

Supplementary Materials: Manganese-Induced Neurotoxicity through Impairment of Cross-Talk Pathways in Human Neuroblastoma Cell Line *SH-SY5Y* Differentiated with Retinoic Acid

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Table S1. Genes differentially expressed in RA-differentiated SH-SY5Y cells after exposure to MnCl₂ are listed below.

Chemical Specie	Effect	Gene Symbol	Gene Name
MnCl ₂	Up-expression	RASL11B	Ras-like protein family member 11B
		SCLY	Selenocysteine lyase
		ABCA12	ATP-binding cassette sub-family A member 12
		CORIN	Atrial natriuretic peptide-converting enzyme
		GPD1L	Glycerol-3-phosphate dehydrogenase 1-like protein
		NDUFAF2	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex assembly factor 2
		RAC3	Ras-related C3 botulinum toxin substrate 3
		TAF9B	Transcription initiation factor TFIID subunit 9B
		WLS	Protein wntless homolog
		MT-CO1	Cytochrome c oxidase subunit 1
		MT-CYB	Cytochrome b
		MT-ND1	NADH-ubiquinone oxidoreductase chain 1
		MT-ND5	NADH-ubiquinone oxidoreductase chain 5
		MT-ND4	NADH-ubiquinone oxidoreductase chain 4
		NTNG1	Netrin-G1
		ROR1	Inactive tyrosine-protein kinase transmembrane receptor ROR1
		TRIM63	E3 ubiquitin-protein ligase TRIM63
		C6orf48	Protein G8
		ZNF157	Zinc finger protein 157
		AHNAK	Neuroblast differentiation-associated protein AHNAK
		STEAP3	Metalloreductase STEAP3
		RPS29	Ribosomal protein S29
		BCL2	Apoptosis regulator Bcl-2
		WDR4	tRNA (guanine-N(7)-)-methyltransferase non-catalytic subunit WDR4
		CCNL2	Cyclin-L2
		SCFD2	Sec1 family domain-containing protein 2
		KIF26B	Kinesin-like protein KIF26B
		CHST15	Carbohydrate sulfotransferase 15
		KIRREL3	Kin of IRRE-like protein 3
		RAB40B	Ras-related protein Rab-40B
		COLCA2	Colorectal cancer associated 2
	Down-expression	WDR54	WD repeat-containing protein 54
		PPP2R5B	Serine/threonine-protein phosphatase 2A 56 kDa regulatory subunit beta isoform
		C4orf6	Uncharacterized protein encoded by LINC01587
		PLOD1	Procollagen-lysine
		CABP7	Calcium-binding protein 7
		TRIB3	Tribbles homolog 3
		SFXN3	Sideroflexin-3

	DUSP3	Dual specificity protein phosphatase 3
	ALDOC	Aldolase
	GALNT18	Polypeptide N-acetylgalactosaminyltransferase 18
	GAPDH	Glyceraldehyde-3-phosphate dehydrogenase
	TPI1	Triosephosphate isomerase 1
	HBEGF	Proheparin-binding EGF-like growth factor
	LOX	Protein-lysine 6-oxidase
	PFKFB4	6-phosphofructo-2-kinase/fructose-2
	ENO1	Alpha-enolase
	ELL2	RNA polymerase II elongation factor ELL2
	PPP1R3C	Protein phosphatase 1 regulatory subunit 3C
	DUSP4	Dual specificity protein phosphatase 4
	KIAA1045	PHD finger protein 24
	BHLHE41	Class E basic helix-loop-helix protein 41
	SH3TC1	SH3 domain and tetratricopeptide repeats 1
	INSIG2	Insulin-induced gene 2 protein
	GDF15	Growth differentiation factor 15
	NTS	Neurotensin/neuromedin N
	BHLHE40	Class E basic helix-loop-helix protein 40
	ANO3	Anoctamin-3
	EMP1	Epithelial membrane protein 1
	HNF1A	Hepatocyte nuclear factor 1-alpha
	HILPDA	Hypoxia-inducible lipid droplet-associated protein
	CCL27	C-C motif chemokine 27
	IER3	Radiation-inducible immediate-early gene IEX-1
	HS3ST2	Heparan sulfate glucosamine 3-O-sulfotransferase 2
	P4HA1	Prolyl 4-hydroxylase subunit alpha-1
	NGEF	Ephexin-1
	LOXL3	Lysyl oxidase homolog 3
	IL11	Interleukin-11
	HRASLS	Phospholipid-metabolizing enzyme A-C1
	STC2	Stanniocalcin-2
	ABCB6	ATP-binding cassette sub-family B member 6
	GAL	Galanin peptides
	MTFP1	Mitochondrial fission process protein 1
	GABARAPL1	Gamma-aminobutyric acid receptor-associated protein-like 1
	RAB20	Ras-related protein Rab-20
	MAP1LC3B	Microtubule-associated proteins 1A/1B light chain 3B
	PPFIA4	Liprin-alpha-4
	KIAA1715	Endoplasmic reticulum junction formation protein lunapark
	ZNF215	Zinc finger protein 215
	RAB6B	Ras-related protein Rab-6B
	MAGEC1	Melanoma-associated antigen C1
	C8orf58	Uncharacterized protein C8orf58
	HK2	Hexokinase-2
	PDXK	Pyridoxal kinase
	PRSS12	Neurotrypsin
	SCRG1	Scrapie-responsive protein 1
	F2RL2	Proteinase-activated receptor 3
	MICALL2	MICAL-like protein 2
	ANGPTL4	Angiopoietin-related protein 4
	MAP2K1	Dual specificity mitogen-activated protein kinase kinase 1
	GTPBP2	GTP binding protein 2
	ADORA2B	Adenosine receptor A2b

	ISG20	Interferon-stimulated gene 20 kDa protein
	DDIT4	DNA damage-inducible transcript 4 protein
	RIN1	Ras and Rab interactor 1
	FAM57A	Protein FAM57A
	CHRNA9	Neuronal acetylcholine receptor subunit alpha-9
	TNIP1	TNFAIP3-interacting protein 1
	GYS1	Glycogen [starch] synthase
	MPI	Mannose-6-phosphate isomerase
	AQP10	Aquaporin-10
	TMEM45A	Transmembrane protein 45A
	PHLDA2	Pleckstrin homology-like domain family A member 2
	ANKZF1	Ankyrin repeat and zinc finger domain-containing protein 1
	PGA3	Pepsin A-3
	EBF1	Transcription factor COE1
	BAIAP3	BAI1 associated protein 3
	P4HB	Protein disulfide-isomerase
	ARHGEF37	Rho guanine nucleotide exchange factor 37
	CYB5D1	Cytochrome b5 domain containing 1
	ASCL2	Achaete-scute homolog 2
	ZNF470	Zinc finger protein 470
	NXPH4	Neurexophilin-4
	RAX	Retinal homeobox protein Rx
	EDARADD	Ectodysplasin-A receptor-associated adapter protein
	ANKRD37	Ankyrin repeat domain-containing protein 37
	ANG	Angiogenin
	RIOK3	Serine/threonine-protein kinase RIO3
	STMN4	Stathmin-4
	ATF3	Cyclic AMP-dependent transcription factor ATF-3
	DHRS2	Dehydrogenase/reductase SDR family member 2
	MAFF	Transcription factor Maff
	MYH7	Myosin-7
	DOK3	Docking protein 3
	SERTAD1	SERTA domain-containing protein 1
	GOLGA8A	Golgin subfamily A member 8A
	AKR1B10	Aldo-keto reductase family 1 member B10
	MAGEC2	Melanoma-associated antigen C2
	MT-ND6	NADH-ubiquinone oxidoreductase chain 6
	RHOU	Rho-related GTP-binding protein RhoU
	LEMD1	LEM domain containing 1
	FAM129A	Protein Niban
	BNIP3	BCL2/adenovirus E1B 19 kDa protein-interacting protein 3
	DUSP5	Dual specificity protein phosphatase 5
	DPCD	Protein DPCD
	PGAM1	Phosphoglycerate mutase 1
	PGM1	Phosphoglucomutase-1
	GNAS	Guanine nucleotide-binding protein G(s) subunit alpha isoforms XLas
	BEND5	BEN domain-containing protein 5
	IL13RA2	Interleukin-13 receptor subunit alpha-2
	FUT11	Alpha-(1
	SRPX2	Sushi repeat-containing protein SRPX2
	PGK1	Phosphoglycerate kinase 1
	SPAG4	Sperm-associated antigen 4 protein
	COX4I2	Cytochrome c oxidase subunit 4 isoform 2
	PTPRH	Receptor-type tyrosine-protein phosphatase H

	HIST1H2BL	Histone H2B type 1-L
	CA9	Carbonic anhydrase 9
	ID4	DNA-binding protein inhibitor ID-4
	C4orf47	UPF0602 protein C4orf47
	TUBB2A	Tubulin beta-2A chain
	BNIP3L	BCL2/adenovirus E1B 19 kDa protein-interacting protein 3-like
	PFKP	ATP-dependent 6-phosphofructokinase
	PDK1	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 1
	GAP43	Neuromodulin
	NDUFA4L2	NADH dehydrogenase [ubiquinone] 1 alpha subcomplex subunit 4-like 2
	VKORC1	Vitamin K epoxide reductase complex subunit 1
	SPP1	Osteopontin
	ALDOA	Fructose-bisphosphate aldolase A
	AK4	Adenylate kinase 4
	ODAM	Odontogenic ameloblast-associated protein
	GPR146	Probable G-protein coupled receptor 146
	TSPAN4	Tetraspanin-4
	CEP250	Centrosome-associated protein CEP250
	IRF7	Interferon regulatory factor 7
	COL13A1	Collagen alpha-1(XIII) chain
	ENSG00000164096	Uncharacterized protein C4orf3
	P4HA2	Prolyl 4-hydroxylase subunit alpha-2
	PDK3	[Pyruvate dehydrogenase (acetyl-transferring)] kinase isozyme 3
	SEC61G	Protein transport protein Sec61 subunit gamma
	SEMA5B	Semaphorin-5B
	IGF2	Insulin-like growth factor II
	TTC39A	Tetratricopeptide repeat domain containing
	PDZK1	Na(+)/H(+) exchange regulatory cofactor NHE-RF3
	PPP1R13L	RelA-associated inhibitor
	NDRG1	Protein NDRG1
	GBE1	1, 4-alpha-glucan-branching enzyme 1
	RIMKLA	N-acetylasparylglutamate synthase A
	SLC2A1	Solute carrier family 2
	FAM162A	Protein FAM162A
	TFR2	Transferrin receptor protein 2
	SH3D21	SH3 domain containing 21
	MPP2	MAGUK p55 subfamily member 2
	LGALS8	Galectin 8
	ADM	ADM
	ENO2	Gamma-enolase
	PFKFB3	6-phosphofructo-2-kinase/fructose-2
	LDHA	Lactate dehydrogenase A
	DDIT3	DNA damage-inducible transcript 3 protein
	BDKRB2	B2 bradykinin receptor
	GPR56	Adhesion G-protein coupled receptor G1
	LOC730098	HCG2040265
	CCDC64B	BICD family-like cargo adapter 2
	SLC16A3	Monocarboxylate transporter 4
	HIST1H2BO	Histone H2B type 1-O
	MTHFD1L	Monofunctional C1-tetrahydrofolate synthase
	VEGFA	Vascular endothelial growth factor A
	HIST1H2BH	Histone H2B type 1-H
	NUDT18	8-oxo-dGDP phosphatase NUDT18
	HIST1H2BB	Histone H2B type 1-B

Table S2. Genes differentially expressed in RA-differentiated SH-SY5Y cells after exposure to MnCl₂ are listed below.

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		CORIN	Atrial natriuretic peptide-converting enzyme
		GPD1L	Glycerol-3-phosphate dehydrogenase 1-like protein
		KCNE2	Potassium voltage-gated channel subfamily E member 2
		RAC3	Ras-related C3 botulinum toxin substrate 3
		TBC1D16	TBC1 domain family member 16
		MPPED2	Metallophosphoesterase MPPED2
		LDLRAD4	Low-density lipoprotein receptor class A domain-containing protein 4
		NTRK3	NT-3 growth factor receptor
		MT-CO1	Cytochrome c oxidase subunit 1
		MT-CYB	Cytochrome b
		MT-ND5	NADH-ubiquinone oxidoreductase chain 5
		MT-ND4	NADH-ubiquinone oxidoreductase chain 4
		BRINP3	BMP/retinoic acid-inducible neural-specific protein 3
		NTNG1	Netrin-G1
		ROR1	Inactive tyrosine-protein kinase transmembrane receptor ROR1
		FNDC5	Fibronectin type III domain-containing protein 5
		HSD17B8	Estradiol 17-beta-dehydrogenase 8
		C6orf48	Protein G8
		ZNF157	Zinc finger protein 157
		AHNAK	Neuroblast differentiation-associated protein AHNAK
		SOHLH2	Spermatogenesis- and oogenesis-specific basic helix-loop-helix-containing protein 2
		STEAP3	Metalloreductase STEAP3
		RPS29	Ribosomal protein S29
		BCL2	Apoptosis regulator Bcl-2
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		C22orf31	Uncharacterized protein C22orf31
		CABP7	Calcium-binding protein 7
		SFXN3	Sideroflexin-3
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	NGEF	Ephexin-1
	IL11	Interleukin-11
	ABCB6	ATP-binding cassette sub-family B member 6
	MTFP1	Mitochondrial fission process protein 1
	SLC7A11	Cystine/glutamate transporter
	ABCC3	Canalicular multispecific organic anion transporter 2
	SLCO2B1	Solute carrier organic anion transporter family member 2B1
	C8orf58	Uncharacterized protein C8orf58
	HK2	Hexokinase-2
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	SLC2A1	Solute carrier family 2
	FAM162A	Protein FAM162A
	SH3D21	SH3 domain containing 21
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	ADM	ADM
	ENO2	Gamma-enolase
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	DDIT3	DNA damage-inducible transcript 3 protein
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	CCDC64B	BICD family-like cargo adapter 2
	SLC16A3	Monocarboxylate transporter 4
	HIST1H2BO	Histone H2B type 1-O
	MTHFD1L	Monofunctional C1-tetrahydrofolate synthase
	GREM1	Gremlin-1
	HIST1H2BH	Histone H2B type 1-H
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	HIST1H2BB	Histone H2B type 1-B