

Supplementary Table 2: Candidate genes having one or more variants that have been associated with one substance[†]

Gene symbol	Gene name	Biological Function	Chromosomal location	Drug (Phenotype [#])	Evidence from knockout animal model
<i>Genes verified with meta-analyses *</i>					
<i>ADH2/ADH1b</i>	Alcohol dehydrogenases 2	Ethanol metabolic process	4q21-q23	Alcohol (d)	
<i>ALDH2</i>	Aldehyde dehydrogenase 2	Oxidation reduction	12q24.2	Alcohol (d, c)	Reduced alcohol intake; Increased blood acetaldehyde levels after alcohol administration
<i>Genes not investigated or not verified with meta-analyses*</i>					
<i>ADORA2A</i>	Adenosine A2a receptor	adenosine receptor signaling pathway	22q11.23	Alcohol (d, c)	Increased alcohol intake; Decreased alcohol withdrawal severity
<i>ARRB1</i>	Arrestin, beta, 1	Signal transduction	11q13	Nicotine (d)	
<i>ARRB2</i>	Arrestin, beta, 2	Signal transduction	17p13	Nicotine (d, c)	Reduced voluntary alcohol intake and alcohol-induced psychomotor stimulation
<i>CHRM1</i>	Cholinergic receptor, muscarinic, 1	Neuromuscular synaptic transmission	11q13	Nicotine (d)	
<i>CHRM5</i>	Cholinergic receptor, muscarinic, 5	Neuromuscular synaptic transmission	15q26	Nicotine (d)	
<i>CHRNA7</i>	Cholinergic receptor, neuronal nicotinic, $\alpha 7$	Synaptic transmission, cholinergic	15q14	Nicotine (d)	Loss of nicotine withdrawal-induced hyperalgesia
<i>CRF 1</i>	Corticotropin releasing hormone, receptor 1	Signal transduction	17q12-q22	Alcohol (d, c)	Increased alcohol intake
<i>DLG4</i>	Discs large, drosophila, homolog of, 4	Synaptic transmission	17p13.1	Nicotine (d)	
<i>DNMI</i>	Dynamin 1	Receptor-mediated endocytosis	9q34	Nicotine (d)	
<i>EPAC</i>	Rap guanine nucleotide exchange factor 3	Signal transduction	12q13.1	Nicotine (d)	
<i>EPHX1</i>	Epoxide hydrolase 1, microsomal	Aromatic compound catabolic process	1q42.1	Nicotine (d)	
<i>FREQ</i>	Frequenin, drosophila, homolog of	Signal transduction	9q34	Nicotine (c)	
<i>GABARAP</i>	GABA-A receptor-associated protein	Gamma-aminobutyric acid signaling pathway	17p13.1	Nicotine (d)	
<i>GABRA4</i>	Gamma-aminobutyric acid receptor, alpha-4	Gamma-aminobutyric acid signaling pathway	4p12	Nicotine (d)	Tonic inhibition potentiated by alcohol
<i>GABRA6</i>	GABA receptor A alpha 6	Gamma-aminobutyric acid signaling pathway	5q34	Alcohol (d)	Altered sensitivity to alcohol

<i>GABRG1</i>	GABA-A receptor G sub-type 1	Gamma-aminobutyric acid signaling pathway	4p12	Alcohol (d)	
<i>GABRG2</i>	GABA-A receptor G sub-type 2	Gamma-aminobutyric acid signaling pathway	5q31.1-q33.1	Methamphetamine (d)	Alcohol intake same as wild type
<i>GAD1</i>	Glutamate decarboxylase 1	Gamma-aminobutyric acid signaling pathway	2q31	Alcohol (d)	
<i>GCCR</i>	Glucocorticoid receptor	Signal transduction	5q31.3	Nicotine (d)	
<i>GRIK3</i>	Glutamate receptor, ionotropic, kainate 3	Glutamate signaling pathway	1p34-p33	Alcohol (d, c)	
<i>GRIK5</i>	Glutamate receptor, ionotropic, kainate 5	Glutamate signaling pathway	19q13.2	Alcohol (d)	
<i>GRIN2B</i>	N-methyl-D-aspartate (NMDA) receptor 2B	Glutamate signaling pathway	12p12	Alcohol (d)	
<i>HINT1</i>	Histidine triad nucleotide-binding protein 1	Glutamate signaling pathway	5q31.2	Nicotine (c)	
<i>HTR1F</i>	Serotonin receptor 1F	Serotonin receptor signaling pathway	3p12	Nicotine (d)	
<i>HTR2B</i>	Serotonin receptor 2B	Serotonin receptor signaling pathway	2q36.3-q37.1	Alcohol (d)	
<i>HTR2C</i>	Serotonin receptor 2C	Serotonin receptor signaling pathway	Xq24	Alcohol (d)	
<i>HTR3B</i>	Serotonin receptor 3B	Serotonin receptor signaling pathway	11q23.1	Alcohol (d)	
<i>IL8</i>	Interleukin 8	Serotonin receptor signaling pathway	4q13-q21	Nicotine (i)	
<i>MAOB</i>	Monoamine oxidase b	Neurotransmitter catabolic process	Xp11.23	Nicotine (d)	
<i>MLH1</i>	MutL, <i>E. coli</i> , homolog of, 1	Glutamate signaling pathway	3p21.3	Nicotine (d)	
<i>NCAM1</i>	Neural cell adhesion molecule 1	Response to DNA damage stimulus	11q23	Alcohol (d)	
<i>NRXN1</i>	Neurexin 1	Glutamate signaling pathway	2p16.3	Nicotine (d)	
<i>OGG1</i>	8-oxoguanine dna glycosylase	Signal transduction	3p26.2	Nicotine (d)	
<i>PAM</i>	Peptidylglycine alpha-amidating monooxygenase	Synaptic transmission	5q14-q21	Nicotine(d)	
<i>POMC</i>	Proopiomelanocortin	Signal transduction	2p23.3	Alcohol (d)	Increased alcohol self-administration
<i>PPP1R1B</i>	Phosphatase 1 regulatory subunit 1B	Signal transduction	17q12	Nicotine (d)	

<i>PTEN</i>	Phosphatase and tensin homolog	Signal transduction	10q23.3	Nicotine (i, d)	
<i>RHOA</i>	RAS homolog gene family, member A	Signal transduction	3p21.3	Nicotine (i)	
<i>SHC3</i>	SHC transforming protein 3	Signal transduction	9q22.1	Nicotine (d)	

Notes: #: d – Abuse/Dependence; i - initiation; c - cessation/withdrawal. * Meta-analyses conducted for genetic associations for at least one of the drug addictions listed in the table. †: This table may only represent a partial list of genes that have been investigated for association with addictions.