Supplementary information S1 (table) | **Paradigms for understanding roles played by non-coding RNAs in nervous system disorders with examples**

Disease	ncRNA	Relationship	Ref.
Genetic variation in ncRNA genes			
Epilepsy	*Bc1* lncRNA	*Bc1*$^{-/-}$ mice exhibit neuronal hyperexcitability and seizures	1
Gliomas	miR-26a	Amplification of miR-26a, targeting PTEN, is often present in gliomas	2
Gliomas	miR-185	Loss of heterozygosity and associated overexpression of miR-185, targeting DNMT1, promotes glioma formation	3
Major depression / insomnia	miR-182	Polymorphism leads to abnormal processing of pre-miR-182 and target gene deregulation	4
Mitochondrial encephalo-myopathies	Mitochondrial tRNAs / rRNAs	Heterogeneous mutations impair mitochondrial protein synthesis and respiration	5, 6
Prader-Willi syndrome	*SNORD116* snoRNA cluster	Microdeletion gives rise to clinical features of PWS	7
Primitive neuroectodermal tumors	miR-517c, -520g poly-cistronic cluster	Chr19q13.41 amplification results in oncogenic miRNA overexpression	8
Spinocerebellar ataxia type 8	*ATXN8OS* lncRNA	Expanded repeats in lncRNA gene cause RNA-mediated toxicity	9, 10
Stroke, gliomas, neurofibromas	*ANRIL* lncRNA	Variation in the *ANRIL* gene confers disease risk	11-15
Genetic variation in disease-linked protein-coding genes impacts interactions with ncRNAs			
Alzheimer's disease and frontotemporal lobar dementia	miR-659	Altered miR-659 binding site in *GRN* 3'-UTR is risk factor for hippocampal sclerosis in AD and TARDBP-positive FTLD	16, 17
Tourette's syndrome	miR-189	Variant miR-189 binding site in *SLITRK1* 3′-UTR is deregulation of SLITRK1 and is associated with Tourette' syndrome	18
Parkinson's disease	miR-433	Altered miR-433 binding site in *FGF20* 3′-UTR leads to deregulation and repression of α-synuclein	19

Epigenetic deregulation of ncRNA genes			
Brain tumors	*H19*	Partial loss of imprinting leads to biallelic expression	20, 21
Brain tumors	miR-124, -137, -199b-5p	Abnormal DNA methylation leads to deregulation	22, 23
Perturbations in factors responsible for modulating ncRNA biogenesis, maturation, and function			
Autosomal recessive leukoencephalopathy	Pol III-dependent ncRNAs,	Mutations in Pol III subunits impair transcription of ncRNAs	24
Fragile X syndrome	miRNAs	FMRP interacts with miRNA pathways	25
Frontotemporal lobar dementia	*NEAT1/2*	TARDBP binds high levels of *NEAT1/2* in FTLD brains	26
FUS-associated pathological states	*CCND1* promoter-derived lncRNAs	FUS recruited by lncRNAs to *CCND1* promoter in response to DNA damage	27
Huntington's disease	miRNA isomiRs, lncRNAs	Deregulation of REST and consequently of ncRNAs	28-30
Macular degeneration	*Alu* ncRNAs	*DICER1* deletion leads to accumulation of toxic *Alu* ncRNAs in retinal pigmented epithelium	31
Parkinson's disease	miRNAs	Mutations in *LRRK2* impair miRNA-mediated translational repression	32
Genomic context links ncRNA genes to disease-causing genes and susceptibility loci			
Alzheimer's disease	*BACE1-antisense* lncRNA	Derived from the *BACE1* gene locus; modulates BACE1 expression and localization	33
Fragile X and associated tremor and ataxia syndrome	*FMR4, ASFMR* lncRNAs	Overlap the *FMR1* gene locus and are deregulated in these diseases	34, 35
Neurodevelopmental syndromes associated with Sox2 locus	*SOX2OT, SOX2DOT* lncRNAs	Overlap the *SOX2* gene locus	36
Non-syndromic mental retardation	endo-siRNAs	Derived from and implicated in regulating synaptic gene loci including *SYNGAP1*	37
Schizophrenia, bipolar disorder, major depression, autism	*DISC2* lncRNA	Derived from and implicated in regulating *DISC1* locus	38
Spinocerebellar ataxia type 7	*SCAANT1* lncRNA	Transcribed antisense to and implicated in regulating *ATXN7*	39

ncRNAs differentially expressed in disease-related central and peripheral tissues			
Amyotrophic lateral sclerosis	miR-206	Upregulated in mouse models of ALS and implicated in slowing disease progression and enhancing regenerative responses	40
Brain tumors	*Alu* / L1 retro-transposon-derived ncRNAs, miRNAs	Tumor cells release exosomes containing ncRNAs potentially promoting angiogenesis, local invasion, and metastasis	41, 42
Cerebral ischemia	piRNAs	piRNAs implicated in regulating LINE retrotransposons are differentially expressed in ischemic mouse brain	43
Down syndrome	snoRNAs, lncRNAs	Deregulated in human endothelial progenitor cells isolated from blood	44
Rett syndrome	L1 retrotransposon-derived ncRNAs	Patients with MECP2 mutations have increased susceptibility to L1 retrotransposition	45

AD, Alzheimer's disease; ALS, amyotrophic lateral sclerosis; AS, Angelman syndrome; ATXN7, ataxin 7; BACE1, ß-site APP-cleaving enzyme 1; CCND1, cyclin D1; DISC1, disrupted in schizophrenia 1; DNMT1, DNA methyltransferase 1; FMR1, fragile X mental retardation 1; FMRP, fragile X mental retardation protein; FTLD, frontotemporal lobar dementia; FUS, fused in sarcoma; GRN, granulin; HD, Huntington's disease; LRRK2, leucine-rich repeat kinase 2; lncRNA, long non-coding RNA; MECP2, methyl CpG binding protein 2; miRNA, microRNA; ncRNA, non-coding RNA; PD, Parkinson's disease; piRNA, PIWI-interacting RNA; PTEN, phosphatase and tensin homolog; PWS, Prader-Willi syndrome; RNA Pol III, RNA polymerase III; SCA8, spinocerebellar ataxia type 8; SLITRK1, Slit and Trk-like; SOX2, SRY (sex determining region Y)-box 2; SYNGAP1, synaptic Ras GTPase activating protein 1; TARDBP, TAR DNA binding protein; XLMR, X-linked mental retardation.

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