

Appendix 1. Hypoxia-associated Gene Expression in the Rat Retina.

Categories are convenient functional groupings and are not related to Gene Ontology (GO) categories. The fold change was calculated between mean values of hypoxic retinas (n=6) and control normoxic (n=6) retinas in the hypoxia column and between mean values from retinas after 24 hrs of recovery from hypoxia (n=6) and control normoxic retinas (n=6) in the recovery column. Positive values indicate an increase and negative values indicate a decrease in gene expression relative to control retina. No significant change is indicated by nc. RGD = Rat Genome Database.

Accession #	RGD Symbol	Name	Fold-change Hypoxia	Fold-change Recovery
<u>Apoptosis</u>				
<i>Proapoptotic</i>				
AF027954	Bok	Bcl-2-related ovarian killer protein	1.08	1.18
NM_012675	Tnf	Tumor necrosis factor superfamily, member 2	1.11	nc
AF025670	Casp6	Caspase 6	nc ^d	1.14
<i>Antiapoptotic</i>				
AF025671	Casp2	Caspase 2	1.15	1.31
U72350	Bcl2l1	Bcl2-like 1	1.17	1.16
AF053362	Dedd	Death effector domain-containing	1.24	nc
AJ012603	Adam17	A disintegrin and metalloproteinase domain 17 (TNF α converting enzyme)	-1.11	nc
U73142	Mapk14	Mitogen activated protein kinase 14	nc	-1.11
<u>Calcium Signaling and Transport</u>				
<i>Calcium channel activity</i>				
L15453	Cacna1e	Calcium channel, voltage-dependent, L type, alpha 1E subunit	1.26	1.38
M92905	Cacna1b	Calcium channel, voltage-dependent, N type, alpha 1B subunit	1.13	1.22
U38373	Hap1	Huntingtin-associated protein 1	1.24	1.26
U38653	Itpr1	Inositol 1,4,5-triphosphate receptor 1	1.10	1.27
L04684	Cacna1s	Calcium channel, voltage-dependent, L type, alpha 1S subunit	nc	1.16
M89924	Cacna1c	L-type Ca ²⁺ channel (VDCC) α 1 subunit variable region (IVS3)	nc	1.11
M80545	Cacnb2	Calcium channel, voltage-dependent, beta 2 subunit	nc	-1.11
<i>Calcium ion transport</i>				
J03754	Atp2b2	ATPase, Ca ⁺⁺ transporting, plasma membrane 2	1.25	1.37
M16112	Camk2b	Calcium/calmodulin-dependent protein kinase II β -subunit	1.12	1.26
S71570	Camk2b	Calcium/calmodulin-dependent protein kinase II γ -b	1.16	1.24
<i>Calmodulin related functions</i>				
D86556	Pnck	Pregnancy upregulated non-ubiquitously expressed CaM kinase	1.20	1.20
L09119	Nrgn	Neurogranin	1.21	1.38
X14265	Calm3	Calmodulin III	1.10	1.21
X74227	Itpkb	Inositol 1,4,5-trisphosphate 3-kinase B	nc	1.18
M17069	Calm2	Calmodulin 2	1.23	1.25
<u>Carbohydrate Metabolism</u>				
AB006137	Fut1	Fucosyltransferase 1	1.27	1.21
AF019973	Eno2	γ -enolase 2	1.19	1.19

D28561	Slc2a4	Solute carrier family 2 (facilitated glucose transporter), member 4	1.30	1.32
M27466	Cox6c	Cytochrome c oxidase, subunit VIc	1.19	1.52
X07467	G6pdx	Glucose-6-phosphate dehydrogenase	1.15	1.23
D13871	Slc2a5	Solute carrier family 2, member 5	1.14	nc
M68971	Hk2	Hexokinase 2	-1.20	nc
AB003478	B3galt4	UDP-Gal:betaGlcNAc beta 1,3-galactosyltransferase, polypeptide 4	1.26	nc
D17809	Galgt1	UDP-N-acetyl- α -D-galactosamine:(N-acetylneuraminy)-galactosylglucosylceramide- β 1,4-N-acetylgalactosaminyltransferase	nc	1.14
<u>Cell Adhesion</u>				
D89655	Scarb1	Scavenger receptor class B, member 1	1.32	1.44
D25224	Lamr1	Laminin receptor 1 (67kD, ribosomal protein SA)	1.12	nc
AF003598	Itgb7	β 7 integrin	nc	1.18
<u>Cell Differentiation and Proliferation</u>				
D32249	Pja2	Praja 2	1.32	1.36
AF205717	Tm4sf4	Transmembrane 4 superfamily member 4	1.14	nc
D88672	Pld2	Phospholipase D2	1.10	nc
L15011	Ctxn	Cortexin	1.21	nc
M24852	Pcp4	Purkinje cell protein 4	1.12	nc
L36884	Esp	Protein tyrosine phosphatase, receptor type, V	nc	1.17
X06942	Araf1	v-raf oncogene homolog 1	nc	1.20
U10071	Cart	Cocaine and amphetamine regulated transcript	nc	1.19
<u>Cytokine Activity</u>				
U81492	Il3	Interleukin 3	1.14	1.12
S73424	Mif	Macrophage migration inhibitory factor (MIF)	1.25	1.18
L36460	Il9	Interleukin 9	1.08	nc
E01884	Il1b	IL-1 β	1.12	nc
M63101	Il1rn	IL-1 receptor antagonist	1.12	nc
<u>Growth Factor Related</u>				
J04486	Igfbp2	Insulin-like growth factor binding protein 2	1.48	1.46
L04535	Sstr5	Somatostatin receptor 5	1.27	1.21
U57715	Frag1	FGF receptor activating protein 1	1.16	1.25
S60953	Ntrk3	Receptor tyrosine kinase (TrkC(ki39)), alternatively spliced.	1.34	1.35
X63143	Cspg5	Neuroglycan	1.09	1.17
X95096	Mst1	Macrophage stimulating 1 (hepatocyte growth factor-like)	1.12	nc
D00698	Igf1	Insulin-like growth factor I	1.17	nc
L41623	Pdgfb	PDGF (c-sis)	1.118	nc
S62933	Ntrk3	Receptor tyrosine kinase (TrkC(ki14)), alternatively spliced	nc	1.14
U59809	Igf2r	Insulin-like growth factor 2 receptor	-1.12	nc
M77809	Tgfb β 3	Transforming growth factor receptor β 3	nc	-1.12
AF003825	Gfra2	Glial cell line derived neurotrophic factor receptor α 2	1.25	1.24
<u>Hormone and Other Receptors</u>				
U92469	Arrb1	Gonadotropin-releasing hormone receptor	1.16	1.12
D16443	Ptger3	Prostaglandin E receptor 3 (subtype EP3)	nc	1.20

D14869	Ptger3	Prostaglandin E receptor 3 (subtype EP3)	-1.11	nc
S74898	Ptgfr	Prostaglandin F2- α receptor	nc	1.18
Y11433	P2ry4	Pyrimidinergic receptor P2Y, G-protein coupled, 4	1.18	1.29
X62295	Agtr1a	Vascular type-1 angiotensin II receptor.	1.23	1.29
M85183	Nalp6	Angiotensin/vasopressin receptor	1.10	nc
S75952	Glp1r	Glucagon-like peptide 1 receptor (GLP-1)	nc	1.25
X59249	Adora3	Adenosine A3 receptor	1.16	1.17
<u>Ion Transport (not Ca⁺⁺ or K⁺)</u>				
U76220	Cnga1	Cyclic nucleotide-gated cation channel	nc	-1.39
M90398	Atp12a	ATPase, H ⁺ /K ⁺ transporting, α -polypeptide	nc	-1.20
D17521	Clcn3	Protein kinase C-regulated chloride channel	1.10	1.23
<u>Neuropeptide related</u>				
AF031522	Galr3	Galanin receptor 3	1.09	1.13
U30290	Galr1	Galanin receptor 1	1.31	1.33
U37058	Nmbr	Neuromedin B receptor	1.15	1.13
K01701	Oxt	Oxytocin/neurophysin (Oxt)	1.12	1.24
X97374	Pnoc	Prepronociceptin	1.17	1.25
D16829	Oprk1	Opioid receptor, kappa 1	nc	1.21
<u>Photoreceptor</u>				
M91590	Arrb2	β 2 arrestin	1.23	1.39
AF015728	Cngb1	Cyclic nucleotide gated channel β 1	1.15	nc
<u>Potassium channel activity</u>				
AF000973	Kcnn1	Potassium intermediate/small conductance calcium-activated channel, subfamily N, member 1	1.18	1.22
AF020712	Kcnmb1	Potassium large conductance calcium-activated channel, subfamily M, β member 1	1.35	1.18
AF031384	Kcnk3	Potassium channel, subfamily K, member 3	1.32	1.39
AF089730	Slack	Potassium channel subunit (Slack)	1.35	1.45
AJ003065	Kcnj14	Potassium inwardly-rectifying channel, subfamily J, member 14	1.24	1.28
J04731	Kcna2	Potassium voltage-gated channel, shaker-related subfamily, member 2	1.10	1.18
M30312	Kcna3	Voltage-gated potassium channel protein (RGK5)	1.37	1.41
AF081366	Kcnj1	Potassium inwardly-rectifying channel, subfamily J, member 1	1.16	nc
M26161	Kcna1	Potassium voltage-gated channel, shaker-related subfamily, member 1	1.11	nc
J04629	Atp1b2	ATPase, Na ⁺ /K ⁺ transporting, β 2 polypeptide	nc	1.30
M81783	Kcnf1	Potassium voltage-gated channel, subfamily F, member 1	nc	1.13
X87635	Kcnj4	Potassium inwardly-rectifying channel, subfamily J, member 4	-1.13	-1.12
D86039	Kcnj8	ATP-sensitive inwardly rectifying K ⁺ channel, BIR(Kir6.2)	-1.62	-1.41
<u>Regulation of Transcription</u>				
AJ001029	Sox10	SRY-box containing gene 10	1.13	1.13
M20133	Ar	Androgen receptor	1.21	1.15
U40188	Taf9l	TAF9-like RNA polymerase II, TATA box binding protein (TBP)-associated factor	1.26	1.29
X06769	Fos	c-fos	-1.07	nc

AF050663	Rinzf	Zinc finger protein RIN ZF	1.07	1.17
J03933	Thrb	Thyroid hormone receptor, β	1.15	1.18
<u>Response to Stress</u>				
X78848	Gsta5	Glutathione S-transferase A5	nc	1.22
M86389	Hspb1	Heat shock 27kDa protein 1	-1.11	-1.29
S45392	Hspcb	Heat shock protein 90	-1.05	-1.09
<u>Signal Transduction</u>				
AJ000556	Jak1	Janus kinase 1	1.26	1.24
X07287	Prkcc	Protein kinase C- γ	1.21	nc
D30734	Rasa2	Ras GTPase-activating protein	nc	1.23
L02615	Pkia	Protein kinase inhibitor, α	nc	-1.21
AF013144	Dusp5	Dual specificity phosphatase 5	1.34	1.44
U49953	Pak1	P21 (CDKN1A)-activated kinase 1	1.29	1.39
<u>Structural Molecule Activity</u>				
M83196	Mtap1a	Microtubule-associated protein 1 A	1.12	1.19
X15013	Rpl7a	Ribosomal protein L7a	1.58	1.52
K00512	Mbp	Myelin basic protein	1.17	nc
X03475	Rpl35a	Ribosomal protein L35a	nc	1.20
AB011679	Tubb5	β 5 tubulin	-1.30	-1.34
AB015946	Tubg1	γ 1 tubulin	-1.40	-1.44
X62952	Vim	Vimentin	-1.79	-1.96
X66870	Lmna	Lamin A	-1.52	-1.96
AF459021	Tubb3	β 3 tubulin	-1.32	nc
V01227	Tuba1	α 1 tubulin	nc	-1.80
L16532	Cnp1	Cyclic nucleotide phosphodiesterase 1	1.26	1.32
<u>Synaptic Transmission</u>				
<i>Presynaptic function</i>				
AF056704	Syn3	Synapsin III	1.19	1.19
AJ006855	Synj1	Synaptojanin 1	1.23	1.28
D12573	Hpcal	Hippocalcin	1.21	1.24
M24104	Vamp1	Vesicle-associated membrane protein 1	1.10	1.16
U39549	Syngr1	Synaptogyrin 1	1.32	1.38
M95735	Stx1b2	Syntaxin 1B2	1.18	nc
U20105	Syt6	Synaptotagmin 6	1.12	nc
U26402	Syt5	Synaptotagmin 5	1.14	nc
AF033109	Stx8	Syntaxin 8	nc	1.26
X06655	Syp	Synaptophysin	nc	1.18
AF030253	Viaat	Vesicular inhibitory amino acid transporter	1.24	nc
<i>Catecholamine related</i>				
NM_012944	Drd4	Dopamine receptor 4	1.41	1.52
S48813	Adrbk1	β -adrenergic receptor kinase	1.23	1.29
L31771	Adra1d	α 1d adrenergic receptor	1.09	nc
U13368	Adra1a	α 1a adrenergic receptor	1.13	nc
X14211	Pnmt	Phenylethanolamine-N-methyltransferase	nc	1.27
D00634	Adrb1	β 1 adrenergic receptor	nc	1.24
X57659	Adra2c	α 2-C4 adrenergic receptor	-1.16	nc

M36831	Drd2	Dopamine receptor 2	nc	-1.22
M23601	Maob	Monoamine oxidase B	1.12	1.16
<i>Acetylcholine related</i>				
L31622	Chrb2	Cholinergic receptor, nicotinic, β 2	1.26	1.43
NM_017078	Chrna5	Cholinergic receptor, nicotinic, α 5	1.15	nc
AF007583	Colq	Collagen-like tail subunit of asymmetric acetylcholinesterase	-1.57	-1.57
<i>GABA related</i>				
L08491		GABA-A receptor α 2 subunit	1.33	1.30
S42358	Slc6a11	GABA transporter	1.09	1.23
X57514	Gabrg1	GABA-A receptor, γ 1	nc	1.26
D87839	Abat	4-aminobutyrate aminotransferase	-1.31	-1.19
<i>Glutamate related</i>				
M92075	Grm2	Glutamate receptor, metabotropic 2	1.17	1.20
D13212	Grin2c	N-methyl-D-aspartate receptor (NMDAR2C)	1.12	nc
D63772	Slc1a1	Solute carrier family 1 (neuronal/epithelial high affinity glutamate transporter, system Xag), member 1	1.13	1.25
M96853	Dlgh4	Discs, large homolog 4 (Drosophila)	1.26	1.19
U08260	Grin2d	N-methyl-D-aspartate receptor (NMDAR2D)	1.12	1.22
U88572	Grip1	Glutamate receptor interacting protein 1	1.14	1.26
L19708	Grin1	N-methyl-D-aspartate receptor (NMDAR1)	1.33	1.46
M90518	Grm4	Glutamate receptor, metabotropic 4	nc	1.29
X57573	Gad1	Glutamate decarboxylase 1	nc	-1.28
<i>Serotonin related</i>				
S68944	SLC6A4	Na ⁺ /Cl ⁻ dependent neurotransmitter transporter	1.33	1.38
L05596	Htr1f	serotonin receptor	1.21	1.22
X53501	Tph1	Tryptophan hydroxylase	1.11	1.28
X66842	Htr2b	Serotonin receptor 2B	1.17	nc
U01227	Htr3a	Serotonin receptor 3	-1.11	-1.08
<i>Other</i>				
AJ005641	Klk8	brain serine protease (bsp1)	1.19	1.43
<u>Other</u>				
U33472	Stk10	Serine/threonine kinase 10	1.12	nc
S68809	S100a1	S100 α	1.13	1.25
L09120	Capn2	Calpain 2	nc	1.21
X73683	H3f3b	Histone H3.3B	-1.67	-2.09
NM_012656	Sparc	Secreted acidic cysteine rich glycoprotein	1.11	1.12
M91652	Glul	Glutamine synthetase 1	-1.17	-1.31
S71597	Nos2	Nitric oxide synthase 2, inducible	1.38	1.15
U03388	Ptgs1	Prostaglandin-endoperoxide synthase 1	1.15	1.24
M19533	Ppia	Peptidylprolyl isomerase A	1.12	1.18
U61696	Rnpep	Arginyl aminopeptidase (aminopeptidase B)	1.10	nc
X62085	Hprt	Hypoxanthine guanine phosphoribosyl transferase	-1.22	nc
D50093	Prnp	Prion protein	nc	-1.18
L22339	Sult1a2	Sulfotransferase family 1A, member 2	1.07	1.19