of the cell cycle. Very little research is conducted in this condition.

AA arachidonic acid

AADPR O-acetyl-ADP ribose

ACETYL CoA acetyl coenzyme A

ACh acetylcholine

AChR acetylcholine receptor (nicotinic receptor)

AD Alzheimer's disease

ADP adenosine diphosphate

AGE advanced glycation end-product

AICAR 5-aminoimidazole-4 carboxamide ribonucloside

AIF apoptosis-inducing factor (in mitochondria)

aka "also known as"

αKG alpha ketoglutarate

AKT1/2/3 aka PKBα/β/Ɣ (the serine kinase S474 is activated in skeletal muscle during the G1 phase)

ALDOC aldolase

ALS amyotrophic lateral sclerosis/motor neurone disease

ALS FTD amyotrophic lateral sclerosis frontotemporal dementia

*ALS2 alsin (Predominant UMN phenotype)

ALT alternative lengthening of telomeres

AMP adenosine monophosphate. A compound containing adenine, ribose and one phosphate group

AMPAR α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid receptor

AMPK 5'-AMP-activated protein kinase

*ANG angiogenin

APC antigen-presenting cell

ARF6 ADP-ribosylation factor 6

ATF activating-transcription factor (4 or 6)

ATG autophagy-related genes

ATM ataxia telangiectasia mutated (ATM is a checkpoint kinase that helps activate the G1 check point, or restriction point-R)

ATP adenosine triphosphate

ATXN2 ataxin 2 (Interaction with TDP-43)

BAD Bcl-2 associated death protein (pro-apoptosis)

Bak Bcl-2 antagonist/killer (pro-apoptosis)

Bax Bcl-2 associated X protein (pro-apoptosis)

BBB blood-brain barrier

BCL-2 bcl-2 gene, aka B-cell lymphoma 2, (an anti-apoptosis regulator)

BDNF brain-derived neurotrophic factor

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BECN1 beclin 1

BH3 Bcl-2 homology domain 3

Bim BIP binding immunoglobulin protein

BIP binding immunoglobulin protein

BMAA beta-methalamino-1-alanine

BNB blood-nerve barrier

Bnip3 Bcl2/adenovirus E1B 19 kDa protein-interacting protein 3

BRAF baroreflex arc function

BULBAR bulbar onset in neck area

C1-INH complement C1 inhibitor

C1q complement 1 subcomponent q

C4BP C4b-binding protein

C5 complement C5

*C9orf72 chromosome 9 open reading frame 72 (Associates with LC3 and leads to ALS FTD)

Ca2+ calcium

Calmodulin/Ca2+ intracellular calcium receptor

CALS carer of ALS patient

cAMP cyclic adenosine monophosphate

CBP CREB binding protein. Assists acetylation

CCD coiled-coil domain

*CCNF G2-mitotic-specific cyclin-F

CCR2 CC chemokine receptor 2

Cdc42 cell division cycle 42

CDK4 cyclin-dependent kinase 4

CDKN2A cyclin-dependent kinase inhibitor 2A

*CHCHD10 coiled-coil-helix-coiled-coil-helix domain containing 10

Chk1/Claspin (DNA damage) checkpoint kinase 1

*CHMP 2B chromatin modifying protein 2B (Predominant LMN phenotype)

CHOP CCAAT-enhancer-binding protein homologous protein

CIP2A cancerous inhibitor of PP2A (A protein encoded by the KIAA1524 gene)

CK creatine kinase. (In brain, thyroid, skeletal and cardiac muscle)

cMyc cyclic myelocytomatosis oncogene

CNS central nervous system

COFILIN An actin binding protein in skeletal muscle and a major actin depolymerisation factor in the CNS. Cofilin is inactivated after phosphorylation of serine residues.

COX-1 cyclooxygenase-1. aka prostaglandin-endoperoxide synthase (PTGS). (Also, COX-2)

CPT-1&2

CR1 complement receptor type 1

CREB cyclic AMP-response element-binding protein

CSF cerebrospinal fluid

CSMN corticospinal motor neuron

CYT C cytochrome C

DAF decay-accelerating factor

DAG diacylglycerol

*DAO d-amino acid oxidase

DAPI 4,6-diamidino-2-phenylindole

DC dendritic cell

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*DHFR (Associated with bulbar onset when mutated)

*DCTN1 dynactin 1

DEPTOR an inhibitor of mTOR complex 2

DMF dimethyl fumarate (Activates Nrf2 and NQ01)

DNA deoxyribonucleic acid

dsDNA double-strand DNA

DSB double strand break

*DYRK1A dual specificity tyrosine phosphorylation-regulated kinase 1A

EAAT2 excitatory amino acid transporter 2

eIF2α eukaryotic initiation factor 2α

eIF4E eukaryotic initiation factor 4E

EMG electromyography

EMT epithelial-mesenchymal transition

ENO enolase

EPH A4 ephrin receptor A4 (Repels axons at NMJ)

ER endoplasmic reticulum

ERAD endoplasmic reticulum protein degradation

ERK extracellular-signal regulated kinase (aka MAPK)

ERV endogenous retrovirus

ESC embryonic stem cell

ETC electron transport chain

E2F1 E2F transcription factor 1, aka E2 promotor binding factor

FA fatty acid

FAD Flavin adenine dinucleotide

fALS familial ALS, (Usually caused before the age of 35 years; caused by a familial fault)

*FIG4 SAC 1 lipid phosphatase domain containing (S cerevisiae)

FLD frontal lobe degeneration

FLCN folliculin

fMND familial MND (Same as fALS)

FOXO forkhead box O. There are 5 family members, Foxo1 (FKHR), Fox02, Foxo3 FKHRL1, Foxo4 (AFX), and Foxo6.

FOXP3 forkhead box P-3. aka scurfin

FTD frontotemporal dementia

FTLD frontotemporal lobar atrophy/disease

*FUS fused in sarcoma (aka translocated in liposarcomer, or fused in osteosarcomer)

GABA gamma-aminobutyric acid. An inhibitory neurotransmitter. (Receptors A, A-ρ, and B)

GAPDH glyceraldehyde-3-phosphate dehydrogenase

GβL co-activator of mTOR C2 (an ortholog of yeast LST8)

GEF guanine nucleotide exchange factor

GLU glucose

GLUT4 glucose transporter 4

GM-CSF granulocyte-macrophage colony-stimulating factor

GPCR G-protein coupled receptor

GPI glycosylphosphatidylinositol, (or glucose-6-phosphate isomerase)

GRK G-protein coupled receptor kinase

GSK3 glycogen synthase kinase 3 (α, β, ϒ)

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GTP guanosine triphosphate

GWAS genome wide association study

H3K9 histone H3K9

HCCS human copper chaperone for SOD1

HDAC histone deacetylase

HDM2 human DM2, aka MDM2 for mouse

HERV K human endogenous retrovirus K

HIF-1α hypoxia inducible transcription factor 1α

HK Hexokinase

*hnRNPA1 heterogeneous ribonucleoprotein A1

*hnRNPA2B1 heterogeneous ribonucleoprotein A2B1

hnRNP H heterogeneous ribonucleoprotein H

HSP heat-shock protein, with different kDa versions, (e.g. 60, 70, 90)

IF intermediate filaments

IFN-α, β or ϒ interferon α/β/ϒ, a cytokine. There is also a Tau and Omega and other minor versions. (INF-α has 13 subtypes, IFN-β has 2 subtypes, INF-ϒ has 1 subtype). INF-α and β are referred to as Type 1 Interferons. IFN-ϒ is referred to as Type 2 interferon. In ALS; INF-β will be activated.

IGF-1 insulin-like growth factor-1

IGF-1R insulin-like growth factor-1 receptor

IGF-2 insulin-like growth factor-2

IGF-2R insulin-like growth factor-2 receptor

IGIF interferon gamma inducing factor. aka IL-18

IκB-α I kappa B-alpha

IKK I kappa B kinase

IL-1β interleukin 1 beta (also IL-6, or IL-10)

ILK beta 1-integrin-linked protein kinase

iNOS inducible nitric oxide synthase

ILF3 interleukin factor 3

IP3 inositol 1,4,5-trisphosphate

IR insulin receptor

IRE-1 inositol-requiring kinase 1

IRF 1-9 interferon regulatory factor 1 to 9

IRS 1,2 insulin receptor substrate (1 or 2)

ISREs interferon-stimulated response elements

iTreg inducible regulatory T cells

JAK janus kinase. In ALS; only JAK1 (and TYK2) activated in muscles. JAK1 and JAK2 are activated in neurons, but not at the same time as TYK2 or G1 phase muscle regeneration. This is an important reason that a chronic muscular condition can cause the death of connected neurons in ALS.

JNK c-Jun N-terminal kinase (aka SAPK)

KD kinase domain

KLD kinase-ligase Dpnl

LC3-1 or 2 microtubule-associated 1 light chain 3β (1 or 2), (associates with C9ORF72)

LDH/LD lactate dehydrogenase

LIR LC3 interacting motive

LKB1 lyman-kutcher-burman 1 (activates 13 kinases of the AMPK family)

LMN lower motor neuron

LMND lower motor neuron disease

LPS lipopolysaccharide

MAC membrane attack complex

MAPK mitogen-activated protein kinase (aka ERK)

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MASP MBL-associated serine protease

*MATR3 matrin 3

MBL mannose-binding lectin

MCL-1 induced myeloid leukaemia cell differentiation protein 1, (enhances cell survival by inhibiting apoptosis)

MCP membrane cofactor protein

MCT 1 monocarboxylate transporter 1

MEK MAPK/ERK kinase

MG myasthenia gravis

MHC major histocompatibility complex. In ALS; activated MHC I in muscles. MHC II is inhibited via its receptor.

MIF macrophage migration inhibitory factor

MIP macrophage inflammatory protein

mMCT mitochondrial monocarboxylate transport inhibitor

MMP9 matrix metalloproteinase 9

MND motor neuron disease

MNLS muscle-neuronal lactate shuttle

MO25 calcium-binding protein 39, (aka CAB 39, CGI-66)

MPS mononuclear phagocytic system

mRNA messenger RNA

mTOR mammalian transducer of regulated CREB activity, (mammalian target of rapamycin). There are 2 complexes of TOR, a C1 and C2 complex. See “TORC1, TORC2” listing.

MW molecular weight

MYC myelocytomatosis oncogene

NAD+ nicotinamide adenine dinucleotide, (PARP consumes NAD+ as a substrate). See NMN

NADH the reduced form of NAD, (aka niacin or coenzyme 1)

NADP+ NAD phosphate

NADPH reduced nicotinamide adenine dinucleotide phosphate

NAM nicotinamide; a form of vitamin B3. Helps increase sirtuin 1 in brain tissue, and decrease NFκB

NAMPT nicotinamide phosphoribosyltransferase, required to produce NAD+

NAP1 NAK-associated protein 1

NDP52 nuclear domain 10 protein 52

NEMO NF-κB essential modulator

NF neurofilament, or neuclear factor

NFκB neuclear factor kappa-light-chain-enhancer of activated B cells. NFκB has two isoforms, p50 and p65.

NK natural killer

NLS nuclear localization signal

NMJ neuromuscular junction

NMN nicotinamide mononucleotide. A precursor of NAD+

NO nitric oxide

NOS nitric oxide synthase

NOXA a mediator of p53-induced apoptosis

NQ01 NAD(P)H: Quinone oxidoreductase 1, (can be induced by dimethyl fumarate)

Nrf2 neuclear factor erythroid 2-related factor 2, (aka NF kappa B-repressing factor 2). In C. elegans the equivalent of Nrf2 is called SKN-1.

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NT non-transfected

nTreg natural regulatory T cell

*OPTN optineurin (associates with TBK-1 and autophagy)

OxPHOS oxidative phosphorylation

P16 ^{INK4A} melanoma gene

P21 a 21 kDa inhibitor of cyclin-dependent kinase

P27 a 27 kDa inhibitor of cyclin-dependent kinase

P53 protein 53

P70S6K1 PI(3,4,5)P3-dependent kinase (p70 or S6K1)

p300/HAT histone acetyl transferase

PALS patients with ALS

PARP 1 poly (ADP-ribose) polymerase 1. (PARP 1 helps repair damaged single-stranded DNA and helps activate the G1 phase). PARP consumes NAD+ as a substrate.

PAS phagophore assembly site

PAT1 paroxysmal atrial tachycardia

PCD programmed cell death

PCR polymerase chain reaction

PDH pyruvate dehydrogenase

*PDIA1/3 protein disulphide isomerase (1/3)

PDK pyruvate dehydrogenase kinase (1 to 4). Mutated PDK3 causes Charcot-Marie-Tooth neuropathy.

PDP-1 pyruvate dehydrogenase phosphatase (muscle)

PE phosphatidylethanolamine

PEA palmitoylethenolamide (a PPAR agonist)

PEP phosphoenolpyruvate (a PPAR agonist)

PEPck phosphoenolpyruvate carboxykinase

PERK PKR-like endoplasmic reticulum kinase

PFK phosphofructokinase

*PFN1 profilin 1 (Mutations disrupt polymerization of monomeric G-actin to its filamentous F-actin form)

PGC-1α/PGC-1β PPAR-gamma coactivator-1 alpha/beta

PGE2 prostaglandin E2

PGK phosphoglycerate kinase

PGM phosphoglycerate mutase

PHGDH phosphoglycerate dehydrogenase

Pi inorganic phosphate

PI3K phosphatidylinositol 3 kinase

PK pyruvate kinase

PKA protein kinase A

PKBα/β/ϒ protein kinase B α/β/ϒ. (aka Akt). The serine kinase PKBβ is activated in skeletal muscle during G1 phase

PKC protein kinase C. (aka phosphokinase C)

PKD protein kinase D

PKH pyruvate kinase (heart)

PKM pyruvate kinase (muscle form)

PKM1/2 are 2 different splicing products of PKM

PLA2 phospholipase A2

PLC phospholipase C (β, δ, ε, or ϒ)

PLD phospholipase D (1 or 2)

PLS primary lateral sclerosis

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PMA progressive muscular atrophy
PMA phorbol myristate acetate (A phorbol ester that assists in inhibiting the vitamin D receptor)

PMN polymorphonuclear cell

PNS peripheral nerve system

PP2A protein phosphatase-2A

PP2A/Ca2+ protein phosphatase-2A or calcium

PPAR-α peroxisome proliferator activated receptor-α

PPAR-β peroxisome proliferator activated receptor-β

PRAS40 proline-rich Akt substrate of 40 kDa

pRb retinoblastoma protein

PTEN (aka MMAC1) phosphatase and tensin homologue deleted on chromosome 10 (aka MMAC1)

PTX pertussis toxin

PUMA p53 upregulated modulator of apoptosis

RA retinoic acid

RAF repetitive atrial firing

RAG2 recombination activating gene 2

Raptor activator of mTOR Complex 1

Rb retinoblastoma

REDD-1 regulated in development and DNA damage response 1

Rheb1-GTP Rheb aka Ras homolog enriched in brain, is a GTP-binding protein involved in the mTOR C1 pathway

Rictor activator of mTOR Complex 2

RIP1 receptor interacting protein 1

RIPK 1 receptor interacting protein kinase 1

RNA ribonucleic acid

RNAPII or RNPII RNA polymerase II

ROS reactive oxygen species

S6K1 ribosomal protein S6 kinase 1

S6P phosphorylation of ribosomal s6

sALS sporadic Amyotrophic Lateral Sclerosis

SAPK stress-activated protein kinase (aka JNK)

SC Schwann cell (or spinal cord)

SD semantic dementia

*SETX senataxin

shRNA small hairpin RNA

*SIGMA1 sigma nonopioid intracellular receptor 1

SIK2 salt-inducible kinase 2

SIN1/MIP1 stress activated protein kinase interacting protein 1. SIN1 assists with activating mTORC2.

siRNA small interfering RNA (aka. Silencing RNA)

SIRT sirtuin (1 to 6)

sMND sporadic Motor Neuron Disease

SOCS suppressor of cytokine signalling. In ALS; SOCS1 is activated and SOCS3 will be inhibited.

*SOD1 superoxide dismutase 1 (there is already 170 different SOD1 mutations reported in fALS with different virulence)

SOL soleus

*SPG11 spatacsin 11

*SQSTM1 sequestosome 1

Src non-receptor tyrosine kinase

LIST OF ABBREVIATIONS FOR ALS/MND

ssDNA single-stranded DNA

STAT signal transducers and activators of transcription. In ALS; stats 1 and 2 will be activated, and stat3 inhibited.

STRAD straightened

TA tibialis anterior

*TANK TRAF family member-associated NFκB activator

TARDBP transactivation response element (TAR) DNA-binding protein of 43 kDa (The gene encoding TDP-43)

TAU a protein

*TBK-1 TANK binding kinase 1

TBST tris-buffered saline tween

TCA tricarboxylic acid cycle

TCF-3 transcription factor 3

TCR T cell receptor

*TDP-43 transactivation response element (TAR) DNA-binding protein of 43 kDa

TERT telomerase reverse transcriptase

TGF transforming growth factor

TK tyrosine kinase

TKTL1 transketolase-like enzyme 1

TLR toll like receptor

TNF tumour necrosis factor

TORC1, TORC2 TOR complex 1 or 2. Complex 1 (GβL, mTOR, Raptor) is inhibited, and Complex 2 (GβL, mTOR, Rictor) is activated in ALS/MND skeletal muscle. Also see “mTOR” listing.

TPI triose phosphate isomerase

Treg regulatory T cell

TSC1 tuberous sclerosis complex 1 (aka hamartin)

TSC 2 tuberous sclerosis complex 2 (aka tuberin)

*TUBA4A tubulin α1

TYK2 tyrosine kinase 2

*UBQLN2 ubiquilin2

UCP-2/3 uncoupling protein (2 or 3)

ULD ubiquitin-like domain

ULK Unc 51-like autophagy activating kinase

UMND upper motor neuron disease

UNC13A unc-13 homolog A. (Regulates neurite outgrowth and synaptic neurotransmission)

UPR unfolded protein response

*VAPB vesicle-associated membrane associated-protein B. (Mutations disrupt endocytosis and transport of vesicles from the golgi and ER)

VB1 vitamin B1 (thiamine). Benfotiamine is a lipid-soluble analogue (synthetic) VB1

VCAM-1 vascular cell adhesion molecule

*VCP valosin-containing protein

VDR vitamin D receptor, (the receptor is inhibited in ALS/MND)

VEGF vascular epithelial growth factor

WASP Wiskot-Aldrich syndrome protein

WT wild-type

XBP1 x-box binding protein 1

ZO-1 zonular occludens 1, (aka tight junction protein-1)

4E-BP1 eukaryotic initiation factor 4E-binding protein 1

14-3-3 binding motive