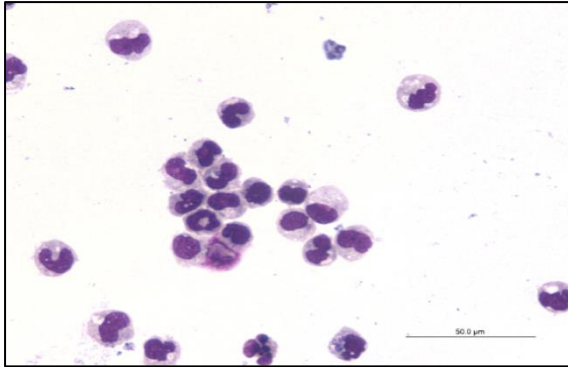
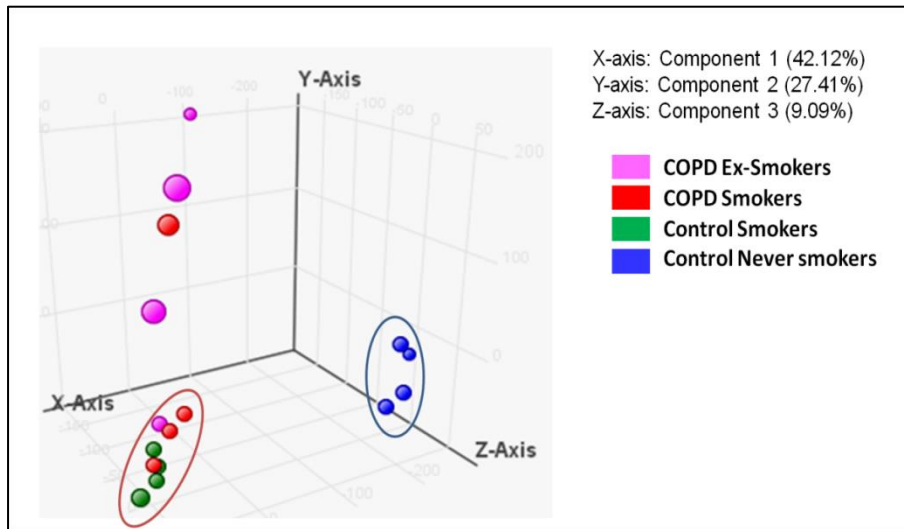


Supplementary Figure 1



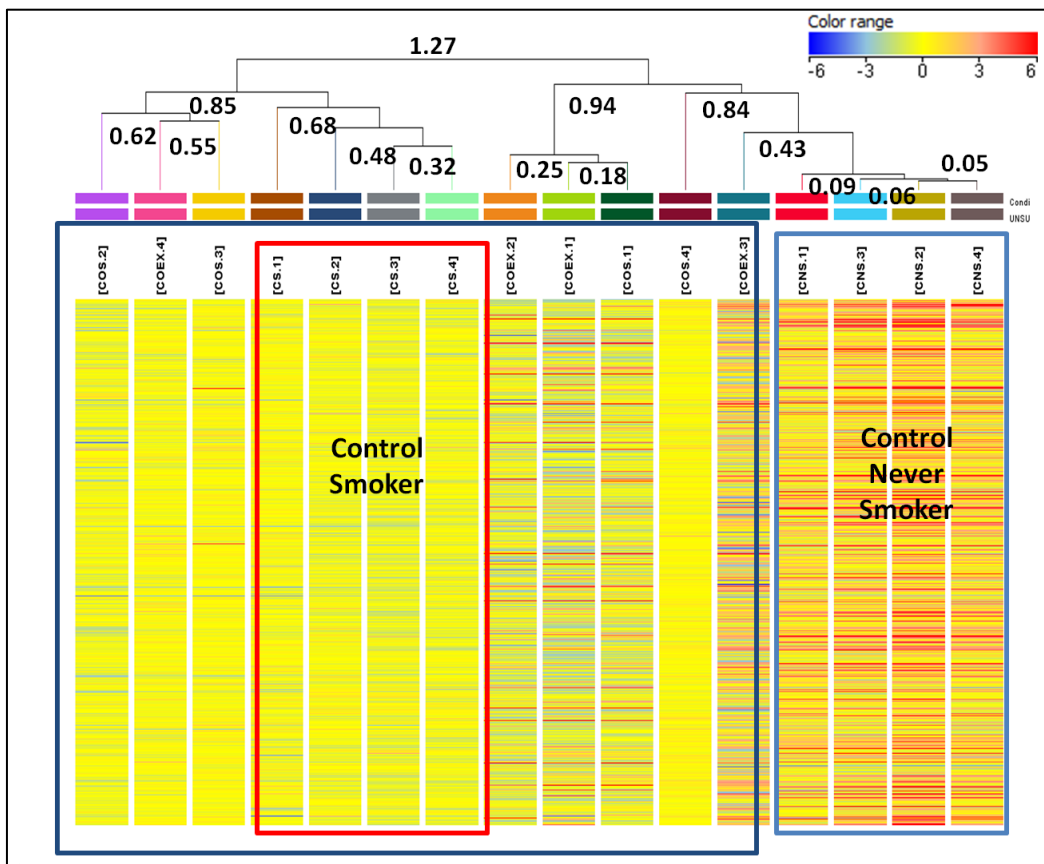
Supplementary Figure 1: Photomicrograph of CD14+ monocytes isolated from blood cells of COPD patients and stained with Giemsa. x40

Supplementary Figure 2



Supplementary Figure 2: Principal Component Analysis (PCA) of all (n=16) samples [COPD (n = 8) and Control (n = 8)]. The X-axis refers to the PCA component 1 with 42.12% variance. The Y axis refers to the PCA component 2 with 27.41% variance and the Z-axis refers to PCA component 3 with 9.09% variance.

Supplementary Figure 3



Supplementary Figure 3: Unsupervised Hierarchical Clustering analysis (uHCA) of COPD [COPD S (n = 4) and COPD Ex-S (n = 4)] and Control [CNS (n=4) and CS (n=4)] samples.

Supplementary Table 1: Differentially expressed genes in subgroups of Controls and COPD

- (i) Differentially expressed genes between Control smokers and COPD smoker having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	CLPS	colipase, pancreatic	-8.46	0.04
2	ARMC6	armadillo repeat containing 6	-6.03	0.02
3	ZNF646	zinc finger protein 646	-4.83	0.02
4	FLJ38576	uncharacterized LOC651430	-4.79	0.02
5	ITPKC	inositol-trisphosphate 3-kinase C	-4.35	0.04
6	PLOD3	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3	-3.49	0.02
7	SLC4A8	solute carrier family 4, sodium bicarbonate cotransporter, member 8	-3.43	0.02
8	TMEM30B	transmembrane protein 30B	-3.41	0.04

- (ii) Differentially expressed genes between Control smokers and COPD Ex-smoker having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	CLPS	colipase, pancreatic	-164.39	0.02
2	ARMC6	armadillo repeat containing 6	-30.69	0.04
3	FLJ38576	uncharacterized LOC651430	-29.07	0.04
4	ZNF646	zinc finger protein 646	-28.55	0.02
5	SLC4A8	solute carrier family 4, sodium bicarbonate cotransporter, member 8	-23.70	0.02
6	TMEM30B	transmembrane protein 30B	-19.61	0.02
7	CYP7A1	cytochrome P450, family 7, subfamily A, polypeptide 1	-16.44	0.04
8	IGSF21	immunoglobulin superfamily, member 21	-11.78	0.02

9	ITPKC	inositol-trisphosphate 3-kinase C	-11.29	0.02
10	LINC00476	long intergenic non-protein coding RNA 476	-11.27	0.04
11	GLTSCR1	glioma tumor suppressor candidate region gene 1	-9.84	0.02
12	TIRAP	toll-interleukin 1 receptor (TIR) domain containing adaptor protein	-9.73	0.02
13	PLOD3	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3	-9.54	0.02
14	HSPBP1	HSPA (heat shock 70kDa) binding protein, cytoplasmic cochaperone 1	-8.24	0.02
15	CASC3	cancer susceptibility candidate 3	-7.60	0.04
16	LOC100507277	uncharacterized LOC100507277	-7.41	0.04
17	TBC1D25	TBC1 domain family, member 25	-6.36	0.02
18	ZNF587	zinc finger protein 587	-6.15	0.02
19	THSD7A	thrombospondin, type I, domain containing 7A	-6.14	0.02
20	GFM1	G elongation factor, mitochondrial 1	-6.03	0.02
21	FECH	ferrochelatase	-5.17	0.02
22	KIF22	kinesin family member 22	-4.70	0.02
23	PWWP2B	PWWP domain containing 2B	-4.66	0.02
24	FAM127B	family with sequence similarity 127, member B	-4.52	0.04
25	NCAPH2	non-SMC condensin II complex, subunit H2	-4.34	0.02
26	SHISA9	shisa family member 9	-4.34	0.02
27	NOC2L	nucleolar complex associated 2 homolog (<i>S. cerevisiae</i>)	-4.25	0.02
28	TRIM60	tripartite motif containing 60	-4.08	0.02
29	BCAR3	breast cancer anti-estrogen resistance 3	-4.05	0.02
30	NDUFB7	NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 7, 18kDa	-4.02	0.02
31	RABL3	RAB, member of RAS oncogene family-like 3	-4.02	0.02
32	ZNF813	zinc finger protein 813	-3.97	0.02
33	PRPS1L1	phosphoribosyl pyrophosphate synthetase 1-like 1	-3.94	0.04
34	lnc-OTX2-3	lnc-OTX2-3:1	-3.89	0.04

35	PAQR7	progesterone and adiponectin receptor family member VII	-3.63	0.02
36	CELSR3	cadherin, EGF LAG seven-pass G-type receptor 3	-3.40	0.02
37	PTPRZ1	protein tyrosine phosphatase, receptor-type, Z polypeptide 1	-3.35	0.02
38	PCDH1	protocadherin 1	-3.32	0.02
39	NKX3-1	NK3 homeobox 1	-3.29	0.02
40	lnc-ESR2-1	lnc-ESR2-1:1	-3.25	0.02
41	ZNF510	zinc finger protein 510	-3.19	0.02
42	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	-3.18	0.02
43	SLC13A1	solute carrier family 13 (sodium/sulfate symporter), member 1	-3.06	0.02
44	lnc-AC040934.1-3	lnc-AC040934.1-3:1	-3.03	0.02
45	CBLN1	cerebellin 1 precursor	-3.00	0.02

(iii) Differentially expressed genes between Control smokers and Control Never smokers having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	GFM1	G elongation factor, mitochondrial 1	-165.59	0.02
2	MLLT4	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 4	-135.33	0.02
3	MAGI2-AS3	MAGI2 antisense RNA 3	-122.62	0.02
4	SLC6A14	solute carrier family 6 (amino acid transporter), member 14	-112.62	0.02
5	PHLPP1	PH domain and leucine rich repeat protein phosphatase 1	-110.73	0.02
6	ZNF229	zinc finger protein 229	-103.50	0.02
7	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	-100.77	0.02
8	PLN	phospholamban	-100.48	0.02
9	PCDHB10	protocadherin beta 10	-100.29	0.02
10	VLDLR	very low density lipoprotein receptor	-95.62	0.02
11	lnc-ESR2-1	lnc-ESR2-1:1	-93.16	0.02

12	CERS3	ceramide synthase 3	-92.15	0.02
13	TUBB2B	tubulin, beta 2B class IIb	-91.55	0.02
14	TEKT1	tektin 1	-90.27	0.02
15	THSD7A	thrombospondin, type I, domain containing 7A	-90.15	0.02
16	RHAG	Rh-associated glycoprotein	-87.53	0.02
17	AVPR1A	arginine vasopressin receptor 1A	-85.79	0.02
18	C1QL3	complement component 1, q subcomponent-like 3	-84.04	0.02
19	LCE1B	late cornified envelope 1B	-81.95	0.02
20	AASDH	aminoadipate-semialdehyde dehydrogenase	-80.36	0.02
21	LOC101929683	uncharacterized LOC101929683	-79.77	0.02
22	NKAIN3	Na ⁺ /K ⁺ transporting ATPase interacting 3	-79.55	0.02
23	IQCH	IQ motif containing H	-78.45	0.02
24	lnc-DR1-1	lnc-DR1-1:1	-78.24	0.02
25	LOC286071	uncharacterized LOC286071	-77.44	0.02
26	CCDC68	coiled-coil domain containing 68	-74.64	0.02
27	MID1	midline 1	-74.21	0.02
28	ADARB1	adenosine deaminase, RNA-specific, B1	-72.98	0.02
29	SPO11	SPO11 meiotic protein covalently bound to DSB	-72.81	0.02
30	CARD14	caspase recruitment domain family, member 14	-71.63	0.02
31	lnc-AKR1C3-1	lnc-AKR1C3-1:1	-68.97	0.02
32	LOC642620	uncharacterized LOC642620	-68.96	0.02
33	KLHL29	kelch-like family member 29	-67.58	0.02
34	SLC26A7	solute carrier family 26 (anion exchanger), member 7	-67.34	0.02
35	STEAP1	six transmembrane epithelial antigen of the prostate 1	-67.24	0.02
36	C2orf80	chromosome 2 open reading frame 80	-66.59	0.02
37	SLITRK5	SLIT and NTRK-like family, member 5	-65.20	0.02
38	TRIM60	tripartite motif containing 60	-64.82	0.02
39	FAM13A	family with sequence similarity 13, member A	-64.63	0.02
40	AQP11	aquaporin 11	-63.76	0.02
41	SALL1	spalt-like transcription factor 1	-63.74	0.02
42	COLCA2	colorectal cancer associated 2	-63.53	0.02

43	LINC01192	long intergenic non-protein coding RNA 1192	-62.57	0.02
44	RSPO2	R-spondin 2	-62.34	0.02
45	LOC101929475	uncharacterized LOC101929475	-62.23	0.02
46	WFDC10A	WAP four-disulfide core domain 10A	-60.83	0.02
47	CDH6	cadherin 6, type 2, K-cadherin (fetal kidney)	-60.80	0.02
48	SLC13A1	solute carrier family 13 (sodium/sulfate symporter), member 1	-60.28	0.02
49	GBP7	guanylate binding protein 7	-60.01	0.02
50	AGXT	alanine-glyoxylate aminotransferase	-59.47	0.02
51	LYPD1	LY6/PLAUR domain containing 1	-59.05	0.02
52	LINC00403	long intergenic non-protein coding RNA 403	-58.39	0.02
53	RGS17	regulator of G-protein signaling 17	-58.25	0.02
54	CRISP3	cysteine-rich secretory protein 3	-57.74	0.02
55	LOC100507277	uncharacterized LOC100507277	-57.36	0.02
56	SEMA5A	sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5A	-57.18	0.02
57	LINC00656	long intergenic non-protein coding RNA 656	-56.52	0.02
58	DLGAP1	discs, large (Drosophila) homolog-associated protein 1	-56.37	0.02
59	MAGEB3	melanoma antigen family B, 3	-56.10	0.02
60	FAM149B1	family with sequence similarity 149, member B1	-55.40	0.02
61	ATP13A4	ATPase type 13A4	-55.18	0.02
62	PCDHGA5	protocadherin gamma subfamily A, 5	-55.13	0.02
63	SPDYA	speedy/RINGO cell cycle regulator family member A	-55.12	0.02
64	AMOT	angiominin	-53.57	0.02
65	C17orf104	chromosome 17 open reading frame 104	-53.56	0.02
66	PNPO	pyridoxamine 5'-phosphate oxidase	-53.43	0.02
67	HMMR-AS1	HMMR antisense RNA 1	-53.10	0.02

68	CAPN11	calpain 11	-52.93	0.02
69	TP53BP1	tumor protein p53 binding protein 1	-52.91	0.02
70	lnc-PDE4D-1	lnc-PDE4D-1:1	-52.91	0.02
71	BHMT2	betaine--homocysteine S-methyltransferase 2	-52.82	0.02
72	CBLN1	cerebellin 1 precursor	-52.63	0.02
73	DPP10	dipeptidyl-peptidase 10 (non-functional)	-52.47	0.02
74	CYP4X1	cytochrome P450, family 4, subfamily X, polypeptide 1	-52.40	0.02
75	ATF7	activating transcription factor 7	-52.39	0.02
76	ZFP28	ZFP28 zinc finger protein	-52.16	0.02
77	SLC6A3	solute carrier family 6 (neurotransmitter transporter), member 3	-51.96	0.02
78	SLC10A7	solute carrier family 10, member 7	-51.58	0.02
79	SFRP2	secreted frizzled-related protein 2	-51.13	0.02
80	GRIK2	glutamate receptor, ionotropic, kainate 2	-50.03	0.02
81	GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	-49.77	0.02
82	LRRIQ1	leucine-rich repeats and IQ motif containing 1	-49.51	0.02
83	FAM53B-AS1	FAM53B antisense RNA 1	-49.29	0.02
84	LHX6	LIM homeobox 6	-49.23	0.02
85	KLHL1	kelch-like family member 1	-49.21	0.02
86	LOC100131864	uncharacterized LOC100131864	-49.14	0.02
87	DUSP21	dual specificity phosphatase 21	-49.09	0.02
88	DYNC2H1	dynein, cytoplasmic 2, heavy chain 1	-48.78	0.02
89	SALL3	spalt-like transcription factor 3	-48.78	0.02
90	DKK3	dickkopf WNT signaling pathway inhibitor 3	-48.76	0.02
91	AFF2	AF4/FMR2 family, member 2	-48.74	0.02
92	lnc-OTX2-3	lnc-OTX2-3:1	-48.40	0.02
93	DCC	DCC netrin 1 receptor	-48.38	0.02
94	DIRAS3	DIRAS family, GTP-binding RAS-like 3	-48.24	0.02
95	LHX9	LIM homeobox 9	-48.08	0.02
96	ZIC2	Zic family member 2	-47.99	0.02
97	TMEM257	transmembrane protein 257	-47.57	0.02

98	GRM1	glutamate receptor, metabotropic 1	-47.45	0.02
99	SEMA3E	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3E	-47.27	0.02
100	SCAMPER	sphingolipid Ca ²⁺ release mediating protein of endoplasmic reticulum	-47.14	0.02
101	COL19A1	collagen, type XIX, alpha 1	-47.09	0.02
102	SPAG16	sperm associated antigen 16	-47.01	0.02
103	TIE1	tyrosine kinase with immunoglobulin-like and EGF-like domains 1	-46.68	0.02
104	PRKAA2	protein kinase, AMP-activated, alpha 2 catalytic subunit	-46.65	0.02
105	ANGPT1	angiopoietin 1	-46.53	0.02
106	IFNA8	interferon, alpha 8	-46.41	0.02
107	LOC101928036	uncharacterized LOC101928036	-46.41	0.02
108	GJD4	gap junction protein, delta 4, 40.1kDa	-46.38	0.02
109	BRIP1	BRCA1 interacting protein C-terminal helicase 1	-46.33	0.02
110	MMP20	matrix metalloproteinase 20	-46.20	0.02
111	GLP1R	glucagon-like peptide 1 receptor	-46.06	0.02
112	MBTPS2	membrane-bound transcription factor peptidase, site 2	-45.70	0.02
113	CNTFR	ciliary neurotrophic factor receptor	-45.57	0.02
114	LRRC55	leucine rich repeat containing 55	-45.50	0.02
115	lnc-C3orf65-1	lnc-C3orf65-1:1	-45.46	0.02
116	PCDHGB6	protocadherin gamma subfamily B, 6	-45.39	0.02
117	COL6A3	collagen, type VI, alpha 3	-45.29	0.02
118	PTPRZ1	protein tyrosine phosphatase, receptor-type, Z polypeptide 1	-45.26	0.02
119	FLRT2	fibronectin leucine rich transmembrane protein 2	-45.03	0.02
120	ANKRD62	ankyrin repeat domain 62	-44.96	0.02
121	LRP2BP	LRP2 binding protein	-44.94	0.02
122	CADM2	cell adhesion molecule 2	-44.85	0.02
123	lnc-GFAP-1	lnc-GFAP-1:1	-44.77	0.02

124	SLC5A7	solute carrier family 5 (sodium/choline cotransporter), member 7	-44.77	0.02
125	LOC101928794	uncharacterized LOC101928794	-44.33	0.02
126	UTS2B	urotensin 2B	-44.24	0.02
127	MARK4	MAP/microtubule affinity-regulating kinase 4	-44.15	0.02
128	KRT12	keratin 12, type I	-43.90	0.02
129	LOC100996573	uncharacterized LOC100996573	-43.54	0.02
130	NDC80	NDC80 kinetochore complex component	-43.34	0.02
131	DNAH14	dynein, axonemal, heavy chain 14	-42.99	0.02
132	DPY19L2	dpy-19-like 2 (C. elegans)	-42.92	0.02
133	lnc-SNURF-3	lnc-SNURF-3:21	-42.84	0.02
134	SFXN1	sideroflexin 1	-42.81	0.02
135	SYNE1	spectrin repeat containing, nuclear envelope 1	-42.44	0.02
136	CCDC113	coiled-coil domain containing 113	-42.14	0.02
137	MIR1245A	microRNA 1245a	-42.07	0.02
138	ZNF682	zinc finger protein 682	-41.98	0.02
139	PCDHB2	protocadherin beta 2	-41.94	0.02
140	SPERT	spermatid associated	-41.70	0.02
141	MYH7B	myosin, heavy chain 7B, cardiac muscle, beta	-41.56	0.02
142	ZNF471	zinc finger protein 471	-41.32	0.02
143	NCAM2	neural cell adhesion molecule 2	-40.65	0.02
144	LINC00615	long intergenic non-protein coding RNA 615	-39.82	0.02
145	MLPH	melanophilin	-38.78	0.02
146	APBB2	amyloid beta (A4) precursor protein-binding, family B, member 2	-38.14	0.02
147	WDR72	WD repeat domain 72	-37.86	0.02
148	IL22RA1	interleukin 22 receptor, alpha 1	-37.70	0.02
149	NOX4	NADPH oxidase 4	-37.38	0.02
150	TRAF3IP2	TRAF3 interacting protein 2	-37.18	0.02
151	VSTM2L	V-set and transmembrane domain containing 2 like	-36.76	0.02
152	DMD	dystrophin	-36.19	0.02
153	ADAMTSL1	ADAMTS-like 1	-35.67	0.02
154	SRGAP3	SLIT-ROBO Rho GTPase activating protein 3	-34.41	0.02

155	PHC3	polyhomeotic homolog 3 (Drosophila)	-34.36	0.02
156	INSM1	insulinoma-associated 1	-34.16	0.02
157	lnc-FAM189A1-3	lnc-FAM189A1-3:1	-33.64	0.02
158	RGS4	regulator of G-protein signaling 4	-33.63	0.02
159	FAM47E	family with sequence similarity 47, member E	-33.57	0.02
160	FBLIM1	filamin binding LIM protein 1	-33.57	0.02
161	CCDC144A	coiled-coil domain containing 144A	-33.55	0.02
162	PVRL3	poliovirus receptor-related 3	-33.10	0.02
163	XKR6	XK, Kell blood group complex subunit-related family, member 6	-33.06	0.02
164	SLC30A8	solute carrier family 30 (zinc transporter), member 8	-31.30	0.02
165	CCM2L	cerebral cavernous malformation 2-like	-30.97	0.02
166	NR0B1	nuclear receptor subfamily 0, group B, member 1	-29.98	0.02
167	C15orf56	chromosome 15 open reading frame 56	-29.54	0.02
168	RBMY1E	RNA binding motif protein, Y-linked, family 1, member E	-28.66	0.02
169	ECM2	extracellular matrix protein 2, female organ and adipocyte specific	-27.58	0.02
170	BMP7	bone morphogenetic protein 7	-27.52	0.02
171	DCAF12L1	DDB1 and CUL4 associated factor 12-like 1	-25.86	0.02
172	PDP2	pyruvate dehydrogenase phosphatase catalytic subunit 2	-25.29	0.02
173	LUM	lumican	-23.03	0.02
174	WDR62	WD repeat domain 62	-21.92	0.02
175	CTGF	connective tissue growth factor	-21.67	0.02
176	C8orf34	chromosome 8 open reading frame 34	-21.06	0.02
177	FHAD1	forkhead-associated (FHA) phosphopeptide binding domain 1	-20.18	0.02
178	C5orf66-AS2	C5orf66 antisense RNA 2	-19.34	0.02
179	OTC	ornithine carbamoyltransferase	-18.12	0.02
180	lnc-FZD4-1	lnc-FZD4-1:2	-18.04	0.02

181	ACSS3	acyl-CoA synthetase short-chain family member 3	-17.93	0.02
182	UACA	uveal autoantigen with coiled-coil domains and ankyrin repeats	-17.85	0.02
183	CDH26	cadherin 26	-17.62	0.02
184	FOXP2	forkhead box P2	-17.33	0.02
185	ATP1B4	ATPase, Na ⁺ /K ⁺ transporting, beta 4 polypeptide	-17.32	0.02
186	ETV3L	ets variant 3-like	-17.00	0.02
187	LIPH	lipase, member H	-16.92	0.02
188	TXNL1	thioredoxin-like 1	-16.21	0.02
189	CASC5	cancer susceptibility candidate 5	-15.88	0.02
190	THOC5	THO complex 5	-15.81	0.02
191	CCP110	centriolar coiled coil protein 110kDa	-15.24	0.02
192	ACACA	acetyl-CoA carboxylase alpha	-14.78	0.02
193	PGAP1	post-GPI attachment to proteins 1	-14.70	0.02
194	BRCA2	breast cancer 2, early onset	-14.34	0.02
195	TTY12	testis-specific transcript, Y-linked 12 (non-protein coding)	-14.25	0.02
196	GLDN	gliomedin	-14.23	0.02
197	BRIP1	BRCA1 interacting protein C-terminal helicase 1	-14.20	0.02
198	HOGA1	4-hydroxy-2-oxoglutarate aldolase 1	-14.16	0.02
199	PRDM9	PR domain containing 9	-14.01	0.02
200	NMNAT2	nicotinamide nucleotide adenylyltransferase 2	-13.85	0.02
201	MARVELD3	MARVEL domain containing 3	-13.80	0.02
202	SLC25A26	solute carrier family 25 (S-adenosylmethionine carrier), member 26	-13.73	0.02
203	lnc-ANTXRL-2	lnc-ANTXRL-2:1	-13.51	0.02
204	GARNL3	GTPase activating Rap/RanGAP domain-like 3	-13.11	0.02
205	FRMD3	FERM domain containing 3	-13.04	0.02
206	ZFYVE16	zinc finger, FYVE domain containing 16	-13.00	0.02
207	PUS10	pseudouridylate synthase 10	-12.04	0.02
208	INTS1	integrator complex subunit 1	-12.00	0.02
209	SPINK6	serine peptidase inhibitor, Kazal type 6	-11.91	0.02

210	PRAMENP	PRAME N-terminal-like, pseudogene	-11.07	0.02
211	ULBP2	UL16 binding protein 2	-10.93	0.02
212	TRAF3IP2-AS1	TRAF3IP2 antisense RNA 1	-10.91	0.02
213	FAM27E2	family with sequence similarity 27, member E2	-10.70	0.02
214	PIANP	PILR alpha associated neural protein	-10.65	0.02
215	SLC25A5-AS1	SLC25A5 antisense RNA 1	-10.52	0.02
216	HBM	hemoglobin, mu	-10.52	0.02
217	TRIM17	tripartite motif containing 17	-10.30	0.02
218	KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	-10.30	0.02
219	TRIM48	tripartite motif containing 48	-10.28	0.02
220	CASC10	cancer susceptibility candidate 10	-10.27	0.02
221	C1orf167	chromosome 1 open reading frame 167	-10.26	0.02
222	FMNL3	formin-like 3	-10.24	0.02
223	CALCR	calcitonin receptor	-10.24	0.02
224	IFT57	intraflagellar transport 57	-10.23	0.02
225	ENAH	enabled homolog (Drosophila)	-10.21	0.02
226	RSPH9	radial spoke head 9 homolog (Chlamydomonas)	-10.06	0.02
227	WDHD1	WD repeat and HMG-box DNA binding protein 1	-9.79	0.02
228	ZNF587B	zinc finger protein 587B	-9.76	0.02
229	ZNF251	zinc finger protein 251	-9.54	0.02
230	LOC643406	uncharacterized LOC643406	-9.40	0.02
231	FITM2	fat storage-inducing transmembrane protein 2	-9.36	0.02
232	ZFP2	ZFP2 zinc finger protein	-9.30	0.02
233	lnc-PCDH19-1	lnc-PCDH19-1:1	-9.30	0.02
234	SCN9A	sodium channel, voltage gated, type IX alpha subunit	-9.18	0.02
235	TCTN1	tectonic family member 1	-9.11	0.02
236	CAPN13	calpain 13	-9.06	0.02
237	COLEC11	collectin sub-family member 11	-8.97	0.02
238	SLC9B1	solute carrier family 9, subfamily B (NHA1, cation proton antiporter 1), member 1	-8.97	0.02
239	CNNM2	cyclin and CBS domain divalent metal cation transport mediator 2	-8.77	0.02

240	LRR63	leucine rich repeat containing 63	-8.72	0.02
241	LACRT	lacritin	-8.65	0.02
242	LOC101927482	uncharacterized LOC101927482	-8.59	0.02
243	ZFP30	ZFP30 zinc finger protein	-8.53	0.02
244	AVPR2	arginine vasopressin receptor 2	-8.48	0.02
245	SLC35D1	solute carrier family 35 (UDP-GlcA/UDP-GalNAc transporter), member D1	-8.47	0.02
246	KRT80	keratin 80, type II	-8.46	0.02
247	PLA2G10	phospholipase A2, group X	-8.40	0.02
248	CD276	CD276 molecule	-8.39	0.02
249	RBBP5	retinoblastoma binding protein 5	-8.35	0.02
250	HCG9	HLA complex group 9 (non-protein coding)	-8.27	0.02
251	ASH1L	ash1 (absent, small, or homeotic)-like (Drosophila)	-8.27	0.02
252	STRBP	spermatid perinuclear RNA binding protein	-8.17	0.02
253	TNFRSF21	tumor necrosis factor receptor superfamily, member 21	-8.15	0.02
254	ZSCAN2	zinc finger and SCAN domain containing 2	-8.10	0.02
255	ABCA10	ATP-binding cassette, sub-family A (ABC1), member 10	-8.06	0.02
256	SLC4A8	solute carrier family 4, sodium bicarbonate cotransporter, member 8	-7.92	0.02
257	CALB2	calbindin 2	-7.88	0.02
258	RSPH4A	radial spoke head 4 homolog A (Chlamydomonas)	-7.78	0.02
259	TPD52	tumor protein D52	-7.76	0.02
260	MUC12	mucin 12, cell surface associated	-7.75	0.02
261	ZNF383	zinc finger protein 383	-7.71	0.02
262	RIC3	RIC3 acetylcholine receptor chaperone	-7.68	0.02
263	GSTCD	glutathione S-transferase, C-terminal domain containing	-7.64	0.02
264	TRAM1	translocation associated membrane protein 1	-7.56	0.02
265	TBC1D25	TBC1 domain family, member 25	-7.51	0.02

266	ACSBG1	acyl-CoA synthetase bubblegum family member 1	-7.49	0.02
267	HNRNPM	heterogeneous nuclear ribonucleoprotein M	-7.48	0.02
268	MRAP	melanocortin 2 receptor accessory protein	-7.48	0.02
269	STAG3L4	stromal antigen 3-like 4 (pseudogene)	-7.46	0.02
270	ASTN1	astrotactin 1	-7.45	0.02
271	PRSS1	protease, serine, 1 (trypsin 1)	-7.44	0.02
272	GLUD1P7	glutamate dehydrogenase 1 pseudogene 7	-7.44	0.02
273	HDAC6	histone deacetylase 6	-7.43	0.02
274	ELL3	elongation factor RNA polymerase II-like 3	-7.43	0.02
275	CELF3	CUGBP, Elav-like family member 3	-7.42	0.02
276	EOGT	EGF domain-specific O-linked N-acetylglucosamine (GlcNAc) transferase	-7.40	0.02
277	ANKRD34B	ankyrin repeat domain 34B	-7.39	0.02
278	IL4	interleukin 4	-7.37	0.02
279	LMF1	lipase maturation factor 1	-7.36	0.02
280	FLJ44715	uncharacterized LOC386671	-7.33	0.02
281	C19orf80	chromosome 19 open reading frame 80	-7.25	0.02
282	IER3IP1	immediate early response 3 interacting protein 1	-7.23	0.02
283	ZNF551	zinc finger protein 551	-7.21	0.02
284	CCDC173	coiled-coil domain containing 173	-7.19	0.02
285	SSX2	synovial sarcoma, X breakpoint 2	-7.09	0.02
286	FBXO10	F-box protein 10	-7.07	0.02
287	SUN3	Sad1 and UNC84 domain containing 3	-7.04	0.02
288	P2RY12	purinergic receptor P2Y, G-protein coupled, 12	-7.04	0.02
289	ZNF366	zinc finger protein 366	-7.00	0.02
290	lnc-WDR34-2	lnc-WDR34-2:2	-6.98	0.02
291	WNK2	WNK lysine deficient protein kinase 2	-6.98	0.02
292	DPYS	dihydropyrimidinase	-6.91	0.02
293	lnc-PLA2G3-1	lnc-PLA2G3-1:1	-6.88	0.02
294	GPR27	G protein-coupled receptor 27	-6.80	0.02
295	ARHGEF10	Rho guanine nucleotide exchange factor (GEF) 10	-6.79	0.02

296	RNF157	ring finger protein 157	-6.65	0.02
297	FAM106CP	family with sequence similarity 106, member C, pseudogene	-6.45	0.02
298	C6orf52	chromosome 6 open reading frame 52	-6.42	0.02
299	FSIP1	fibrous sheath interacting protein 1	-6.42	0.02
300	STON2	stonin 2	-6.40	0.02
301	IGSF21	immunoglobulin superfamily, member 21	-6.39	0.02
302	SEC14L1	SEC14-like 1 (<i>S. cerevisiae</i>)	-6.37	0.02
303	C11orf97	chromosome 11 open reading frame 97	-6.36	0.02
304	NF2	neurofibromin 2 (merlin)	-6.32	0.04
305	PRAMEF19	PRAME family member 19	-6.30	0.02
306	HAS3	hyaluronan synthase 3	-6.25	0.02
307	CUX1	cut-like homeobox 1	-6.25	0.02
308	OSBP2	oxysterol binding protein 2	-6.24	0.02
309	DLGAP5	discs, large (<i>Drosophila</i>) homolog-associated protein 5	-6.19	0.02
310	RSG1	REM2 and RAB-like small GTPase 1	-6.11	0.02
311	TXLNA	taxilin alpha	-6.10	0.02
312	POTEI	POTE ankyrin domain family, member I	-6.05	0.02
313	PPEF1	protein phosphatase, EF-hand calcium binding domain 1	-6.03	0.02
314	SLC35G1	solute carrier family 35, member G1	-6.02	0.02
315	C9orf131	chromosome 9 open reading frame 131	-5.99	0.02
316	DTX4	deltex 4, E3 ubiquitin ligase	-5.99	0.02
317	LPPR4	lipid phosphate phosphatase-related protein type 4	-5.96	0.02
318	RPS2	ribosomal protein S2	-5.95	0.02
319	ALKBH5	AlkB family member 5, RNA demethylase	-5.95	0.02
320	ZCCHC18	zinc finger, CCHC domain containing 18	-5.86	0.02
321	LANCL2	LanClantibioticsynthetase component C-like 2 (bacterial)	-5.84	0.02
322	KIRREL2	kin of IRRE like 2 (<i>Drosophila</i>)	-5.83	0.02
323	ZNF221	zinc finger protein 221	-5.83	0.02
324	lnc-FAS-1	lnc-FAS-1:1	-5.80	0.02
325	NEK9	NIMA-related kinase 9	-5.80	0.02
326	FLCN	folliculin	-5.78	0.02

327	OLFML2A	olfactomedin-like 2A	-5.78	0.02
328	ARHGAP5-AS1	ARHGAP5 antisense RNA 1 (head to head)	-5.77	0.02
329	ZNF16	zinc finger protein 16	-5.73	0.02
330	CD79B	CD79b molecule, immunoglobulin-associated beta	-5.72	0.02
331	KCNJ9	potassium channel, inwardly rectifying subfamily J, member 9	-5.71	0.02
332	GPR135	G protein-coupled receptor 135	-5.70	0.02
333	CDC25B	cell division cycle 25B	-5.70	0.02
334	ZNF530	zinc finger protein 530	-5.67	0.02
335	LINC00839	long intergenic non-protein coding RNA 839	-5.67	0.02
336	CLGN	calmegin	-5.64	0.02
337	SFTPA2	surfactant protein A2	-5.63	0.02
338	TM7SF2	transmembrane 7 superfamily member 2	-5.60	0.02
339	KLKB1	kallikrein B, plasma (Fletcher factor) 1	-5.58	0.02
340	LOC200726	hCG1657980	-5.53	0.02
341	L3MBTL1	l(3)mbt-like 1 (Drosophila)	-5.52	0.02
342	BEND7	BEN domain containing 7	-5.52	0.02
343	ZNF501	zinc finger protein 501	-5.50	0.02
344	OTUD7B	OTU deubiquitinase 7B	-5.48	0.02
345	OLAH	oleoyl-ACP hydrolase	-5.47	0.02
346	LOC101928092	uncharacterized LOC101928092	-5.41	0.02
347	PPP2R3A	protein phosphatase 2, regulatory subunit B'', alpha	-5.40	0.02
348	ERMN	ermin, ERM-like protein	-5.39	0.02
349	MYNN	myoneurin	-5.39	0.02
350	VPS13B	vacuolar protein sorting 13 homolog B (yeast)	-5.37	0.02
351	HAGLROS	HAGLR opposite strand (non-protein coding)	-5.33	0.02
352	GPALPP1	GPALPP motifs containing 1	-5.32	0.02
353	PIP5K1P1	phosphatidylinositol-4-phosphate 5-kinase, type I, pseudogene 1	-5.29	0.02
354	FGF14-AS2	FGF14 antisense RNA 2	-5.28	0.02
355	ZNF146	zinc finger protein 146	-5.26	0.02
356	NAA40	N(alpha)-acetyltransferase 40, NatD catalytic subunit	-5.24	0.02
357	ZNF718	zinc finger protein 718	-5.23	0.02

358	BBS7	Bardet-Biedl syndrome 7	-5.21	0.02
359	IKZF2	IKAROS family zinc finger 2 (Helios)	-5.21	0.02
360	SMURF2	SMAD specific E3 ubiquitin protein ligase 2	-5.20	0.02
361	CDK17	cyclin-dependent kinase 17	-5.20	0.02
362	ZFP3	ZFP3 zinc finger protein	-5.19	0.02
363	ND1	NADH dehydrogenase, subunit 1 (complex I)	-5.18	0.02
364	MSANTD3	Myb/SANT-like DNA-binding domain containing 3	-5.17	0.02
365	CCL26	chemokine (C-C motif) ligand 26	-5.16	0.02
366	RABL2A	RAB, member of RAS oncogene family-like 2A	-5.14	0.02
367	ZNF682	zinc finger protein 682	-5.11	0.02
368	MAPRE2	microtubule-associated protein, RP/EB family, member 2	-5.11	0.04
369	C1orf115	chromosome 1 open reading frame 115	-5.08	0.02
370	ABCA11P	ATP-binding cassette, subfamily A (ABC1), member 11, pseudogene	-5.05	0.02
371	UEVLD	UEV and lactate/malate dehydrogenase domains	-5.03	0.02
372	ANXA11	annexin A11	-5.00	0.02
373	TRPV4	transient receptor potential cation channel, subfamily V, member 4	-5.00	0.02
374	PDE12	phosphodiesterase 12	-4.99	0.02
375	lnc-XRCC6-1	lnc-XRCC6-1:1	-4.99	0.02
376	ZNF75A	zinc finger protein 75a	-4.94	0.02
377	ADAL	adenosine deaminase-like	-4.93	0.02
378	PRG2	proteoglycan 2, bone marrow (natural killer cell activator, eosinophil granule major basic protein)	-4.93	0.02
379	MFI2-AS1	MFI2 antisense RNA 1	-4.92	0.02
380	CLCN2	chloride channel, voltage-sensitive 2	-4.91	0.02
381	ZNF561	zinc finger protein 561	-4.91	0.02
382	KIAA1804	mixed lineage kinase 4	-4.88	0.02
383	OPTC	opticin	-4.84	0.02
384	BRWD1-IT2	BRWD1 intronic transcript 2 (non-protein coding)	-4.84	0.02
385	lnc-GPR183-2	lnc-GPR183-2:4	-4.84	0.02
386	MCOLN2	mucolipin 2	-4.80	0.02

387	ATP6V1C2	ATPase, H ⁺ transporting, lysosomal 42kDa, V1 subunit C2	-4.79	0.02
388	RAP2C-AS1	RAP2C antisense RNA 1	-4.77	0.02
389	SETD8	SET domain containing (lysine methyltransferase) 8	-4.77	0.02
390	AHI1	Abelson helper integration site 1	-4.77	0.02
391	ORAOV1	oral cancer overexpressed 1	-4.74	0.02
392	TMEM144	transmembrane protein 144	-4.73	0.02
393	NUP43	nucleoporin 43kDa	-4.73	0.02
394	HESX1	HESX homeobox 1	-4.73	0.02
395	DDX31	DEAD (Asp-Glu-Ala-Asp) box polypeptide 31	-4.70	0.02
396	ANKRD20A12P	ankyrin repeat domain 20 family, member A12, pseudogene	-4.70	0.02
397	LURAP1	leucine rich adaptor protein 1	-4.68	0.02
398	ZNF443	zinc finger protein 443	-4.67	0.02
399	ACTR3B	ARP3 actin-related protein 3 homolog B (yeast)	-4.67	0.02
400	CDHR1	cadherin-related family member 1	-4.67	0.02
401	PHF8	PHD finger protein 8	-4.67	0.02
402	ZNF664	zinc finger protein 664	-4.63	0.02
403	ZMAT3	zinc finger, matrin-type 3	-4.62	0.02
404	MCM4	minichromosome maintenance complex component 4	-4.62	0.02
405	DNAH9	dynein, axonemal, heavy chain 9	-4.61	0.02
406	ZBTB41	zinc finger and BTB domain containing 41	-4.61	0.02
407	PDE12	phosphodiesterase 12	-4.60	0.02
408	NAV2	neuron navigator 2	-4.60	0.02
409	VHLL	von Hippel-Lindau tumor suppressor-like	-4.57	0.02
410	C17orf100	chromosome 17 open reading frame 100	-4.57	0.02
411	FLJ38576	uncharacterized LOC651430	-4.56	0.02
412	ZC3H12D	zinc finger CCCH-type containing 12D	-4.55	0.02
413	SPG11	spastic paraplegia 11 (autosomal recessive)	-4.53	0.02
414	RNF38	ring finger protein 38	-4.53	0.02
415	TNRC6C	trinucleotide repeat containing 6C	-4.52	0.02
416	RPS3	ribosomal protein S3	-4.52	0.02

417	TMEM171	transmembrane protein 171	-4.50	0.02
418	LRRC42	leucine rich repeat containing 42	-4.49	0.02
419	lnc-TMEM109-1	lnc-TMEM109-1:1	-4.47	0.02
420	ERCC4	excision repair cross-complementation group 4	-4.47	0.02
421	HMG5	high mobility group nucleosome binding domain 5	-4.45	0.02
422	lnc-CHD1L-1	lnc-CHD1L-1:3	-4.44	0.02
423	TLE6	transducin-like enhancer of split 6	-4.41	0.02
424	ZNF69	zinc finger protein 69	-4.39	0.02
425	MFAP3	microfibrillar-associated protein 3	-4.39	0.02
426	NTF3	neurotrophin 3	-4.36	0.02
427	SCAND2P	SCAN domain containing 2 pseudogene	-4.35	0.02
428	CD81	CD81 molecule	-4.35	0.02
429	MEIG1	meiosis/spermiogenesis associated 1	-4.34	0.02
430	SNRPC	small nuclear ribonucleoprotein polypeptide C	-4.34	0.02
431	GPATCH2L	G patch domain containing 2-like	-4.33	0.02
432	MAGED4B	melanoma antigen family D, 4B	-4.31	0.02
433	SESN3	sestrin 3	-4.30	0.02
434	RALGPS1	Ral GEF with PH domain and SH3 binding motif 1	-4.29	0.02
435	ZSCAN30	zinc finger and SCAN domain containing 30	-4.28	0.02
436	THRAP3	thyroid hormone receptor associated protein 3	-4.27	0.02
437	TCEAL7	transcription elongation factor A (SII)-like 7	-4.27	0.02
438	PIP5KL1	phosphatidylinositol-4-phosphate 5-kinase-like 1	-4.26	0.02
439	CAPRIN2	caprin family member 2	-4.24	0.02
440	DRC1	dynein regulatory complex subunit 1	-4.23	0.02
441	CDCA3	cell division cycle associated 3	-4.23	0.02
442	GAS8	growth arrest-specific 8	-4.21	0.02
443	KIAA1257	KIAA1257	-4.21	0.02
444	MACROD2	MACRO domain containing 2	-4.19	0.02
445	GAB1	GRB2-associated binding protein 1	-4.19	0.02

446	STS	steroid sulfatase (microsomal), isozyme S	-4.16	0.02
447	ATP11A	ATPase, class VI, type 11A	-4.16	0.02
448	ZNF2	zinc finger protein 2	-4.16	0.02
449	TRAF3IP2	TRAF3 interacting protein 2	-4.12	0.02
450	LOC100507537	uncharacterized LOC100507537	-4.11	0.02
451	DHTKD1	dehydrogenase E1 and transketolase domain containing 1	-4.11	0.02
452	KBTBD8	kelch repeat and BTB (POZ) domain containing 8	-4.10	0.02
453	NGRN	neugrin, neurite outgrowth associated	-4.10	0.02
454	TRAF3	TNF receptor-associated factor 3	-4.09	0.02
455	ZNF76	zinc finger protein 76	-4.08	0.02
456	ZNF510	zinc finger protein 510	-4.08	0.02
457	COLQ	collagen-like tail subunit (single strand of homotrimer) of asymmetric acetylcholinesterase	-4.07	0.02
458	SLC9A1	solute carrier family 9, subfamily A (NHE1, cation proton antiporter 1), member 1	-4.05	0.02
459	USP38	ubiquitin specific peptidase 38	-4.04	0.02
460	ZNF764	zinc finger protein 764	-4.02	0.02
461	KCNK13	potassium channel, two pore domain subfamily K, member 13	-4.01	0.02
462	POC1A	POC1 centriolar protein A	-4.00	0.02
463	BMS1P20	BMS1 pseudogene 20	-4.00	0.02
464	SH3BGRL2	SH3 domain binding glutamate-rich protein like 2	-3.99	0.02
465	C8orf31	chromosome 8 open reading frame 31	-3.97	0.02
466	TMEM86A	transmembrane protein 86A	-3.94	0.02
467	SCMH1	sex comb on midleg homolog 1 (Drosophila)	-3.92	0.02
468	HERC2	HECT and RLD domain containing E3 ubiquitin protein ligase 2	-3.92	0.02
469	C9orf9	chromosome 9 open reading frame 9	-3.91	0.02
470	CYP7A1	cytochrome P450, family 7, subfamily A, polypeptide 1	-3.91	0.02

471	VPS13A	vacuolar protein sorting 13 homolog A (<i>S. cerevisiae</i>)	-3.88	0.02
472	SENP8	SUMO/sentrin specific peptidase family member 8	-3.88	0.02
473	NAPEPLD	N-acyl phosphatidylethanolamine phospholipase D	-3.87	0.02
474	DNAJC18	DnaJ (Hsp40) homolog, subfamily C, member 18	-3.85	0.02
475	PCDH1	protocadherin 1	-3.84	0.02
476	BAG3	BCL2-associated athanogene 3	-3.83	0.02
477	C1orf86	chromosome 1 open reading frame 86	-3.83	0.02
478	SPATA5	spermatogenesis associated 5	-3.83	0.02
479	ZNF197	zinc finger protein 197	-3.82	0.02
480	ZFAND3	zinc finger, AN1-type domain 3	-3.81	0.02
481	IL37	interleukin 37	-3.80	0.02
482	HSPA13	heat shock protein 70kDa family, member 13	-3.80	0.02
483	PGS1	phosphatidylglycerophosphate synthase 1	-3.80	0.02
484	LINC00476	long intergenic non-protein coding RNA 476	-3.79	0.02
485	CSPP1	centrosome and spindle pole associated protein 1	-3.76	0.02
486	STK3	serine/threonine kinase 3	-3.74	0.02
487	ZRANB1	zinc finger, RAN-binding domain containing 1	-3.69	0.02
488	ING3	inhibitor of growth family, member 3	-3.68	0.02
489	SP4	Sp4 transcription factor	-3.66	0.04
490	CLDN14	claudin 14	-3.63	0.02
491	ABHD12	abhydrolase domain containing 12	-3.62	0.02
492	DPY19L1P1	DPY19L1 pseudogene 1	-3.62	0.02
493	FAM27E3	family with sequence similarity 27, member E3	-3.61	0.02
494	PLCB3	phospholipase C, beta 3 (phosphatidylinositol-specific)	-3.59	0.02
495	FZD5	frizzled class receptor 5	-3.56	0.02
496	GTF2I	general transcription factor Iii	-3.55	0.02
497	ARRDC1-AS1	ARRDC1 antisense RNA 1	-3.53	0.02
498	APP	amyloid beta (A4) precursor protein	-3.52	0.02

499	FXR2	fragile X mental retardation, autosomal homolog 2	-3.52	0.02
500	NUP93	nucleoporin 93kDa	-3.51	0.02
501	FLJ32255	uncharacterized LOC643977	-3.51	0.02
502	SCLY	selenocysteinylase	-3.49	0.02
503	AGAP1	ArfGAP with GTPase domain, ankyrin repeat and PH domain 1	-3.49	0.02
504	LOC101928068	uncharacterized LOC101928068	-3.48	0.02
505	ZRANB3	zinc finger, RAN-binding domain containing 3	-3.47	0.02
506	SPATA24	spermatogenesis associated 24	-3.46	0.02
507	MAK	male germ cell-associated kinase	-3.46	0.04
508	BAP1	BRCA1 associated protein-1 (ubiquitin carboxy-terminal hydrolase)	-3.45	0.02
509	HERC4	HECT and RLD domain containing E3 ubiquitin protein ligase 4	-3.44	0.02
510	ARHGAP27	Rho GTPase activating protein 27	-3.44	0.02
511	ERLIN1	ER lipid raft associated 1	-3.44	0.02
512	PRR11	proline rich 11	-3.43	0.02
513	ZNF799	zinc finger protein 799	-3.42	0.02
514	ZNF530	zinc finger protein 530	-3.41	0.02
515	WDR19	WD repeat domain 19	-3.40	0.02
516	RPRD2	regulation of nuclear pre-mRNA domain containing 2	-3.40	0.02
517	C9orf66	chromosome 9 open reading frame 66	-3.40	0.02
518	SLC9B2	solute carrier family 9, subfamily B (NHA2, cation proton antiporter 2), member 2	-3.38	0.02
519	ZACN	zinc activated ligand-gated ion channel	-3.37	0.02
520	XRCC6P5	X-ray repair complementing defective repair in Chinese hamster cells 6 pseudogene 5	-3.37	0.02
521	LOC101927418	uncharacterized LOC101927418	-3.35	0.02
522	ZNF35	zinc finger protein 35	-3.34	0.02
523	CALM3	calmodulin 3 (phosphorylase kinase, delta)	-3.32	0.02
524	GAS6	growth arrest-specific 6	-3.32	0.02

525	CRHBP	corticotropin releasing hormone binding protein	-3.31	0.02
526	ABCF2	ATP-binding cassette, sub-family F (GCN20), member 2	-3.30	0.02
527	MIB1	mindbomb E3 ubiquitin protein ligase 1	-3.30	0.02
528	RABL3	RAB, member of RAS oncogene family-like 3	-3.30	0.02
529	NCOA5	nuclear receptor coactivator 5	-3.29	0.02
530	SLC5A5	solute carrier family 5 (sodium/iodide cotransporter), member 5	-3.28	0.02
531	MEPCE	methylphosphate capping enzyme	-3.27	0.02
532	PIGG	phosphatidylinositol glycan anchor biosynthesis, class G	-3.26	0.02
533	SPDYE3	speedy/RINGO cell cycle regulator family member E3	-3.24	0.02
534	NDE1	nudE neurodevelopment protein 1	-3.24	0.02
535	PGS1	phosphatidylglycerophosphate synthase 1	-3.23	0.02
536	CCDC57	coiled-coil domain containing 57	-3.23	0.02
537	BRD4	bromodomain containing 4	-3.22	0.02
538	ANKRD9	ankyrin repeat domain 9	-3.20	0.02
539	VCX3A	variable charge, X-linked 3A	-3.17	0.02
540	TFDP1	transcription factor Dp-1	-3.16	0.02
541	HSD17B12	hydroxysteroid (17-beta) dehydrogenase 12	-3.16	0.02
542	RFPL1S	RFPL1 antisense RNA 1	-3.14	0.02
543	MED16	mediator complex subunit 16	-3.14	0.02
544	HSD11B1L	hydroxysteroid (11-beta) dehydrogenase 1-like	-3.13	0.02
545	AGPAT6	1-acylglycerol-3-phosphate O-acyltransferase 6	-3.13	0.02
546	TRIM65	tripartite motif containing 65	-3.12	0.02
547	EXOGL	endo/exonuclease (5'-3'), endonuclease G-like	-3.09	0.02
548	FNDC3A	fibronectin type III domain containing 3A	-3.03	0.02
549	WWOX	WW domain containing oxidoreductase	-3.02	0.02
550	UTP14A	UTP14, U3 small nucleolar ribonucleoprotein, homolog A (yeast)	-3.00	0.02

- (iv) Differentially expressed genes between COPD Smoker and COPD Ex smoker having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	GFM1	G elongation factor, mitochondrial 1	-5.68	0.02
2	TRIM60	tripartite motif containing 60	-3.60	0.02
3	lnc-OTX2-3	lnc-OTX2-3:1	-3.44	0.02
4	CRISP3	cysteine-rich secretory protein 3	-3.32	0.02
5	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	-3.10	0.02

- (v) Differentially expressed genes between COPD Smoker and Control Never Smoker having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	GFM1	G elongation factor, mitochondrial 1	-155.93	0.02
2	SLC6A14	solute carrier family 6 (amino acid transporter), member 14	-114.57	0.02
3	VLDLR	very low density lipoprotein receptor	-104.45	0.02
4	MAGI2-AS3	MAGI2 antisense RNA 3	-103.60	0.02
5	CCDC68	coiled-coil domain containing 68	-102.63	0.02
6	MLLT4	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 4	-99.64	0.02
7	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	-98.23	0.02
8	PHLPP1	PH domain and leucine rich repeat protein phosphatase 1	-95.34	0.02
9	ZNF229	zinc finger protein 229	-89.13	0.02
10	PCDHB10	protocadherin beta 10	-87.15	0.02
11	PLN	phospholamban	-86.83	0.02
12	CRISP3	cysteine-rich secretory protein 3	-83.34	0.02
13	TUBB2B	tubulin, beta 2B class IIb	-81.91	0.02
14	lnc-ESR2-1	lnc-ESR2-1:1	-79.70	0.02
15	IQCH	IQ motif containing H	-74.57	0.02
16	LCE1B	late cornified envelope 1B	-74.33	0.02
17	CERS3	ceramide synthase 3	-73.46	0.02

18	TEKT1	tektin 1	-72.54	0.02
19	TP53BP1	tumor protein p53 binding protein 1	-69.95	0.02
20	NKAIN3	Na ⁺ /K ⁺ transporting ATPase interacting 3	-68.77	0.02
21	AASDH	aminoadipate-semialdehyde dehydrogenase	-68.54	0.02
22	lnc-DR1-1	lnc-DR1-1:1	-67.47	0.02
23	FAM13A	family with sequence similarity 13, member A	-66.29	0.02
24	MID1	midline 1	-65.78	0.02
25	LOC286071	uncharacterized LOC286071	-65.16	0.02
26	STEAP1	six transmembrane epithelial antigen of the prostate 1	-65.13	0.02
27	LINC01192	long intergenic non-protein coding RNA 1192	-64.47	0.02
28	C1QL3	complement component 1, q subcomponent-like 3	-63.91	0.02
29	ADARB1	adenosine deaminase, RNA-specific, B1	-63.90	0.02
30	THSD7A	thrombospondin, type I, domain containing 7A	-63.13	0.02
31	C2orf80	chromosome 2 open reading frame 80	-62.82	0.02
32	RGS17	regulator of G-protein signaling 17	-61.44	0.02
33	LOC101929683	uncharacterized LOC101929683	-61.33	0.02
34	FAM53B-AS1	FAM53B antisense RNA 1	-60.90	0.02
35	KLHL29	kelch-like family member 29	-59.84	0.02
36	lnc-AKR1C3-1	lnc-AKR1C3-1:1	-59.27	0.02
37	SLC26A7	solute carrier family 26 (anion exchanger), member 7	-59.23	0.02
38	TRIM60	tripartite motif containing 60	-57.21	0.02
39	SLITRK5	SLIT and NTRK-like family, member 5	-57.17	0.02
40	COLCA2	colorectal cancer associated 2	-55.22	0.02
41	lnc-SNURF-3	lnc-SNURF-3:21	-54.16	0.02
42	SEMA5A	sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5A	-53.93	0.02
43	AQP11	aquaporin 11	-53.81	0.02
44	GBP7	guanylate binding protein 7	-53.60	0.02
45	SPDYA	speedy/RINGO cell cycle regulator family member A	-53.09	0.02

46	SLC13A1	solute carrier family 13 (sodium/sulfate symporter), member 1	-53.00	0.02
47	RSPO2	R-spondin 2	-52.96	0.02
48	SLC5A7	solute carrier family 5 (sodium/choline cotransporter), member 7	-52.67	0.02
49	LINC00656	long intergenic non-protein coding RNA 656	-52.65	0.02
50	CDH6	cadherin 6, type 2, K-cadherin (fetal kidney)	-52.63	0.02
51	LINC00403	long intergenic non-protein coding RNA 403	-52.43	0.02
52	AVPR1A	arginine vasopressin receptor 1A	-51.89	0.02
53	LOC642620	uncharacterized LOC642620	-51.71	0.02
54	AGXT	alanine-glyoxylate aminotransferase	-51.01	0.02
55	FAM149B1	family with sequence similarity 149, member B1	-50.77	0.02
56	MAGEB3	melanoma antigen family B, 3	-50.66	0.02
57	DYNC2H1	dynein, cytoplasmic 2, heavy chain 1	-50.46	0.02
58	AFF2	AF4/FMR2 family, member 2	-50.39	0.02
59	C17orf104	chromosome 17 open reading frame 104	-49.67	0.02
60	LYPD1	LY6/PLAUR domain containing 1	-49.33	0.02
61	SEMA3E	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3E	-49.20	0.02
62	LOC100507277	uncharacterized LOC100507277	-49.15	0.02
63	RHAG	Rh-associated glycoprotein	-49.12	0.02
64	PCDHGA5	protocadherin gamma subfamily A, 5	-48.94	0.02
65	ATP13A4	ATPase type 13A4	-48.17	0.02
66	MIR1245A	microRNA 1245a	-47.88	0.02
67	lnc-PDE4D-1	lnc-PDE4D-1:1	-47.69	0.02
68	HMMR-AS1	HMMR antisense RNA 1	-47.52	0.02
69	ATF7	activating transcription factor 7	-47.44	0.02
70	CARD14	caspase recruitment domain family, member 14	-47.15	0.02
71	NDC80	NDC80 kinetochore complex component	-46.97	0.02
72	KLHL1	kelch-like family member 1	-46.93	0.02

73	LOC101928036	uncharacterized LOC101928036	-46.90	0.02
74	APBB2	amyloid beta (A4) precursor protein-binding, family B, member 2	-46.30	0.02
75	LOC101929475	uncharacterized LOC101929475	-45.75	0.02
76	BHMT2	betaine--homocysteine S- methyltransferase 2	-45.71	0.02
77	LHX6	LIM homeobox 6	-45.64	0.02
78	SLC10A7	solute carrier family 10, member 7	-45.56	0.02
79	CBLN1	cerebellin 1 precursor	-45.35	0.02
80	CYP4X1	cytochrome P450, family 4, subfamily X, polypeptide 1	-45.30	0.02
81	DPP10	dipeptidyl-peptidase 10 (non- functional)	-45.28	0.02
82	AMOT	angiomin	-45.05	0.02
83	SLC6A3	solute carrier family 6 (neurotransmitter transporter), member 3	-44.97	0.02
84	ZFP28	ZFP28 zinc finger protein	-44.93	0.02
85	SALL1	spalt-like transcription factor 1	-44.91	0.02
86	IFNA8	interferon, alpha 8	-44.36	0.02
87	COL6A3	collagen, type VI, alpha 3	-44.09	0.02
88	SPO11	SPO11 meiotic protein covalently bound to DSB	-44.08	0.02
89	GRIK2	glutamate receptor, ionotropic, kainate 2	-44.01	0.02
90	ANKRD62	ankyrin repeat domain 62	-43.96	0.02
91	NOX4	NADPH oxidase 4	-43.85	0.02
92	GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	-43.54	0.02
93	ZIC2	Zic family member 2	-43.23	0.02
94	LOC100996573	uncharacterized LOC100996573	-43.05	0.02
95	SPAG16	sperm associated antigen 16	-42.82	0.02
96	Inc-OTX2-3	Inc-OTX2-3:1	-42.81	0.02
97	MARK4	MAP/microtubule affinity- regulating kinase 4	-42.66	0.02
98	DLGAP1	discs, large (Drosophila) homolog-associated protein 1	-42.62	0.02
99	DUSP21	dual specificity phosphatase 21	-42.61	0.02
100	LOC101928794	uncharacterized LOC101928794	-42.56	0.02

101	SALL3	spalt-like transcription factor 3	-42.51	0.02
102	DMD	dystrophin	-42.21	0.02
103	DIRAS3	DIRAS family, GTP-binding RAS-like 3	-42.19	0.02
104	LOC100131864	uncharacterized LOC100131864	-42.17	0.02
105	lnc-FAM189A1-3	lnc-FAM189A1-3:1	-42.07	0.02
106	GJD4	gap junction protein, delta 4, 40.1kDa	-41.92	0.02
107	DCC	DCC netrin 1 receptor	-41.80	0.02
108	ADAMTSL1	ADAMTS-like 1	-41.75	0.02
109	LHX9	LIM homeobox 9	-41.72	0.02
110	TMEM257	transmembrane protein 257	-41.70	0.02
111	LINC00615	long intergenic non-protein coding RNA 615	-41.47	0.02
112	ZNF471	zinc finger protein 471	-41.46	0.02
113	TRAF3IP2	TRAF3 interacting protein 2	-41.35	0.02
114	XKR6	XK, Kell blood group complex subunit-related family, member 6	-41.34	0.02
115	INSM1	insulinoma-associated 1	-40.97	0.02
116	C15orf56	chromosome 15 open reading frame 56	-40.91	0.02
117	WFDC10A	WAP four-disulfide core domain 10A	-40.80	0.02
118	DPY19L2	dpy-19-like 2 (C. elegans)	-40.77	0.02
119	ANGPT1	angiopoietin 1	-40.74	0.02
120	CNTFR	ciliary neurotrophic factor receptor	-40.59	0.02
121	PCDHGB6	protocadherin gamma subfamily B, 6	-40.51	0.02
122	GLP1R	glucagon-like peptide 1 receptor	-40.38	0.02
123	LRRC55	leucine rich repeat containing 55	-40.22	0.02
124	VSTM2L	V-set and transmembrane domain containing 2 like	-40.22	0.02
125	CADM2	cell adhesion molecule 2	-40.21	0.02
126	NCAM2	neural cell adhesion molecule 2	-40.14	0.02
127	lnc-GFAP-1	lnc-GFAP-1:1	-40.09	0.02
128	GRM1	glutamate receptor, metabotropic 1	-39.97	0.02
129	SFXN1	sideroflexin 1	-39.57	0.02
130	SFRP2	secreted frizzled-related protein 2	-39.44	0.02

131	FLRT2	fibronectin leucine rich transmembrane protein 2	-39.17	0.02
132	ZNF682	zinc finger protein 682	-38.73	0.02
133	CAPN11	calpain 11	-38.68	0.02
134	MMP20	matrix metalloproteinase 20	-38.56	0.02
135	LUM	lumican	-38.34	0.02
136	KRT12	keratin 12, type I	-38.14	0.02
137	UTS2B	urotensin 2B	-38.10	0.02
138	TIE1	tyrosine kinase with immunoglobulin-like and EGF-like domains 1	-37.82	0.02
139	MBTPS2	membrane-bound transcription factor peptidase, site 2	-37.77	0.02
140	PVRL3	poliovirus receptor-related 3	-37.67	0.02
141	WDR72	WD repeat domain 72	-37.63	0.02
142	LRP2BP	LRP2 binding protein	-37.41	0.02
143	PRKAA2	protein kinase, AMP-activated, alpha 2 catalytic subunit	-37.27	0.02
144	PNPO	pyridoxamine 5'-phosphate oxidase	-37.02	0.02
145	DNAH14	dynein, axonemal, heavy chain 14	-36.99	0.02
146	SYNE1	spectrin repeat containing, nuclear envelope 1	-36.83	0.02
147	lnc-C3orf65-1	lnc-C3orf65-1:1	-36.76	0.02
148	FAM47E	family with sequence similarity 47, member E	-35.28	0.02
149	PCDHB2	protocadherin beta 2	-34.90	0.02
150	SCAMPER	sphingolipid Ca ²⁺ release mediating protein of endoplasmic reticulum	-34.51	0.02
151	IL22RA1	interleukin 22 receptor, alpha 1	-34.26	0.02
152	CCM2L	cerebral cavernous malformation 2-like	-34.20	0.02
153	FBLIM1	filamin binding LIM protein 1	-34.14	0.02
154	COL19A1	collagen, type XIX, alpha 1	-33.93	0.02
155	CCDC113	coiled-coil domain containing 113	-33.62	0.02
156	PTPRZ1	protein tyrosine phosphatase, receptor-type, Z polypeptide 1	-33.20	0.02
157	DKK3	dickkopf WNT signaling pathway inhibitor 3	-30.69	0.02

158	BMP7	bone morphogenetic protein 7	-30.06	0.02
159	CCDC144A	coiled-coil domain containing 144A	-28.93	0.02
160	SPERT	spermatid associated	-27.72	0.02
161	LRRIQ1	leucine-rich repeats and IQ motif containing 1	-27.29	0.02
162	MLPH	melanophilin	-27.13	0.02
163	MYH7B	myosin, heavy chain 7B, cardiac muscle, beta	-26.96	0.02
164	SRGAP3	SLIT-ROBO Rho GTPase activating protein 3	-25.91	0.02
165	PHC3	polyhomeotic homolog 3 (Drosophila)	-21.89	0.02
166	SLC30A8	solute carrier family 30 (zinc transporter), member 8	-20.54	0.02
167	NR0B1	nuclear receptor subfamily 0, group B, member 1	-20.27	0.02
168	WDR62	WD repeat domain 62	-20.19	0.02
169	ECM2	extracellular matrix protein 2, female organ and adipocyte specific	-18.77	0.02
170	CTGF	connective tissue growth factor	-18.73	0.02
171	PDP2	pyruvate dehydrogenase phosphatase catalytic subunit 2	-18.67	0.02
172	FOXP2	forkhead box P2	-18.36	0.02
173	C5orf66-AS2	C5orf66 antisense RNA 2	-17.62	0.02
174	lnc-FZD4-1	lnc-FZD4-1:2	-15.92	0.02
175	LIPH	lipase, member H	-15.62	0.02
176	DCAF12L1	DDB1 and CUL4 associated factor 12-like 1	-15.40	0.02
177	CCP110	centriolar coiled coil protein 110kDa	-15.34	0.02
178	UACA	uveal autoantigen with coiled-coil domains and ankyrin repeats	-15.24	0.02
179	RGS4	regulator of G-protein signaling 4	-15.21	0.02
180	TTY12	testis-specific transcript, Y-linked 12 (non-protein coding)	-14.92	0.02
181	RBMY1E	RNA binding motif protein, Y-linked, family 1, member E	-14.74	0.02
182	FRMD3	FERM domain containing 3	-14.35	0.02
183	BRCA2	breast cancer 2, early onset	-14.29	0.02

184	HOGA1	4-hydroxy-2-oxoglutarate aldolase 1	-13.56	0.02
185	C8orf34	chromosome 8 open reading frame 34	-13.25	0.02
186	FHAD1	forkhead-associated (FHA) phosphopeptide binding domain 1	-13.21	0.02
187	PRDM9	PR domain containing 9	-13.21	0.02
188	ACACA	acetyl-CoA carboxylase alpha	-13.15	0.02
189	NMNAT2	nicotinamide nucleotide adenylyltransferase 2	-12.75	0.02
190	CASC5	cancer susceptibility candidate 5	-12.60	0.02
191	PGAP1	post-GPI attachment to proteins 1	-12.35	0.02
192	CDH26	cadherin 26	-11.92	0.02
193	TCTN1	tectonic family member 1	-11.09	0.02
194	ACSS3	acyl-CoA synthetase short-chain family member 3	-11.03	0.02
195	PUS10	pseudouridylate synthase 10	-11.01	0.02
196	THOC5	THO complex 5	-10.99	0.02
197	STRBP	spermatid perinuclear RNA binding protein	-10.95	0.02
198	BRIP1	BRCA1 interacting protein C-terminal helicase 1	-10.82	0.02
199	PIANP	PILR alpha associated neural protein	-10.55	0.02
200	TXNL1	thioredoxin-like 1	-10.54	0.02
201	SLC25A5-AS1	SLC25A5 antisense RNA 1	-10.47	0.02
202	SPINK6	serine peptidase inhibitor, Kazal type 6	-10.40	0.02
203	TRIM48	tripartite motif containing 48	-10.28	0.02
204	FMNL3	formin-like 3	-10.21	0.02
205	INTS1	integrator complex subunit 1	-10.10	0.02
206	lnc-ANTXRL-2	lnc-ANTXRL-2:1	-10.10	0.02
207	ATP1B4	ATPase, Na ⁺ /K ⁺ transporting, beta 4 polypeptide	-9.82	0.02
208	MARVELD3	MARVEL domain containing 3	-9.81	0.02
209	GLDN	gliomedin	-9.80	0.02
210	ZNF383	zinc finger protein 383	-9.74	0.02
211	GARNL3	GTPase activating Rap/RanGAP domain-like 3	-9.73	0.02
212	TPD52	tumor protein D52	-9.51	0.02
213	ZNF587B	zinc finger protein 587B	-9.50	0.02
214	IFT57	intraflagellar transport 57	-9.46	0.02

215	CASC10	cancer susceptibility candidate 10	-9.46	0.02
216	SCN9A	sodium channel, voltage gated, type IX alpha subunit	-9.44	0.02
217	OTC	ornithine carbamoyltransferase	-9.33	0.02
218	ZNF251	zinc finger protein 251	-9.31	0.02
219	ENAH	enabled homolog (Drosophila)	-9.21	0.02
220	ULBP2	UL16 binding protein 2	-9.19	0.02
221	SLC35D1	solute carrier family 35 (UDP-GlcA/UDP-GalNAc transporter), member D1	-9.14	0.02
222	HBM	hemoglobin, mu	-9.00	0.02
223	LOC101927482	uncharacterized LOC101927482	-8.58	0.02
224	ZFP30	ZFP30 zinc finger protein	-8.53	0.02
225	HDAC6	histone deacetylase 6	-8.44	0.02
226	SLC25A26	solute carrier family 25 (S-adenosylmethionine carrier), member 26	-8.41	0.02
227	FITM2	fat storage-inducing transmembrane protein 2	-8.33	0.02
228	MYNN	myoneurin	-8.25	0.02
229	EOGT	EGF domain-specific O-linked N-acetylglucosamine (GlcNAc) transferase	-8.21	0.02
230	ETV3L	ets variant 3-like	-8.20	0.02
231	WDHD1	WD repeat and HMG-box DNA binding protein 1	-8.17	0.02
232	ZFYVE16	zinc finger, FYVE domain containing 16	-8.10	0.02
233	LOC643406	uncharacterized LOC643406	-8.04	0.02
234	STAG3L4	stromal antigen 3-like 4 (pseudogene)	-7.85	0.02
235	ZFP2	ZFP2 zinc finger protein	-7.79	0.02
236	TRAF3IP2-AS1	TRAF3IP2 antisense RNA 1	-7.77	0.02
237	PLA2G10	phospholipase A2, group X	-7.68	0.02
238	SPARC	secreted protein, acidic, cysteine-rich (osteonectin)	-7.61	0.02
239	SLC9B1	solute carrier family 9, subfamily B (NHA1, cation proton antiporter 1), member 1	-7.60	0.02
240	PRAMENP	PRAME N-terminal-like, pseudogene	-7.57	0.02

241	RSPH9	radial spoke head 9 homolog (Chlamydomonas)	-7.35	0.02
242	KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	-7.26	0.02
243	RIC3	RIC3 acetylcholine receptor chaperone	-7.25	0.02
244	LRRC63	leucine rich repeat containing 63	-7.21	0.02
245	FAM27E2	family with sequence similarity 27, member E2	-7.20	0.02
246	ABCA11P	ATP-binding cassette, sub-family A (ABC1), member 11, pseudogene	-7.20	0.02
247	C1orf167	chromosome 1 open reading frame 167	-7.13	0.02
248	CALCR	calcitonin receptor	-7.03	0.02
249	NF2	neurofibromin 2 (merlin)	-6.95	0.02
250	ACSBG1	acyl-CoA synthetase bubblegum family member 1	-6.91	0.02
251	SUN3	Sad1 and UNC84 domain containing 3	-6.83	0.02
252	C9orf131	chromosome 9 open reading frame 131	-6.78	0.02
253	CAPN13	calpain 13	-6.75	0.02
254	GLUD1P7	glutamate dehydrogenase 1 pseudogene 7	-6.75	0.02
255	RBBP5	retinoblastoma binding protein 5	-6.72	0.02
256	FBXO10	F-box protein 10	-6.70	0.02
257	AVPR2	arginine vasopressin receptor 2	-6.70	0.02
258	DPYS	dihydropyrimidinase	-6.68	0.02
259	ARHGEF10	Rho guanine nucleotide exchange factor (GEF) 10	-6.66	0.02
260	FLJ44715	uncharacterized LOC386671	-6.61	0.02
261	ABCA10	ATP-binding cassette, sub-family A (ABC1), member 10	-6.53	0.02
262	lnc-FAS-1	lnc-FAS-1:1	-6.52	0.02
263	C19orf80	chromosome 19 open reading frame 80	-6.51	0.02
264	P2RY12	purinergic receptor P2Y, G-protein coupled, 12	-6.49	0.02
265	MAPRE2	microtubule-associated protein, RP/EB family, member 2	-6.49	0.02
266	DLGAP5	discs, large (Drosophila) homolog-associated protein 5	-6.48	0.02

267	L3MBTL1	l(3)mbt-like 1 (Drosophila)	-6.44	0.02
268	lnc-WDR34-2	lnc-WDR34-2:2	-6.41	0.02
269	ZNF551	zinc finger protein 551	-6.37	0.02
270	COLEC11	collectin sub-family member 11	-6.30	0.02
271	HCG9	HLA complex group 9 (non-protein coding)	-6.29	0.02
272	STON2	stonin 2	-6.29	0.02
273	CD276	CD276 molecule	-6.27	0.02
274	IL4	interleukin 4	-6.25	0.02
275	LPPR4	lipid phosphate phosphatase-related protein type 4	-6.24	0.02
276	RSPH4A	radial spoke head 4 homolog A (Chlamydomonas)	-6.20	0.02
277	RNF38	ring finger protein 38	-6.20	0.02
278	IER3IP1	immediate early response 3 interacting protein 1	-6.16	0.02
279	ASTN1	astrotactin 1	-6.15	0.02
280	TRAM1	translocation associated membrane protein 1	-6.14	0.02
281	ERMN	ermin, ERM-like protein	-6.13	0.02
282	PRAMEF19	PRAME family member 19	-6.03	0.02
283	TNFRSF21	tumor necrosis factor receptor superfamily, member 21	-6.03	0.02
284	CALB2	calbindin 2	-6.03	0.02
285	C6orf52	chromosome 6 open reading frame 52	-5.83	0.02
286	TRIM17	tripartite motif containing 17	-5.80	0.02
287	VPS13B	vacuolar protein sorting 13 homolog B (yeast)	-5.72	0.02
288	KLKB1	kallikrein B, plasma (Fletcher factor) 1	-5.71	0.02
289	BRWD1-IT2	BRWD1 intronic transcript 2 (non-protein coding)	-5.61	0.02
290	ASH1L	ash1 (absent, small, or homeotic)-like (Drosophila)	-5.61	0.02
291	LANCL2	LanClantibioticsynthetase component C-like 2 (bacterial)	-5.61	0.02
292	lnc-PCDH19-1	lnc-PCDH19-1:1	-5.56	0.02
293	GPALPP1	GPALPP motifs containing 1	-5.51	0.02
294	CDC25B	cell division cycle 25B	-5.51	0.02
295	MUC12	mucin 12, cell surface associated	-5.40	0.02
296	GAB1	GRB2-associated binding protein 1	-5.40	0.02
297	OLFML2A	olfactomedin-like 2A	-5.38	0.02

298	ORAOV1	oral cancer overexpressed 1	-5.37	0.02
299	ELL3	elongation factor RNA polymerase II-like 3	-5.31	0.02
300	KBTBD8	kelch repeat and BTB (POZ) domain containing 8	-5.29	0.02
301	CNNM2	cyclin and CBS domain divalent metal cation transport mediator 2	-5.29	0.02
302	MCM4	minichromosome maintenance complex component 4	-5.28	0.02
303	MRAP	melanocortin 2 receptor accessory protein	-5.27	0.02
304	GSTCD	glutathione S-transferase, C-terminal domain containing	-5.27	0.02
305	lnc-GPR183-2	lnc-GPR183-2:4	-5.26	0.02
306	BBS7	Bardet-Biedl syndrome 7	-5.23	0.02
307	MFAP3	microfibrillar-associated protein 3	-5.20	0.02
308	RNF157	ring finger protein 157	-5.19	0.02
309	KIAA1257	KIAA1257	-5.18	0.02
310	PPP2R3A	protein phosphatase 2, regulatory subunit B'', alpha	-5.17	0.02
311	PHF8	PHD finger protein 8	-5.15	0.02
312	ZSCAN2	zinc finger and SCAN domain containing 2	-5.13	0.02
313	HMG5	high mobility group nucleosome binding domain 5	-5.11	0.02
314	MCOLN2	mucolipin 2	-5.11	0.02
315	CUX1	cut-like homeobox 1	-5.10	0.02
316	HNRNPM	heterogeneous nuclear ribonucleoprotein M	-5.08	0.02
317	FAM106CP	family with sequence similarity 106, member C, pseudogene	-5.07	0.02
318	OTUD7B	OTU deubiquitinase 7B	-5.06	0.02
319	UEVLD	UEV and lactate/malate dehydrogenase domains	-5.05	0.02
320	LACRT	lacritin	-5.04	0.02
321	ARHGAP5-AS1	ARHGAP5 antisense RNA 1 (head to head)	-5.03	0.02
322	ZNF75A	zinc finger protein 75a	-5.02	0.02
323	ADAL	adenosine deaminase-like	-5.00	0.02
324	NAA40	N(alpha)-acetyltransferase 40, NatD catalytic subunit	-4.98	0.02
325	ANKRD34B	ankyrin repeat domain 34B	-4.97	0.02

326	ATP6V1C2	ATPase, H ⁺ transporting, lysosomal 42kDa, V1 subunit C2	-4.97	0.02
327	RSG1	REM2 and RAB-like small GTPase 1	-4.96	0.02
328	HESX1	HESX homeobox 1	-4.96	0.02
329	LOC101928092	uncharacterized LOC101928092	-4.95	0.02
330	TRAF3	TNF receptor-associated factor 3	-4.95	0.02
331	lnc-PLA2G3-1	lnc-PLA2G3-1:1	-4.94	0.02
332	DTX4	deltex 4, E3 ubiquitin ligase	-4.93	0.02
333	IKZF2	IKAROS family zinc finger 2 (Helios)	-4.93	0.02
334	CAPRIN2	caprin family member 2	-4.90	0.02
335	PDE12	phosphodiesterase 12	-4.89	0.02
336	DRC1	dynein regulatory complex subunit 1	-4.88	0.02
337	FLCN	folliculin	-4.87	0.02
338	OSBP2	oxysterol binding protein 2	-4.84	0.02
339	WNK2	WNK lysine deficient protein kinase 2	-4.82	0.02
340	GPR135	G protein-coupled receptor 135	-4.81	0.02
341	ZNF221	zinc finger protein 221	-4.80	0.02
342	KRT80	keratin 80, type II	-4.78	0.02
343	VPS13A	vacuolar protein sorting 13 homolog A (<i>S. cerevisiae</i>)	-4.77	0.02
344	ZNF366	zinc finger protein 366	-4.77	0.04
345	C17orf100	chromosome 17 open reading frame 100	-4.75	0.02
346	VHLL	von Hippel-Lindau tumor suppressor-like	-4.74	0.02
347	RALGPS1	Ral GEF with PH domain and SH3 binding motif 1	-4.72	0.02
348	LMF1	lipase maturation factor 1	-4.71	0.02
349	PDE12	phosphodiesterase 12	-4.71	0.02
350	ZNF718	zinc finger protein 718	-4.69	0.02
351	CLGN	calmegin	-4.68	0.02
352	ZNF443	zinc finger protein 443	-4.68	0.02
353	ZNF530	zinc finger protein 530	-4.65	0.02
354	FGF14-AS2	FGF14 antisense RNA 2	-4.64	0.02
355	RAP2C-AS1	RAP2C antisense RNA 1	-4.64	0.02
356	POTEI	POTE ankyrin domain family, member I	-4.63	0.02
357	CELF3	CUGBP, Elav-like family member 3	-4.62	0.02

358	HAS3	hyaluronan synthase 3	-4.61	0.02
359	SCLY	selenocysteinylase	-4.60	0.02
360	SMURF2	SMAD specific E3 ubiquitin protein ligase 2	-4.60	0.02
361	CLCN2	chloride channel, voltage-sensitive 2	-4.53	0.02
362	KIAA1804	mixed lineage kinase 4	-4.50	0.02
363	GPATCH2L	G patch domain containing 2-like	-4.49	0.02
364	SLC9A1	solute carrier family 9, subfamily A (NHE1, cation proton antiporter 1), member 1	-4.48	0.02
365	RPS3	ribosomal protein S3	-4.47	0.02
366	ZNF561	zinc finger protein 561	-4.45	0.02
367	SSX2	synovial sarcoma, X breakpoint 2	-4.44	0.02
368	LINC00839	long intergenic non-protein coding RNA 839	-4.43	0.02
369	THRAP3	thyroid hormone receptor associated protein 3	-4.43	0.02
370	SPG11	spastic paraplegia 11 (autosomal recessive)	-4.38	0.02
371	ZRANB1	zinc finger, RAN-binding domain containing 1	-4.38	0.02
372	MEIG1	meiosis/spermiogenesis associated 1	-4.38	0.02
373	MSANTD3	Myb/SANT-like DNA-binding domain containing 3	-4.37	0.02
374	CSPP1	centrosome and spindle pole associated protein 1	-4.37	0.02
375	SEC14L1	SEC14-like 1 (<i>S. cerevisiae</i>)	-4.37	0.02
376	BEND7	BEN domain containing 7	-4.33	0.02
377	PIP5K1P1	phosphatidylinositol-4-phosphate 5-kinase, type I, pseudogene 1	-4.33	0.04
378	DNAJC18	DnaJ (Hsp40) homolog, subfamily C, member 18	-4.32	0.02
379	GPR27	G protein-coupled receptor 27	-4.31	0.02
380	FSIP1	fibrous sheath interacting protein 1	-4.31	0.02
381	C11orf97	chromosome 11 open reading frame 97	-4.23	0.02
382	HAGLROS	HAGLR opposite strand (non-protein coding)	-4.21	0.02
383	CDK17	cyclin-dependent kinase 17	-4.20	0.02

384	SLC35G1	solute carrier family 35, member G1	-4.20	0.02
385	CCDC173	coiled-coil domain containing 173	-4.20	0.02
386	KIRREL2	kin of IRRE like 2 (Drosophila)	-4.18	0.02
387	ND1	NADH dehydrogenase, subunit 1 (complex I)	-4.18	0.04
388	TMEM86A	transmembrane protein 86A	-4.16	0.02
389	SNRPC	small nuclear ribonucleoprotein polypeptide C	-4.16	0.02
390	HERC4	HECT and RLD domain containing E3 ubiquitin protein ligase 4	-4.15	0.02
391	NUP43	nucleoporin 43kDa	-4.12	0.02
392	ANXA11	annexin A11	-4.10	0.02
393	ZMAT3	zinc finger, matrin-type 3	-4.09	0.02
394	ZNF501	zinc finger protein 501	-4.08	0.02
395	SH3BGRL2	SH3 domain binding glutamate-rich protein like 2	-4.05	0.02
396	LRRC42	leucine rich repeat containing 42	-4.04	0.02
397	lnc-TMEM109-1	lnc-TMEM109-1:1	-4.03	0.02
398	ZNF69	zinc finger protein 69	-4.00	0.02
399	SPATA24	spermatogenesis associated 24	-3.97	0.02
400	FZD5	frizzled class receptor 5	-3.97	0.02
401	EXOGL	endo/exonuclease (5'-3'), endonuclease G-like	-3.97	0.02
402	TXLNA	taxilin alpha	-3.96	0.02
403	ZFP3	ZFP3 zinc finger protein	-3.94	0.02
404	AHI1	Abelson helper integration site 1	-3.94	0.02
405	NEK9	NIMA-related kinase 9	-3.93	0.02
406	PPEF1	protein phosphatase, EF-hand calcium binding domain 1	-3.93	0.02
407	lnc-XRCC6-1	lnc-XRCC6-1:1	-3.93	0.02
408	ZNF146	zinc finger protein 146	-3.92	0.02
409	CD79B	CD79b molecule, immunoglobulin-associated beta	-3.91	0.02
410	ZC3H12D	zinc finger CCCH-type containing 12D	-3.89	0.02
411	RABL2A	RAB, member of RAS oncogene family-like 2A	-3.89	0.02

412	NAV2	neuron navigator 2	-3.87	0.02
413	ACTR3B	ARP3 actin-related protein 3 homolog B (yeast)	-3.86	0.02
414	DNAH9	dynein, axonemal, heavy chain 9	-3.85	0.02
415	USP38	ubiquitin specific peptidase 38	-3.83	0.02
416	ATP11A	ATPase, class VI, type 11A	-3.82	0.02
417	TM7SF2	transmembrane 7 superfamily member 2	-3.82	0.02
418	SPATA5	spermatogenesis associated 5	-3.82	0.02
419	ZCCHC18	zinc finger, CCHC domain containing 18	-3.80	0.02
420	RFPL1S	RFPL1 antisense RNA 1	-3.80	0.02
421	lnc-CHD1L-1	lnc-CHD1L-1:3	-3.78	0.04
422	C8orf31	chromosome 8 open reading frame 31	-3.76	0.02
423	TNRC6C	trinucleotide repeat containing 6C	-3.75	0.02
424	MFI2-AS1	MFI2 antisense RNA 1	-3.75	0.02
425	COX11	COX11 cytochrome c oxidase copper chaperone	-3.75	0.02
426	OLAH	oleoyl-ACP hydrolase	-3.73	0.02
427	ZNF682	zinc finger protein 682	-3.71	0.02
428	SP4	Sp4 transcription factor	-3.70	0.02
429	TLE6	transducin-like enhancer of split 6	-3.70	0.02
430	ZBTB41	zinc finger and BTB domain containing 41	-3.70	0.02
431	ERCC4	excision repair cross-complementation group 4	-3.68	0.02
432	CCL26	chemokine (C-C motif) ligand 26	-3.68	0.02
433	GAS8	growth arrest-specific 8	-3.68	0.02
434	ZNF2	zinc finger protein 2	-3.68	0.02
435	ING3	inhibitor of growth family, member 3	-3.67	0.02
436	HERC2	HECT and RLD domain containing E3 ubiquitin protein ligase 2	-3.66	0.02
437	GAS6	growth arrest-specific 6	-3.66	0.02
438	LURAP1	leucine rich adaptor protein 1	-3.65	0.02
439	SENP8	SUMO/sentrin specific peptidase family member 8	-3.63	0.02
440	RPS2	ribosomal protein S2	-3.59	0.02
441	DPY19L1P1	DPY19L1 pseudogene 1	-3.55	0.02
442	CCDC57	coiled-coil domain containing 57	-3.55	0.02

443	CRHBP	corticotropin releasing hormone binding protein	-3.55	0.02
444	ZSCAN30	zinc finger and SCAN domain containing 30	-3.54	0.02
445	ZNF664	zinc finger protein 664	-3.53	0.02
446	DTWD2	DTW domain containing 2	-3.51	0.02
447	WDR19	WD repeat domain 19	-3.51	0.02
448	C9orf9	chromosome 9 open reading frame 9	-3.49	0.02
449	LOC101928068	uncharacterized LOC101928068	-3.48	0.02
450	GOLGA8F	golgin A8 family, member F	-3.48	0.02
451	CDCA3	cell division cycle associated 3	-3.48	0.02
452	AGAP1	ArfGAP with GTPase domain, ankyrin repeat and PH domain 1	-3.46	0.02
453	OPTC	opticin	-3.46	0.02
454	FNDC3A	fibronectin type III domain containing 3A	-3.45	0.02
455	SFTPA2	surfactant protein A2	-3.41	0.02
456	SETD8	SET domain containing (lysine methyltransferase) 8	-3.38	0.02
457	RSU1	Ras suppressor protein 1	-3.38	0.04
458	MAGED4B	melanoma antigen family D, 4B	-3.37	0.02
459	SCAND2P	SCAN domain containing 2 pseudogene	-3.34	0.02
460	ZNF841	zinc finger protein 841	-3.32	0.02
461	FLJ32255	uncharacterized LOC643977	-3.30	0.04
462	LOC200726	hCG1657980	-3.30	0.02
463	CCND2	cyclin D2	-3.28	0.02
464	TCEAL7	transcription elongation factor A (SII)-like 7	-3.28	0.02
465	TMEM144	transmembrane protein 144	-3.27	0.02
466	NAPEPLD	N-acyl phosphatidylethanolamine phospholipase D	-3.27	0.02
467	SESN3	sestrin 3	-3.26	0.02
468	TRAF3IP2	TRAF3 interacting protein 2	-3.24	0.02
469	NGRN	neugrin, neurite outgrowth associated	-3.24	0.02
470	DBF4B	DBF4 zinc finger B	-3.23	0.02
471	ANKRD9	ankyrin repeat domain 9	-3.22	0.02
472	KCNJ9	potassium channel, inwardly rectifying subfamily J, member 9	-3.22	0.02

473	ANKAR	ankyrin and armadillo repeat containing	-3.22	0.02
474	ZNF16	zinc finger protein 16	-3.22	0.02
475	LIG1	ligase I, DNA, ATP-dependent	-3.20	0.02
476	lnc-NDFIP1-1	lnc-NDFIP1-1:1	-3.19	0.02
477	POC1A	POC1 centriolar protein A	-3.18	0.02
478	PRG2	proteoglycan 2, bone marrow (natural killer cell activator, eosinophil granule major basic protein)	-3.18	0.02
479	NTF3	neurotrophin 3	-3.18	0.04
480	ZRANB3	zinc finger, RAN-binding domain containing 3	-3.17	0.02
481	ZNF345	zinc finger protein 345	-3.17	0.02
482	PRKCI	protein kinase C, iota	-3.15	0.02
483	MAK	male germ cell-associated kinase	-3.12	0.04
484	STK3	serine/threonine kinase 3	-3.10	0.02
485	C1orf115	chromosome 1 open reading frame 115	-3.08	0.02
486	MPC2	mitochondrial pyruvate carrier 2	-3.00	0.02

(vi) Differentially expressed genes between Control Never smokers and COPD Ex-smokers having FC>3 and p value<0.05

S.No	GeneSymbol	GeneName	FC	p value
1	CLPS	colipase, pancreatic	-109.36	0.04
2	SLC6A14	solute carrier family 6 (amino acid transporter), member 14	59.44	0.02
3	MAGI2-AS3	MAGI2 antisense RNA 3	48.33	0.02
4	MLLT4	myeloid/lymphoid or mixed-lineage leukemia (trithorax homolog, Drosophila); translocated to, 4	47.77	0.02
5	PHLPP1	PH domain and leucine rich repeat protein phosphatase 1	45.32	0.02
6	MID1	midline 1	43.71	0.02
7	VLDLR	very low density lipoprotein receptor	43.17	0.02
8	PCDHB10	protocadherin beta 10	42.84	0.02
9	ZNF229	zinc finger protein 229	42.27	0.02
10	CCDC68	coiled-coil domain containing 68	41.64	0.02

11	SFRP2	secreted frizzled-related protein 2	40.88	0.02
12	LCE1B	late cornified envelope 1B	40.77	0.02
13	CERS3	ceramide synthase 3	39.82	0.02
14	TUBB2B	tubulin, beta 2B class IIb	38.66	0.02
15	PLN	phospholamban	37.53	0.02
16	AASDH	aminoadipate-semialdehyde dehydrogenase	37.48	0.02
17	TEKT1	tektin 1	37.01	0.02
18	lnc-DR1-1	lnc-DR1-1:1	36.10	0.02
19	PNPO	pyridoxamine 5'-phosphate oxidase	35.45	0.02
20	IQCH	IQ motif containing H	35.03	0.02
21	LOC286071	uncharacterized LOC286071	34.86	0.02
22	LOC101929683	uncharacterized LOC101929683	34.79	0.02
23	SPO11	SPO11 meiotic protein covalently bound to DSB	33.86	0.02
24	RGS17	regulator of G-protein signaling 17	33.23	0.02
25	ADARB1	adenosine deaminase, RNA-specific, B1	32.90	0.02
26	AVPR1A	arginine vasopressin receptor 1A	32.47	0.02
27	TNFRSF19	tumor necrosis factor receptor superfamily, member 19	31.66	0.02
28	NKAIN3	Na⁺/K⁺ transporting ATPase interacting 3	31.55	0.02
29	FAM53B-AS1	FAM53B antisense RNA 1	31.50	0.02
30	LINC01192	long intergenic non-protein coding RNA 1192	31.07	0.02
31	C1QL3	complement component 1, q subcomponent-like 3	30.94	0.02
32	SLITRK5	SLIT and NTRK-like family, member 5	30.76	0.02
33	FAM13A	family with sequence similarity 13, member A	30.74	0.02
34	CARD14	caspase recruitment domain family, member 14	30.24	0.02
35	lnc-AKR1C3-1	lnc-AKR1C3-1:1	29.99	0.02
36	DYNC2H1	dynein, cytoplasmic 2, heavy chain 1	29.69	0.02
37	KLHL29	kelch-like family member 29	29.55	0.02
38	RHAG	Rh-associated glycoprotein	29.22	0.02
39	lnc-ESR2-1	lnc-ESR2-1:1	28.64	0.02
40	LOC642620	uncharacterized LOC642620	28.33	0.02
41	TP53BP1	tumor protein p53 binding protein 1	28.26	0.02

42	FLRT2	fibronectin leucine rich transmembrane protein 2	27.88	0.02
43	SLC26A7	solute carrier family 26 (anion exchanger), member 7	27.86	0.02
44	SALL1	spalt-like transcription factor 1	27.78	0.02
45	AQP11	aquaporin 11	27.76	0.02
46	LOC101929475	uncharacterized LOC101929475	27.62	0.02
47	CCDC144A	coiled-coil domain containing 144A	27.59	0.02
48	GFM1	G elongation factor, mitochondrial 1	27.46	0.02
49	AFF2	AF4/FMR2 family, member 2	27.45	0.02
50	MIR1245A	microRNA 1245a	27.04	0.02
51	SEMA5A	sema domain, seven thrombospondin repeats (type 1 and type 1-like), transmembrane domain (TM) and short cytoplasmic domain, (semaphorin) 5A	26.60	0.02
52	LYPD1	LY6/PLAUR domain containing 1	26.58	0.02
53	MAGEB3	melanoma antigen family B, 3	26.50	0.02
54	LINC00656	long intergenic non-protein coding RNA 656	26.06	0.02
55	LINC00403	long intergenic non-protein coding RNA 403	25.92	0.02
56	C17orf104	chromosome 17 open reading frame 104	25.63	0.02
57	SEMA3E	sema domain, immunoglobulin domain (Ig), short basic domain, secreted, (semaphorin) 3E	25.57	0.02
58	COLCA2	colorectal cancer associated 2	25.41	0.02
59	CDH6	cadherin 6, type 2, K-cadherin (fetal kidney)	25.35	0.02
60	CRISP3	cysteine-rich secretory protein 3	25.09	0.02
61	PCDHGA5	protocadherin gamma subfamily A, 5	25.00	0.02
62	SLC5A7	solute carrier family 5 (sodium/choline cotransporter), member 7	24.96	0.02
63	NOX4	NADPH oxidase 4	24.80	0.02
64	GBP7	guanylate binding protein 7	24.68	0.02
65	CCM2L	cerebral cavernous malformation 2-like	24.58	0.02

66	CAPN11	calpain 11	24.57	0.02
67	AMOT	angiomotin	24.51	0.02
68	AGXT	alanine-glyoxylate aminotransferase	24.51	0.02
69	ZNF646	zinc finger protein 646	-24.42	0.04
70	lnc-SNURF-3	lnc-SNURF-3:21	24.13	0.02
71	NDC80	NDC80 kinetochore complex component	23.99	0.02
72	CYP4X1	cytochrome P450, family 4, subfamily X, polypeptide 1	23.95	0.02
73	FAM149B1	family with sequence similarity 149, member B1	23.83	0.02
74	ATF7	activating transcription factor 7	23.81	0.02
75	HMMR-AS1	HMMR antisense RNA 1	23.61	0.02
76	IL22RA1	interleukin 22 receptor, alpha 1	23.57	0.02
77	WDR72	WD repeat domain 72	23.39	0.02
78	WFDC10A	WAP four-disulfide core domain 10A	23.20	0.02
79	IFNA8	interferon, alpha 8	23.04	0.02
80	STEAP1	six transmembrane epithelial antigen of the prostate 1	22.98	0.02
81	LOC101928036	uncharacterized LOC101928036	22.76	0.02
82	BHMT2	betaine--homocysteine S- methyltransferase 2	22.67	0.02
83	ZIC2	Zic family member 2	22.64	0.02
84	FBLIM1	filamin binding LIM protein 1	22.59	0.02
85	RSPO2	R-spondin 2	22.43	0.02
86	C2orf80	chromosome 2 open reading frame 80	22.42	0.02
87	DPP10	dipeptidyl-peptidase 10 (non- functional)	22.37	0.02
88	LUM	lumican	22.27	0.02
89	SLC6A3	solute carrier family 6 (neurotransmitter transporter), member 3	21.92	0.02
90	SPDYA	speedy/RINGO cell cycle regulator family member A	21.90	0.02
91	ATP13A4	ATPase type 13A4	21.87	0.02
92	APBB2	amyloid beta (A4) precursor protein-binding, family B, member 2	21.56	0.02
93	LHX9	LIM homeobox 9	21.55	0.02
94	DCC	DCC netrin 1 receptor	21.50	0.02
95	DCAF12L1	DDB1 and CUL4 associated factor 12-like 1	21.45	0.02

96	lnc-PDE4D-1	lnc-PDE4D-1:1	21.43	0.02
97	SCAMPER	sphingolipid Ca ²⁺ release mediating protein of endoplasmic reticulum	21.42	0.02
98	MLPH	melanophilin	21.42	0.02
99	DUSP21	dual specificity phosphatase 21	21.41	0.02
100	INSM1	insulinoma-associated 1	21.39	0.02
101	ZFP28	ZFP28 zinc finger protein	21.33	0.02
102	MYH7B	myosin, heavy chain 7B, cardiac muscle, beta	21.29	0.02
103	LHX6	LIM homeobox 6	21.28	0.02
104	COL6A3	collagen, type VI, alpha 3	21.22	0.02
105	XKR6	XK, Kell blood group complex subunit-related family, member 6	21.21	0.02
106	DPY19L2	dpy-19-like 2 (<i>C. elegans</i>)	21.19	0.02
107	GRM1	glutamate receptor, metabotropic 1	21.19	0.02
108	BRIP1	BRCA1 interacting protein C-terminal helicase 1	21.15	0.02
109	lnc-FZD4-1	lnc-FZD4-1:2	21.12	0.02
110	ADAMTSL1	ADAMTS-like 1	21.09	0.02
111	DLGAP1	discs, large (<i>Drosophila</i>) homolog-associated protein 1	21.08	0.02
112	TRAF3IP2	TRAF3 interacting protein 2	21.08	0.02
113	GJD4	gap junction protein, delta 4, 40.1kDa	21.07	0.02
114	LRRIQ1	leucine-rich repeats and IQ motif containing 1	21.04	0.02
115	CADM2	cell adhesion molecule 2	21.00	0.02
116	NCAM2	neural cell adhesion molecule 2	20.98	0.02
117	lnc-GFAP-1	lnc-GFAP-1:1	20.97	0.02
118	CNTFR	ciliary neurotrophic factor receptor	20.96	0.02
119	C15orf56	chromosome 15 open reading frame 56	20.94	0.02
120	ANKRD62	ankyrin repeat domain 62	20.88	0.02
121	LRRC55	leucine rich repeat containing 55	20.87	0.02
122	UTS2B	urotensin 2B	20.82	0.02
123	MMP20	matrix metalloproteinase 20	20.77	0.02
124	TIE1	tyrosine kinase with immunoglobulin-like and EGF-like domains 1	20.75	0.02
125	lnc-FAM189A1-3	lnc-FAM189A1-3:1	20.74	0.02

126	RBMY1E	RNA binding motif protein, Y-linked, family 1, member E	20.72	0.02
127	ANGPT1	angiopoietin 1	20.71	0.02
128	PCDHB2	protocadherin beta 2	20.70	0.02
129	SPERT	spermatid associated	20.68	0.02
130	SALL3	spalt-like transcription factor 3	20.49	0.02
131	ZNF471	zinc finger protein 471	20.47	0.02
132	FAM47E	family with sequence similarity 47, member E	20.46	0.02
133	NR0B1	nuclear receptor subfamily 0, group B, member 1	20.45	0.02
134	LOC100996573	uncharacterized LOC100996573	20.42	0.02
135	GABRG2	gamma-aminobutyric acid (GABA) A receptor, gamma 2	20.42	0.02
136	GRIK2	glutamate receptor, ionotropic, kainate 2	20.38	0.02
137	ZNF682	zinc finger protein 682	20.34	0.02
138	DNAH14	dynein, axonemal, heavy chain 14	20.34	0.02
139	SYNE1	spectrin repeat containing, nuclear envelope 1	20.28	0.02
140	DKK3	dickkopf WNT signaling pathway inhibitor 3	20.24	0.02
141	SLC10A7	solute carrier family 10, member 7	20.18	0.02
142	MBTPS2	membrane-bound transcription factor peptidase, site 2	20.17	0.02
143	CCDC113	coiled-coil domain containing 113	20.12	0.02
144	LRP2BP	LRP2 binding protein	20.04	0.02
145	LINC00615	long intergenic non-protein coding RNA 615	20.01	0.02
146	PVRL3	poliovirus receptor-related 3	19.99	0.02
147	SFXN1	sideroflexin 1	19.93	0.02
148	SRGAP3	SLIT-ROBO Rho GTPase activating protein 3	19.86	0.02
149	LOC100131864	uncharacterized LOC100131864	19.85	0.02
150	PRKAA2	protein kinase, AMP-activated, alpha 2 catalytic subunit	19.76	0.02
151	MARK4	MAP/microtubule affinity-regulating kinase 4	19.76	0.02

152	SLC13A1	solute carrier family 13 (sodium/sulfate symporter), member 1	19.72	0.02
153	FOXP2	forkhead box P2	19.67	0.02
154	BMP7	bone morphogenetic protein 7	19.60	0.02
155	PDP2	pyruvate dehydrogenase phosphatase catalytic subunit 2	19.00	0.02
156	ECM2	extracellular matrix protein 2, female organ and adipocyte specific	18.98	0.02
157	LOC101928794	uncharacterized LOC101928794	18.88	0.02
158	KLHL1	kelch-like family member 1	18.83	0.02
159	GLP1R	glucagon-like peptide 1 receptor	18.58	0.02
160	PCDHGB6	protocadherin gamma subfamily B, 6	18.36	0.02
161	COL19A1	collagen, type XIX, alpha 1	18.30	0.02
162	KRT12	keratin 12, type I	18.22	0.02
163	FRMD3	FERM domain containing 3	18.19	0.02
164	TMEM257	transmembrane protein 257	18.15	0.02
165	DMD	dystrophin	18.14	0.02
166	CTGF	connective tissue growth factor	18.00	0.02
167	PGAP1	post-GPI attachment to proteins 1	17.89	0.02
168	ATP1B4	ATPase, Na ⁺ /K ⁺ transporting, beta 4 polypeptide	17.80	0.02
169	SPAG16	sperm associated antigen 16	17.78	0.02
170	CBLN1	cerebellin 1 precursor	17.54	0.02
171	ACSS3	acyl-CoA synthetase short-chain family member 3	17.43	0.02
172	GARNL3	GTPase activating Rap/RanGAP domain-like 3	17.10	0.02
173	DIRAS3	DIRAS family, GTP-binding RAS-like 3	17.04	0.02
174	WDR62	WD repeat domain 62	16.75	0.02
175	HOGA1	4-hydroxy-2-oxoglutarate aldolase 1	16.69	0.02
176	TRIM60	tripartite motif containing 60	15.88	0.02
177	lnc-C3orf65-1	lnc-C3orf65-1:1	15.82	0.02
178	SLC30A8	solute carrier family 30 (zinc transporter), member 8	14.81	0.04
179	THSD7A	thrombospondin, type I, domain containing 7A	14.69	0.02
180	TXNL1	thioredoxin-like 1	14.38	0.02

181	TMEM30B	transmembrane protein 30B	-14.27	0.04
182	PRDM9	PR domain containing 9	14.10	0.02
183	RGS4	regulator of G-protein signaling 4	14.03	0.02
184	CCP110	centriolar coiled coil protein 110kDa	13.86	0.02
185	VSTM2L	V-set and transmembrane domain containing 2 like	13.79	0.02
186	BRCA2	breast cancer 2, early onset	13.65	0.02
187	PTPRZ1	protein tyrosine phosphatase, receptor-type, Z polypeptide 1	13.50	0.02
188	ACACA	acetyl-CoA carboxylase alpha	13.22	0.02
189	CDH26	cadherin 26	13.17	0.02
190	TTY12	testis-specific transcript, Y-linked 12 (non-protein coding)	13.14	0.02
191	FMNL3	formin-like 3	13.01	0.02
192	PHC3	polyhomeotic homolog 3 (Drosophila)	12.63	0.02
193	lnc-OTX2-3	lnc-OTX2-3:1	12.45	0.04
194	CASC5	cancer susceptibility candidate 5	12.40	0.02
195	C5orf66-AS2	C5orf66 antisense RNA 2	12.39	0.02
196	lnc-FAS-1	lnc-FAS-1:1	12.32	0.02
197	C8orf34	chromosome 8 open reading frame 34	12.31	0.04
198	PIANP	PILR alpha associated neural protein	12.11	0.02
199	NMNAT2	nicotinamide nucleotide adenyltransferase 2	12.08	0.02
200	UACA	uveal autoantigen with coiled-coil domains and ankyrin repeats	11.89	0.02
201	CASC10	cancer susceptibility candidate 10	11.57	0.02
202	SPARC	secreted protein, acidic, cysteine-rich (osteonectin)	11.46	0.02
203	THOC5	THO complex 5	11.33	0.02
204	FHAD1	forkhead-associated (FHA) phosphopeptide binding domain 1	11.05	0.04
205	TPD52	tumor protein D52	11.04	0.02
206	ZNF383	zinc finger protein 383	10.88	0.02
207	IL4	interleukin 4	10.73	0.02
208	SLC9B1	solute carrier family 9, subfamily B (NHA1, cation proton antiporter 1), member 1	10.44	0.02

209	KIT	v-kit Hardy-Zuckerman 4 feline sarcoma viral oncogene homolog	10.41	0.02
210	ZFP2	ZFP2 zinc finger protein	10.39	0.02
211	SLC25A5-AS1	SLC25A5 antisense RNA 1	10.38	0.02
212	ZNF551	zinc finger protein 551	10.28	0.02
213	MARVELD3	MARVEL domain containing 3	9.89	0.02
214	LIPH	lipase, member H	9.89	0.02
215	SLC35D1	solute carrier family 35 (UDP-GlcA/UDP-GalNAc transporter), member D1	9.84	0.02
216	ITPKC	inositol-trisphosphate 3-kinase C	-9.73	0.04
217	ETV3L	ets variant 3-like	9.70	0.02
218	CD276	CD276 molecule	9.65	0.02
219	GLTSCR1	glioma tumor suppressor candidate region gene 1	-9.64	0.02
220	GLDN	gliomedin	9.54	0.02
221	IFT57	intraflagellar transport 57	9.51	0.02
222	ZFYVE16	zinc finger, FYVE domain containing 16	9.48	0.02
223	ZNF587B	zinc finger protein 587B	9.43	0.02
224	OTC	ornithine carbamoyltransferase	9.40	0.04
225	SPINK6	serine peptidase inhibitor, Kazal type 6	9.37	0.04
226	lnc-GPR183-2	lnc-GPR183-2:4	9.28	0.02
227	ULBP2	UL16 binding protein 2	9.17	0.02
228	PUS10	pseudouridylate synthase 10	8.99	0.02
229	BRIP1	BRCA1 interacting protein C-terminal helicase 1	8.93	0.02
230	NEK9	NIMA-related kinase 9	8.66	0.02
231	PDE12	phosphodiesterase 12	8.57	0.02
232	STAG3L4	stromal antigen 3-like 4 (pseudogene)	8.48	0.02
233	RIC3	RIC3 acetylcholine receptor chaperone	8.38	0.02
234	MYNN	myoneurin	8.36	0.02
235	TRAF3IP2-AS1	TRAF3IP2 antisense RNA 1	8.34	0.02
236	CDK17	cyclin-dependent kinase 17	8.32	0.02
237	DPYS	dihydropyrimidinase	8.30	0.02
238	ZNF251	zinc finger protein 251	8.27	0.02
239	ZNF366	zinc finger protein 366	8.23	0.02
240	MAPRE2	microtubule-associated protein, RP/EB family, member 2	8.15	0.02

241	CAPN13	calpain 13	8.05	0.02
242	C9orf131	chromosome 9 open reading frame 131	7.97	0.02
243	STON2	stonin 2	7.94	0.02
244	FLJ44715	uncharacterized LOC386671	7.94	0.02
245	TRIM17	tripartite motif containing 17	7.93	0.04
246	STRBP	spermatid perinuclear RNA binding protein	7.89	0.02
247	HESX1	HESX homeobox 1	7.86	0.02
248	CLGN	calmegin	7.86	0.02
249	RNF38	ring finger protein 38	7.84	0.02
250	PHF8	PHD finger protein 8	7.84	0.02
251	HNRNPM	heterogeneous nuclear ribonucleoprotein M	7.83	0.02
252	LOC101927482	uncharacterized LOC101927482	7.75	0.02
253	lnc-PLA2G3-1	lnc-PLA2G3-1:1	7.75	0.02
254	ABCA10	ATP-binding cassette, sub-family A (ABC1), member 10	7.74	0.02
255	LOC100507277	uncharacterized LOC100507277	7.74	0.02
256	CD79B	CD79b molecule, immunoglobulin-associated beta	7.72	0.02
257	LANCL2	LanClantibioticsynthetase component C-like 2 (bacterial)	7.71	0.02
258	ENAH	enabled homolog (Drosophila)	7.70	0.02
259	TRIM48	tripartite motif containing 48	7.70	0.02
260	FGF14-AS2	FGF14 antisense RNA 2	7.58	0.02
261	INTS1	integrator complex subunit 1	7.58	0.04
262	TNFRSF21	tumor necrosis factor receptor superfamily, member 21	7.58	0.02
263	FSIP1	fibrous sheath interacting protein 1	7.52	0.02
264	PRAMEF19	PRAME family member 19	7.48	0.02
265	HDAC6	histone deacetylase 6	7.47	0.02
266	CALCR	calcitonin receptor	7.46	0.02
267	AVPR2	arginine vasopressin receptor 2	7.36	0.02
268	FITM2	fat storage-inducing transmembrane protein 2	7.34	0.02
269	ARHGEF10	Rho guanine nucleotide exchange factor (GEF) 10	7.33	0.02
270	P2RY12	purinergic receptor P2Y, G-protein coupled, 12	7.31	0.02
271	CLCN2	chloride channel, voltage-sensitive 2	7.30	0.02

272	NF2	neurofibromin 2 (merlin)	7.28	0.02
273	HAS3	hyaluronan synthase 3	7.21	0.02
274	BRWD1-IT2	BRWD1 intronic transcript 2 (non-protein coding)	7.19	0.02
275	KBTBD8	kelch repeat and BTB (POZ) domain containing 8	7.13	0.02
276	LACRT	lacritin	7.12	0.02
277	PLOD3	procollagen-lysine, 2-oxoglutarate 5-dioxygenase 3	-7.07	0.04
278	WNK2	WNK lysine deficient protein kinase 2	7.06	0.02
279	CDC25B	cell division cycle 25B	6.97	0.02
280	GAB1	GRB2-associated binding protein 1	6.92	0.02
281	VPS13A	vacuolar protein sorting 13 homolog A (<i>S. cerevisiae</i>)	6.91	0.02
282	ZFP30	ZFP30 zinc finger protein	6.88	0.04
283	EOGT	EGF domain-specific O-linked N-acetylglucosamine (GlcNAc) transferase	6.85	0.02
284	RPS3	ribosomal protein S3	6.78	0.02
285	PRAMENP	PRAME N-terminal-like, pseudogene	6.72	0.02
286	ERMN	ermin, ERM-like protein	6.71	0.02
287	VHLL	von Hippel-Lindau tumor suppressor-like	6.65	0.02
288	C1orf167	chromosome 1 open reading frame 167	6.56	0.02
289	CSPP1	centrosome and spindle pole associated protein 1	6.55	0.02
290	C19orf80	chromosome 19 open reading frame 80	6.43	0.02
291	ZMAT3	zinc finger, matrin-type 3	6.42	0.02
292	LOC643406	uncharacterized LOC643406	6.40	0.02
293	DNAJC18	DnaJ (Hsp40) homolog, subfamily C, member 18	6.39	0.02
294	SPATA24	spermatogenesis associated 24	6.38	0.02
295	AHI1	Abelson helper integration site 1	6.35	0.02
296	PGS1	phosphatidylglycerophosphate synthase 1	6.31	0.02
297	SCN9A	sodium channel, voltage gated, type IX alpha subunit	6.27	0.02
298	MFAP3	microfibrillar-associated protein 3	6.25	0.02
299	ABCA11P	ATP-binding cassette, subfamily A (ABC1), member 11, pseudogene	6.21	0.02

300	CUX1	cut-like homeobox 1	6.20	0.02
301	ZNF221	zinc finger protein 221	6.18	0.02
302	GPALPP1	GPALPP motifs containing 1	6.14	0.02
303	PDE12	phosphodiesterase 12	6.13	0.02
304	RABL2A	RAB, member of RAS oncogene family-like 2A	6.10	0.02
305	TCTN1	tectonic family member 1	6.06	0.02
306	HCG9	HLA complex group 9 (non-protein coding)	5.99	0.04
307	lnc-CHD1L-1	lnc-CHD1L-1:3	5.96	0.02
308	NAPEPLD	N-acyl phosphatidylethanolamine phospholipase D	5.95	0.02
309	ZRANB1	zinc finger, RAN-binding domain containing 1	5.92	0.02
310	SMURF2	SMAD specific E3 ubiquitin protein ligase 2	5.92	0.02
311	ZNF2	zinc finger protein 2	5.91	0.02
312	RNF157	ring finger protein 157	5.90	0.02
313	FAM106CP	family with sequence similarity 106, member C, pseudogene	5.86	0.02
314	CAPRIN2	caprin family member 2	5.85	0.02
315	ASH1L	ash1 (absent, small, or homeotic)-like (Drosophila)	5.85	0.02
316	FBXO10	F-box protein 10	5.75	0.02
317	ATP11A	ATPase, class VI, type 11A	5.72	0.02
318	ZSCAN2	zinc finger and SCAN domain containing 2	5.71	0.02
319	lnc-ANTXRL-2	lnc-ANTXRL-2:1	5.69	0.04
320	IKZF2	IKAROS family zinc finger 2 (Helios)	5.67	0.02
321	ORAOV1	oral cancer overexpressed 1	5.66	0.02
322	GPATCH2L	G patch domain containing 2-like	5.66	0.02
323	ND1	NADH dehydrogenase, subunit 1 (complex I)	5.66	0.02
324	TRAF3IP2	TRAF3 interacting protein 2	5.62	0.02
325	EXOGEN	endo/exonuclease (5'-3'), endonuclease G-like	5.59	0.02
326	KIRREL2	kin of IRRE like 2 (Drosophila)	5.58	0.02
327	SNRPC	small nuclear ribonucleoprotein polypeptide C	5.57	0.02
328	DRC1	dynein regulatory complex subunit 1	5.56	0.04
329	CD81	CD81 molecule	5.56	0.02

330	FAM27E2	family with sequence similarity 27, member E2	5.54	0.02
331	THRAP3	thyroid hormone receptor associated protein 3	5.54	0.02
332	TXLNA	taxilin alpha	5.51	0.02
333	SUN3	Sad1 and UNC84 domain containing 3	5.49	0.02
334	ZNF69	zinc finger protein 69	5.48	0.02
335	MFI2-AS1	MFI2 antisense RNA 1	5.41	0.02
336	C1orf86	chromosome 1 open reading frame 86	5.40	0.02
337	RBBP5	retinoblastoma binding protein 5	5.38	0.04
338	PPP1CB	protein phosphatase 1, catalytic subunit, beta isozyme	5.37	0.02
339	HERC2	HECT and RLD domain containing E3 ubiquitin protein ligase 2	5.36	0.02
340	GAS6	growth arrest-specific 6	5.35	0.02
341	MEIG1	meiosis/spermiogenesis associated 1	5.35	0.02
342	ZNF530	zinc finger protein 530	5.34	0.02
343	DTX4	deltex 4, E3 ubiquitin ligase	5.34	0.02
344	ZNF501	zinc finger protein 501	5.33	0.02
345	LPPR4	lipid phosphate phosphatase-related protein type 4	5.32	0.04
346	PLA2G10	phospholipase A2, group X	5.30	0.02
347	MCOLN2	mucolipin 2	5.29	0.02
348	CCDC173	coiled-coil domain containing 173	5.27	0.02
349	PLCB3	phospholipase C, beta 3 (phosphatidylinositol-specific)	5.22	0.02
350	HAGLROS	HAGLR opposite strand (non-protein coding)	5.21	0.02
351	OLAH	oleoyl-ACP hydrolase	5.17	0.04
352	SETD8	SET domain containing (lysine methyltransferase) 8	5.17	0.02
353	NUP43	nucleoporin 43kDa	5.16	0.02
354	ASTN1	astrotactin 1	5.13	0.02
355	L3MBTL1	l(3)mbt-like 1 (Drosophila)	5.10	0.02
356	BBS7	Bardet-Biedl syndrome 7	5.09	0.02
357	COLEC11	collectin sub-family member 11	5.07	0.04
358	COLQ	collagen-like tail subunit (single strand of homotrimer) of asymmetric acetylcholinesterase	5.07	0.02

359	ATP6V1C2	ATPase, H ⁺ transporting, lysosomal 42kDa, V1 subunit C2	5.07	0.02
360	ZNF561	zinc finger protein 561	5.04	0.02
361	ANXA11	annexin A11	5.01	0.04
362	GAS8	growth arrest-specific 8	4.99	0.02
363	ZNF682	zinc finger protein 682	4.98	0.02
364	ZNF76	zinc finger protein 76	4.96	0.02
365	ALKBH5	AlkB family member 5, RNA demethylase	4.94	0.02
366	LURAP1	leucine rich adaptor protein 1	4.93	0.02
367	MRAP	melanocortin 2 receptor accessory protein	4.92	0.02
368	LOC101928092	uncharacterized LOC101928092	4.89	0.02
369	SLC9A1	solute carrier family 9, subfamily A (NHE1, cation proton antiporter 1), member 1	4.86	0.02
370	VPS13B	vacuolar protein sorting 13 homolog B (yeast)	4.86	0.02
371	MEPCE	methylphosphate capping enzyme	4.84	0.02
372	COX11	COX11 cytochrome c oxidase copper chaperone	4.83	0.02
373	ZNF75A	zinc finger protein 75a	4.81	0.02
374	ZNF443	zinc finger protein 443	4.79	0.02
375	ZNF718	zinc finger protein 718	4.78	0.02
376	MAK	male germ cell-associated kinase	4.76	0.02
377	RALGPS1	Ral GEF with PH domain and SH3 binding motif 1	4.75	0.02
378	TM7SF2	transmembrane 7 superfamily member 2	4.74	0.02
379	NAV2	neuron navigator 2	4.74	0.04
380	TRAF3	TNF receptor-associated factor 3	4.72	0.02
381	TMEM86A	transmembrane protein 86A	4.70	0.02
382	DLGAP5	discs, large (Drosophila) homolog-associated protein 5	4.69	0.02
383	MED9	mediator complex subunit 9	4.65	0.02
384	SH3BGRL2	SH3 domain binding glutamate-rich protein like 2	4.64	0.02
385	WDHD1	WD repeat and HMG-box DNA binding protein 1	4.63	0.04
386	FLJ32255	uncharacterized LOC643977	4.61	0.02
387	PPEF1	protein phosphatase, EF-hand calcium binding domain 1	4.56	0.04

388	POC1A	POC1 centriolar protein A	4.54	0.02
389	TCHP	trichoplein, keratin filament binding	4.53	0.02
390	CALM3	calmodulin 3 (phosphorylase kinase, delta)	4.52	0.02
391	GOLGA8F	golgin A8 family, member F	4.52	0.02
392	RSPH4A	radial spoke head 4 homolog A (Chlamydomonas)	4.50	0.04
393	TMEM41A	transmembrane protein 41A	4.48	0.02
394	LOC101928068	uncharacterized LOC101928068	4.47	0.02
395	RAP2C-AS1	RAP2C antisense RNA 1	4.46	0.02
396	C17orf100	chromosome 17 open reading frame 100	4.46	0.02
397	RSU1	Ras suppressor protein 1	4.46	0.02
398	KIAA1804	mixed lineage kinase 4	4.42	0.02
399	ZACN	zinc activated ligand-gated ion channel	4.41	0.02
400	DTWD2	DTW domain containing 2	4.40	0.02
401	C9orf66	chromosome 9 open reading frame 66	4.39	0.02
402	C6orf52	chromosome 6 open reading frame 52	4.38	0.04
403	NGRN	neugrin, neurite outgrowth associated	4.38	0.02
404	CCND2	cyclin D2	4.35	0.02
405	lnc-NDFIP1-1	lnc-NDFIP1-1:1	4.35	0.02
406	SPATA5	spermatogenesis associated 5	4.34	0.04
407	FXR2	fragile X mental retardation, autosomal homolog 2	4.34	0.02
408	LRRC42	leucine rich repeat containing 42	4.33	0.02
409	NAA40	N(alpha)-acetyltransferase 40, NatD catalytic subunit	4.33	0.02
410	SSX2	synovial sarcoma, X breakpoint 2	4.32	0.02
411	WDR19	WD repeat domain 19	4.31	0.02
412	ATF2	activating transcription factor 2	4.31	0.02
413	PRR11	proline rich 11	4.30	0.02
414	XRCC6P5	X-ray repair complementing defective repair in Chinese hamster cells 6 pseudogene 5	4.29	0.02
415	TNRC6C	trinucleotide repeat containing 6C	4.23	0.02
416	HMG5	high mobility group nucleosome binding domain 5	4.19	0.02
417	KIAA1257	KIAA1257	4.19	0.02

418	FLCN	folliculin	4.18	0.04
419	PHTF1	putative homeodomain transcription factor 1	4.15	0.02
420	MPC2	mitochondrial pyruvate carrier 2	4.13	0.02
421	BEND7	BEN domain containing 7	4.13	0.04
422	ZNF35	zinc finger protein 35	4.10	0.02
423	RSPH9	radial spoke head 9 homolog (Chlamydomonas)	4.09	0.04
424	IER3IP1	immediate early response 3 interacting protein 1	4.08	0.02
425	ANKRD9	ankyrin repeat domain 9	4.07	0.02
426	ABHD12	abhydrolase domain containing 12	4.07	0.02
427	ZNF345	zinc finger protein 345	4.06	0.02
428	UBE2M	ubiquitin-conjugating enzyme E2M	4.06	0.02
429	SEC14L1	SEC14-like 1 (S. cerevisiae)	4.05	0.04
430	SENP8	SUMO/sentrin specific peptidase family member 8	4.04	0.02
431	SLC25A38	solute carrier family 25, member 38	4.04	0.02
432	CCL26	chemokine (C-C motif) ligand 26	4.04	0.04
433	RPS2	ribosomal protein S2	4.03	0.02
434	SCLY	selenocysteinylase	4.03	0.02
435	PTPN11	protein tyrosine phosphatase, non-receptor type 11	4.02	0.02
436	LMF1	lipase maturation factor 1	3.99	0.04
437	NTF3	neurotrophin 3	3.97	0.04
438	ZRANB3	zinc finger, RAN-binding domain containing 3	3.95	0.02
439	CECR1	cat eye syndrome chromosome region, candidate 1	3.94	0.02
440	ERCC4	excision repair cross-complementation group 4	3.93	0.02
441	C8orf31	chromosome 8 open reading frame 31	3.88	0.02
442	PRKCI	protein kinase C, iota	3.87	0.02
443	LIG1	ligase I, DNA, ATP-dependent	3.86	0.02
444	GPR135	G protein-coupled receptor 135	3.85	0.04
445	ZSCAN30	zinc finger and SCAN domain containing 30	3.85	0.04
446	UEVLD	UEV and lactate/malate dehydrogenase domains	3.84	0.02

447	LINC00839	long intergenic non-protein coding RNA 839	3.84	0.04
448	HERC4	HECT and RLD domain containing E3 ubiquitin protein ligase 4	3.83	0.02
449	UVRAG	UV radiation resistance associated	3.83	0.02
450	USP38	ubiquitin specific peptidase 38	3.77	0.02
451	ING3	inhibitor of growth family, member 3	3.77	0.02
452	THEM6	thioesterase superfamily member 6	3.77	0.02
453	CNNM2	cyclin and CBS domain divalent metal cation transport mediator 2	3.76	0.02
454	TMEM159	transmembrane protein 159	3.76	0.02
455	HSPA13	heat shock protein 70kDa family, member 13	3.76	0.02
456	PBLD	phenazine biosynthesis-like protein domain containing	3.73	0.02
457	MCM4	minichromosome maintenance complex component 4	3.73	0.02
458	FLCN	folliculin	3.72	0.02
459	CDKN2AIPNL	CDKN2A interacting protein N-terminal like	3.71	0.02
460	SP4	Sp4 transcription factor	3.66	0.02
461	PLCG2	phospholipase C, gamma 2 (phosphatidylinositol-specific)	3.63	0.02
462	MED16	mediator complex subunit 16	3.63	0.04
463	ZNF530	zinc finger protein 530	3.60	0.02
464	ANKRD20A12P	ankyrin repeat domain 20 family, member A12, pseudogene	3.59	0.02
465	TRIM32	tripartite motif containing 32	3.58	0.02
466	USP33	ubiquitin specific peptidase 33	3.57	0.02
467	ZNF548	zinc finger protein 548	3.57	0.02
468	AGAP1	ArfGAP with GTPase domain, ankyrin repeat and PH domain 1	3.57	0.02
469	FZD5	frizzled class receptor 5	3.55	0.04
470	KLKB1	kallikrein B, plasma (Fletcher factor) 1	3.55	0.04
471	FMO4	flavin containing monooxygenase 4	3.54	0.02
472	DIS3L2	DIS3 like 3'-5' exoribonuclease 2	3.53	0.02

473	ITPR2	inositol 1,4,5-trisphosphate receptor, type 2	3.53	0.02
474	DNAH9	dynein, axonemal, heavy chain 9	3.52	0.04
475	ACTR3B	ARP3 actin-related protein 3 homolog B (yeast)	3.52	0.02
476	ZNF841	zinc finger protein 841	3.52	0.02
477	GTF2I	general transcription factor Iii	3.48	0.04
478	NDUFB7	NADH dehydrogenase (ubiquinone) 1 beta subcomplex, 7, 18kDa	-3.48	0.04
479	AP3D1	adaptor-related protein complex 3, delta 1 subunit	3.47	0.02
480	GTPBP1	GTP binding protein 1	3.47	0.02
481	KRT80	keratin 80, type II	3.44	0.04
482	NDUFAF6	NADH dehydrogenase (ubiquinone) complex I, assembly factor 6	3.43	0.02
483	EIF4H	eukaryotic translation initiation factor 4H	3.41	0.02
484	ZFAND3	zinc finger, AN1-type domain 3	3.40	0.02
485	TUBGCP5	tubulin, gamma complex associated protein 5	3.38	0.02
486	PWWP2B	PWWP domain containing 2B	-3.37	0.04
487	TCEAL7	transcription elongation factor A (SII)-like 7	3.37	0.02
488	TPGS2	tubulin polyglutamylase complex subunit 2	3.35	0.02
489	RFPL1S	RFPL1 antisense RNA 1	3.34	0.04
490	ZNF197	zinc finger protein 197	3.32	0.02
491	RABL3	RAB, member of RAS oncogene family-like 3	3.31	0.02
492	lnc-TMEM109-1	lnc-TMEM109-1:1	3.31	0.02
493	APP	amyloid beta (A4) precursor protein	3.31	0.02
494	IFITM2	interferon induced transmembrane protein 2	3.31	0.02
495	C5orf24	chromosome 5 open reading frame 24	3.30	0.04
496	GORAB	golgin, RAB6-interacting	3.28	0.02
497	ELL3	elongation factor RNA polymerase II-like 3	3.27	0.04
498	PTPRN2	protein tyrosine phosphatase, receptor type, N polypeptide 2	3.27	0.02

499	ZC3H12D	zinc finger CCCH-type containing 12D	3.25	0.02
500	TRAM1	translocation associated membrane protein 1	3.24	0.02
501	UBE2H	ubiquitin-conjugating enzyme E2H	3.24	0.02
502	ZNF16	zinc finger protein 16	3.24	0.02
503	CLIP2	CAP-GLY domain containing linker protein 2	3.23	0.02
504	BAP1	BRCA1 associated protein-1 (ubiquitin carboxy-terminal hydrolase)	3.22	0.02
505	VCX3A	variable charge, X-linked 3A	3.21	0.02
506	TTF2	transcription termination factor, RNA polymerase II	3.20	0.04
507	ALDH6A1	aldehyde dehydrogenase 6 family, member A1	3.19	0.02
508	LOC101927418	uncharacterized LOC101927418	3.19	0.02
509	PIGG	phosphatidylinositol glycan anchor biosynthesis, class G	3.19	0.04
510	ARHGAP27	Rho GTPase activating protein 27	3.18	0.02
511	ARRDC1-AS1	ARRDC1 antisense RNA 1	3.16	0.04
512	DOK2	docking protein 2, 56kDa	3.15	0.02
513	C9orf3	chromosome 9 open reading frame 3	3.14	0.02
514	MACROD2	MACRO domain containing 2	3.14	0.04
515	HPCAL1	hippocalcin-like 1	3.13	0.04
516	FBXO31	F-box protein 31	3.12	0.02
517	SLC9B2	solute carrier family 9, subfamily B (NHA2, cation proton antiporter 2), member 2	3.11	0.02
518	lnc-TUBA1C-1	lnc-TUBA1C-1:3	3.11	0.02
519	BAG3	BCL2-associated athanogene 3	3.10	0.02
520	NUDCD3	NudC domain containing 3	3.09	0.02
521	BEND7	BEN domain containing 7	3.08	0.04
522	CRHBP	corticotropin releasing hormone binding protein	3.07	0.02
523	MUS81	MUS81 structure-specific endonuclease subunit	3.07	0.02
524	FNDC3A	fibronectin type III domain containing 3A	3.06	0.04
525	DBF4B	DBF4 zinc finger B	3.04	0.02
526	SIPA1	signal-induced proliferation-associated 1	3.03	0.04

Supplementary Table 2: List of primers for genes selected from microarray analysis

followed by Enrichment analysis along with housekeeping genes

S, sense strand; as, antisense strand; *Housekeeping genes

Gene Symbol (Gene Name)	Primer sequences
ACTB* (Beta-Actin)	CCTGGTGCTCCGTCTTAG (s) GATGCCTTCCTTGTCTTGG (as)
B2M* (Beta-2-Microglobulin)	GCGTGACATTAAGGAGAAG (s) GAAGGAAGGCTGGAAGAG (as)
GAPDH* (Glyceraldehyde-3-Phosphate Dehydrogenase)	GTCTGCTTCTCTGCTGTAG (s) AGGCTGTTGTCATACTTCTC (as)
TNFRSF1A (Tumor Necrosis Factor Receptor Superfamily Member 1A)	TTGAAGGAACTACTACTAAGCC (s) AGGTGAAGGTGGAAGTGG (as)
CASP9 (Caspase 9)	GCGAACTAACAGGCAAGC (s) AAGAGCACCGACATCACC (as)

Supplementary Table 3: Summary of the subject profiles and RNA quality used for array analysis

Subject Identification Number	Age (year)	Height (cm)	Weight (kg)	BMI	GOLD stage severity ^a	MMRC ^b	6MWD (metres) ^c	BODE index ^d	Pack Years ^e	Ex-smokers ^f	FEV ₁ (% predicted)	FVC (% predicted)	FEV1/FVC	RIN Score*
COPDS1	56	162	48	18.1	III	1	281	5	36	-	31	44	53.00	9.1
COPDS2	52	172	62	21.0	III	2	357	3	32	-	46	64	55.41	N/A**
COPDS3	55	170	71	24.6	II	1	440	0	29	-	66	73	56.08	8.6
COPDS4	67	157	48	19.4	III	3	346	6	30	-	45	61	62.00	9.2
COPDS5	46	167	48	17.4	III	2	268	6	37	-	32	52	52.00	8.2
COPD EXS1	65	161	55	21.2	III	3	300	5	40	7	37	65	53.00	N/A**
COPD EXS2	60	167	61	21.9	II	1	401	1	31	4	61	71	68.19	5.0**
COPD EXS3	55	157	45	18.3	III	3	369	5	37	5.5	41	77	47.35	8.7
COPD EXS4	69	156	57	23.4	II	2	447	1	28	9	65	44	60.00	8.5
COPD EXS5	42	161	50	19.3	III	3	258	6	39	4	37	56	68.00	7.0**
COPD EXS6	58	159	57	22.5	III	3	276	5	50	6.5	37	53	55.18	6.1**

COPD EXS7	65	161	55	21.2	III	3	172	7	37	2	33	54	44.21	N/A**
COPD EXS8	69	165	53	19.5	II	3	204	6	21	8	50	58	66.00	N/A**
COPD EXS9	64	168	69	24.6	II	1	488	1	14	10	61	84	58.00	10.0
COPD EXS10	60	167	53	19.0	III	3	301	7	36	3	35	56	53.24	2.2**
COPD EXS11	70	168	70	24.9	III	3	318	6	40	6	33	54	44.21	9.8
CS1	55	160	65	25.4	-	1	586	0	13	-	96	99	80.22	9.6
CS2	52	168	68	24.1	-	0	581	0	15	-	80	82	72.26	N/A**
CS3	45	187	90	25.7	-	0	609	0	10	-	114	118	81.00	9.3
CS4	48	165	73	26.8	-	0	590	0	16	-	85	84	75.30	6.7**
CS5	62	171	75	25.5	-	2	596	1	20	-	94	97	74.25	9.1
CS6	35	172	82	28.0	-	0	570	0	10	-	84	84	84.00	1.0**
CS7	57	169	71	24.9	-	1	440	0	12	-	81	80	73.22	6.7**
CS8	46	166	68	24.7	-	1	520	0	17	-	89	94.2	78.00	N/A**
CS9	64	164	70	26.0	-	0	517	0	11	-	82	91	76.27	8.1
CNS1	47	165	92	33.8	-	1	479	0	-	-	89	89	82.15	3.0**
CNS2	57	165	66	24.2	-	0	606	0	-	-	85	89	80.00	7.7**

CNS3	53	181	85	26.1	-	2	447	1	-	-	82	83	78.42	6.6**
CNS4	45	162	52	19.8	-	0	479	1	-	-	80	82	75.00	6.7**
CNS5	66	176	61	19.7	-	1	585	1	-	-	80	89	75.03	1.0**
CNS6	51	162	64	24.4	-	0	601	0	-	-	93	90	82.22	8.8
CNS7	52	166	81	29.4	-	0	599	0	-	-	87	95	79.00	N/A**
CNS8	49	163	73	27.5	-	0	564	0	-	-	86	97	77.28	4.0**
CNS9	47	176	74	23.9	-	0	524	0	-	-	87	88	84.00	8.5
CNS10	54	177	83	26.5	-	0	618	0	-	-	84	82	74.00	5.2**
CNS11	49	180	53	16.4	-	0	596	1	-	-	80	85	80.00	6.7**
CNS12	50	174	79	26.1	-	0	520	0	-	-	85	83	76.12	6.7**
CNS13	61	168	86	30.5	-	1	517	0	-	-	88	89	81.00	1.0**
CNS14	53	164	67	24.9	-	0	509	0	-	-	82	86	78.09	2.8**
CNS15	38	165	65	23.9	-	0	595	0	-	-	88	88	85.00	9.0
CNS16	50	160	60	23.4	-	1	509	0	-	-	84	88	80.15	8.9

COPDS, COPD Smoker; COPD EXS, COPD Ex smoker; CS, Control Smoker; CNS, Control Never Smoker; 6MWD, Six Minute Walk Distance; BODE, Body mass index, airflow Obstruction, Dyspnea and Exercise capacity; RIN, RNA Integrity Number; MMRC, Modified Medical Research Council; GOLD, Global Initiative for Obstructive Lung Diseases; BMI, Body Mass Index; NA, Not Available. ^aBased on the GOLD staging of COPD severity (GOLD Report). ^bBased on the Modified Medical Research Council Dyspnea Scale (mMRC Dyspnea scale questionnaire). ^cBased on standardized protocol (ATS Statement: Guidelines for the Six-Minute Walk Test). ^dBased on BODE Index for COPD Survival Prediction calculations (Celli et al. 2004; Mahler et al. 1988). ^{e,f} based on the report obtained from the subject. *RIN score \geq 8.0 was taken as cut-off value. **Samples were not included in microarray experiments due to poor quality of RNA.