SUPPLEMENTAL FIGURE LEGENDS

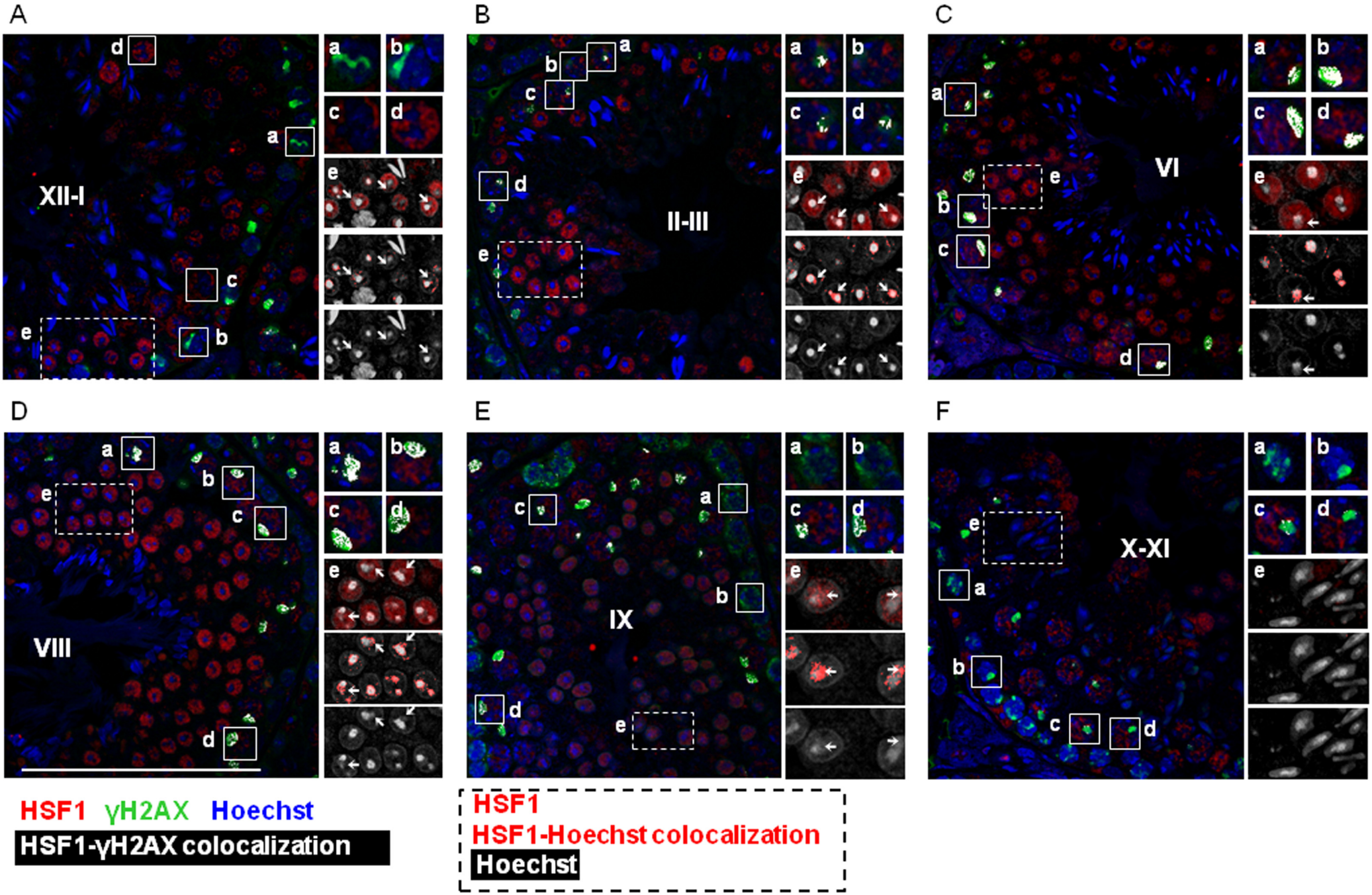
Figure S1. HSF1 is expressed from pachytene spermatocytes to early elongating spermatids, and localized to meiotic and post-meiotic sex chromatin. Localization of HSF1 (red) and γH2AX (green) in stages of mouse seminiferous epithelium was detected from single confocal sections using immunofluorescence confocal microscopy. Hoechst is shown in blue, except in spermatid insets (**A-F. e**, indicated with dashed line), where HSF1 (uppermost panel) or HSF1-Hoechst colocalization (middle panel) is superimposed on Hoechst shown in white. **A.** Cross section of a wild-type seminiferous tubule in stages XII-I, hallmarked by spermatocytes in the leptotene-pachytene transition **(a-b)**, the meiotic divisions **(c-d)**, and formation of haploid spermatids **(e)**. **B.** Tubule from stages II-III with early pachytene spermatocytes **(a-d)** and round spermatids **(e)**. **C.** A stage VI tubular section contains pachytene spermatocytes **(a-d)** and round spermatids **(e)**. **D.** Stage VIII pachytene spermatocytes **(a-d)** and round spermatids **(e)**. **E.** A section of seminiferous tubule in stage IX contains leptotene spermatocytes **(a-b)**, late pachytene spermatocytes **(c-d)**, and early elongating spermatids **(e)**. **F.** Tubule in stages X-XI shows leptotene-zygotene spermatocytes **(a-b)**, diplotene spermatocytes **(c-d)**, and elongating spermatids **(e)**. Stages are denoted by Roman numerals. Scale bar: 100 µm (shown in **D)**.

During male gametogenesis, HSF1 expression is not detected in the leptotene-pachytene transition in stage XII **(A a-b)**, but, instead, HSF1 appears in early pachytene spermatocytes in stages II-III **(B a, c-d)**. In pachytene spematocytes, the silenced sex chromatin is retained in a γH2AX-enriched sex body. Throughout the pachytene development, HSF1 localizes to the sex body, as indicated by HSF1-γH2AX colocalization (white) **(B-E)**. In diplotene spermatocytes, HSF1 gradually disappears from the sex body **(F c-d)**, and localizes to the surroundings of metaphase I and II chromosomes in stage XII **(A c-d)**. HSF1 expression remains high through the meiotic divisions and round spermatid development **(A-D e)**. After the meiotic divisions, HSF1 is not detected at the sex chromatin of spermatids in stage I **(A e)**. The post-meiotic sex chromatin is visualized as a cloud-like structure next to the Hoechst-dense chromocenter, and is indicated by arrows in spermatid insets **(A-F e)**. However, HSF1 relocalizes to sex chromatin in round spermatids in stages II-III **(B e)**, and the localization to post-meiotic sex chromatin is detected during the development of round spermatids in stages II-VIII **(B-D e)**. In early elongating spermatids, HSF1 levels rapidly decrease **(E)**, even though HSF1 still is detected at the sex chromatin **(E e)**. After stage IX, HSF1 is absent from elongating spermatids **(F e)**.

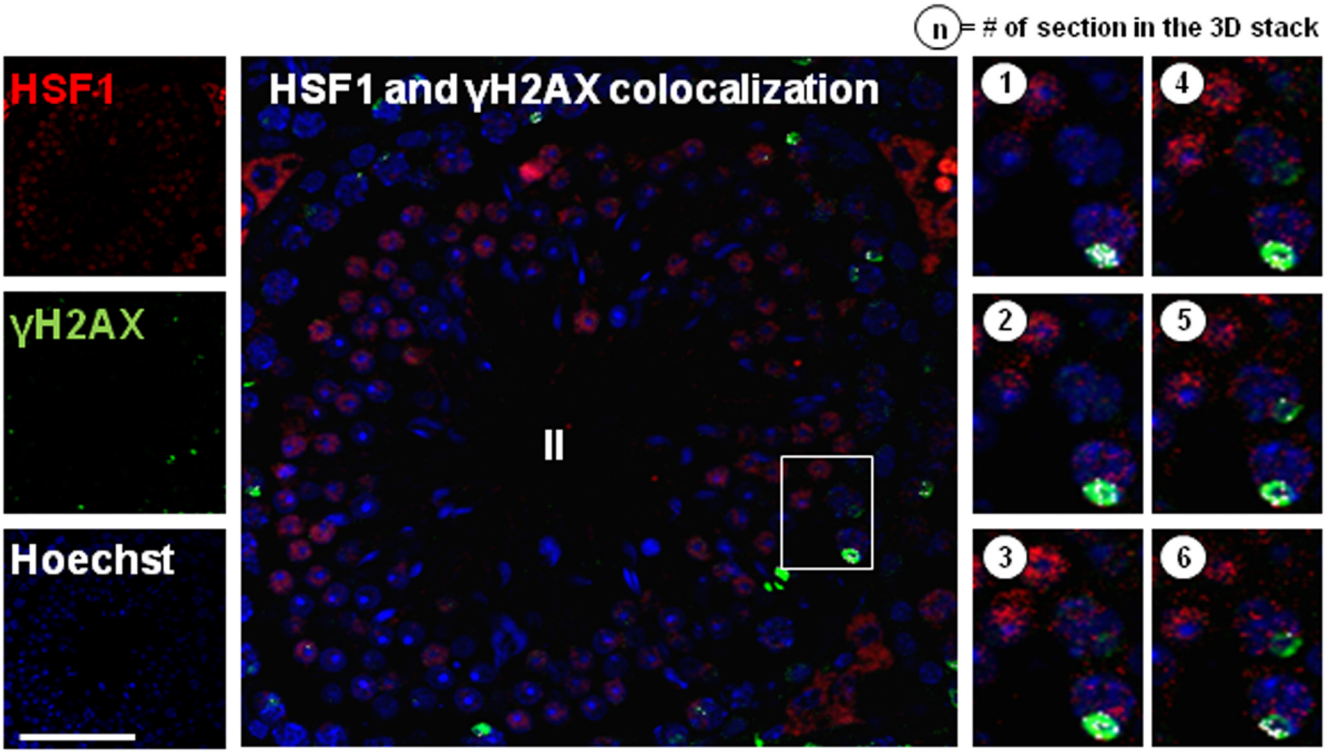
Figure S2. The intensity of colocalization in both spermatocytes and round spermatids varies depending on which section of the 3D stack of confocal immunofluorescence images is shown. HSF1 staining (red) and γH2AX staining (green) of WT testis sections were counterstained with Hoechst (blue). The colocalization of HSF1 and γH2AX (white) was analyzed from six consecutive confocal sections. The main figure presents a single confocal section, whereas the insets show all the six confocal sections of the selected region. Stages are denoted by Roman numerals, and n indicates the section in the 3D stack. Scale bar: 100 µm.

Figure S3. The specificity of the secondary antibodies that were used in colocalization analyses was confirmed by immunofluorescence confocal microscopy. Wild-type testis sections treated with primary antibody and its non-specific secondary antibody that was used in the same staining experiment for colocalization analysis. **A.** Secondary antibody for HSF1, Alexa568 α-rabbit antibody does not detect mouse monoclonal γH2AX antibody. **B.** Secondary antibody for γH2AX, Alexa488 α-mouse antibody does not detect rabbit polyclonal HSF1 antibody. Upper panels in A and B show images captured from the blue, green and red channels. The blue channel shows Hoechst-stained DNA, whereas no signal is detected from the green or the red channels. In lower panels, green and blue (left), and red and blue (right) are merged into a single image. Scale bar: 100 µm.

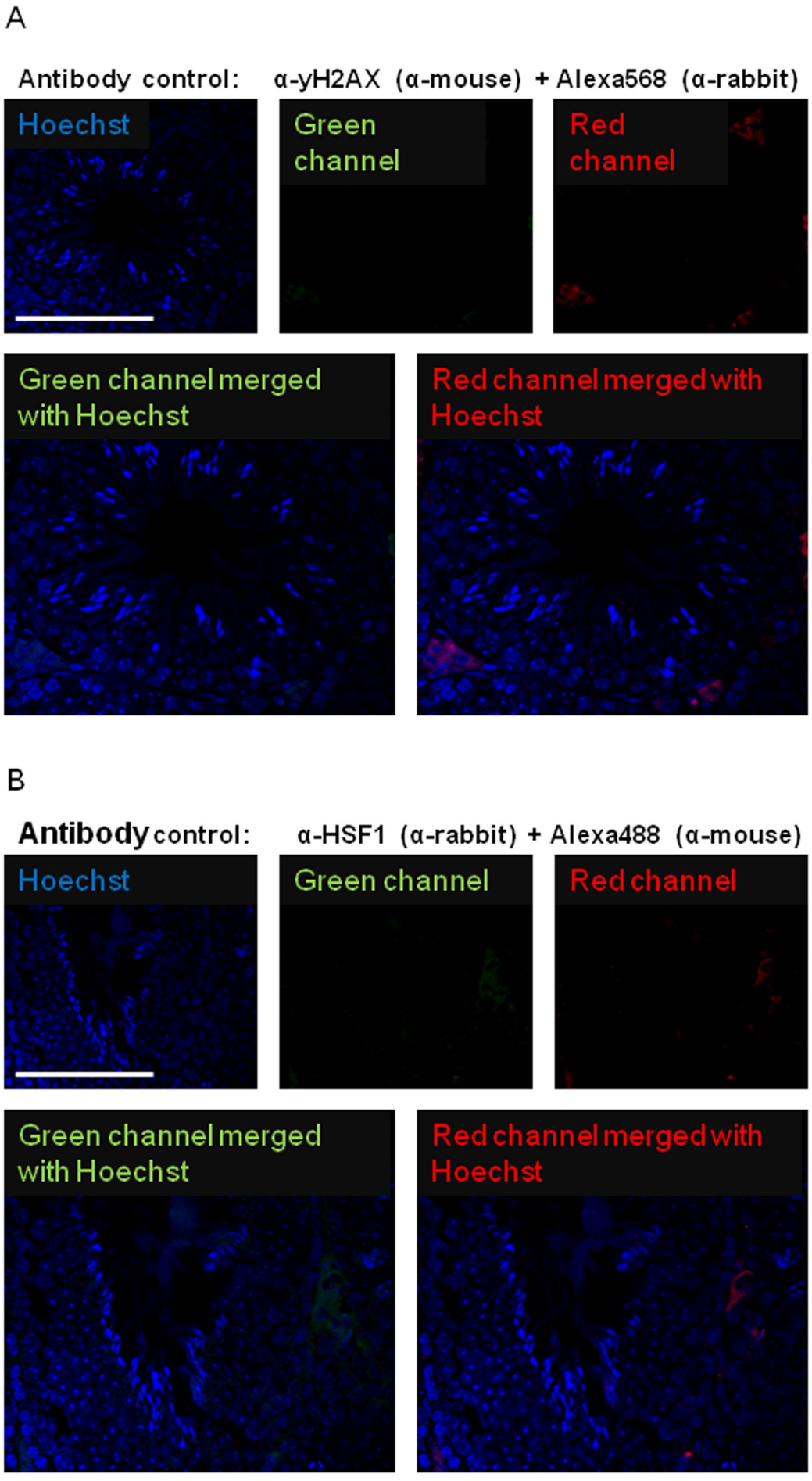
Supplemental Figure S1



Supplemental Figure S2



Supplemental Figure S3



Supplemental table S1. Identified HSF1 target promoters.

No.[a]	P-value[b]	Gene ID[c]	Abbrevation[d]	Gene name	Chr.[e]
1	0.0000	U16671	U16671	NA	6
2	0.0000	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
3	0.0000	NM_027802	Obox1	oocyte specific homeobox 1	7
4	0.0000	AK046764	B630019A10Rik	RIKEN cDNA B630019A10 gene	16
5	0.0000	NM_178875	8430426H19Rik	RIKEN cDNA 8430426H19 gene	13
6	0.0000	NM_001001499	4732465J04Rik	RIKEN cDNA 4732465J04 gene	10
7	0.0000	AK019664	Ak7	adenylate kinase 7	12
8	0.0000	NM_146447	Olfr1309	olfactory receptor 1309	2
9	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
10	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
11	0.0000	U58494	gag	NA	4
12	0.0000	NM_029891	Nkrf	NF-kappaB repressing factor	X
13	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
14	0.0000	NM_146456	Olfr92	olfactory receptor 92	17
15	0.0000	AK029501	Efhc2	EF-hand domain (C-terminal) containing 2	X
16	0.0000	AK086384	6330569M22Rik	RIKEN cDNA 6330569M22 gene	3
17	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
18	0.0000	AK053606	Phf20l1	PHD finger protein 20-like 1	15
19	0.0000	AK129217	Nup155	nucleoporin 155	15
20	0.0000	U16671	U16671	NA	18
21	0.0000	AK031017	Setd3	SET domain containing 3	12
22	0.0000	U16670	U16670	NA	3
23	0.0000	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
24	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
25	0.0000	AK122510	Prei4	preimplantation protein 4	2
26	0.0000	X16669	LOC280487	pol polyprotein	13
27	0.0000	AB010349	Zfp52	zinc finger protein 52	17
28	0.0000	AK048177	Cnot1	CCR4-NOT transcription complex, subunit 1	8
29	0.0000	BC049349	BC049349	cDNA sequence BC049349	8
30	0.0000	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
31	0.0000	AK122272	Fem1b	feminization 1 homolog b (C. elegans)	9
32	0.0000	AK129242	Atg4b	autophagy-related 4B (yeast)	1
33	0.0000	NM_177912	Gsdmc2	gasdermin C2	15
34	0.0000	U16670	U16670	NA	7
35	0.0000	NM_201351	Cybasc3	cytochrome b, ascorbate dependent 3	19
36	0.0000	BC057364	EG210583	predicted gene, EG210583	10
37	0.0000	AY512920	Mdn1	midasin homolog (yeast)	4
38	0.0000	AK083524	LOC280487	pol polyprotein	13
39	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
40	0.0000	U16670	U16670	NA	11
41	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
42	0.0000	AB010348	Zfp52	zinc finger protein 52	17
43	0.0000	U16670	U16670	NA	10
44	0.0000	BC046438	Brd9	bromodomain containing 9	13
45	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
46	0.0000	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
47	0.0000	BC050871	Bat2d	BAT2 domain containing 1	1
48	0.0000	U16671	U16671	NA	10

49	0.0000	BC044791	Trip11	thyroid hormone receptor interactor 11	12
50	0.0000	NM_177135	D830030K20Rik	RIKEN cDNA D830030K20 gene	14
51	0.0000	AK081092	AK081092	NA	5
52	0.0000	AK040719	Etohd2	ethanol decreased 2	13
53	0.0000	AK033285	E4f1	E4F transcription factor 1	17
54	0.0000	NM_146678	Olfr1428	olfactory receptor 1428	19
55	0.0000	AK122341	Zc3h11a	zinc finger CCCH type containing 11A	1
56	0.0000	AK082647	AK082647	NA	2
57	0.0000	AK052067	AK052067	predicted gene, ENSMUSG00000072700	6
58	0.0000	AK083524	LOC280487	pol polyprotein	13
59	0.0000	AF039663	Prom1	prominin 1	5
60	0.0000	NM_175490	Gpr75	G protein-coupled receptor 75	11
61	0.0000	AK003965	Echdc1	enoyl Coenzyme A hydratase domain containing 1	10
62	0.0000	BC057932	LOC629446	gag protein	10
63	0.0000	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
64	0.0000	AK076428	Pknox2	Pbx/knotted 1 homeobox 2	9
65	0.0000	AK018549	Mapk1	mitogen activated protein kinase 1	16
66	0.0000	NM_133789	Strn4	striatin, calmodulin binding protein 4	7
67	0.0000	NM_028866	Wdr33	WD repeat domain 33	18
68	0.0000	NM_020022	Rfc2	replication factor C (activator 1) 2	5
69	0.0000	NM_183125	A930006J02Rik	NA	14
70	0.0000	AK007800	Erp27	endoplasmic reticulum protein 27	6
71	0.0000	NM_008736	Nrl	neural retina leucine zipper gene	14
72	0.0000	AK048052	AK048052	NA	13
73	0.0000	AK048580	EG665308	predicted gene, EG665308	7
74	0.0001	U16670	U16670	NA	14
75	0.0001	NM_029632	Ppp1r11	protein phosphatase 1, regulatory (inhibitor) 11	17
76	0.0001	AB010312	Zfp715	zinc finger protein 715	7
77	0.0001	M10062	M10062	NA	X
78	0.0001	NM_194064	Nanos2	nanos homolog 2 (Drosophila)	7
79	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
80	0.0001	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
81	0.0001	AK088735	Rbm16	RNA binding motif protein 16	17
82	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
83	0.0001	AY395631	Gucy2g	guanylate cyclase 2g	19
84	0.0001	AK122407	Dnajc16	DnaJ (Hsp40) homolog, subfamily C, member 16	4
85	0.0001	BC061245	A230054D04Rik	RIKEN cDNA A230054D04 gene	5
86	0.0001	NM_176976	5830418K08Rik	RIKEN cDNA 5830418K08 gene	9
87	0.0001	BC030840	Psmc5	protease (prosome, macropain) 26S subunit, ATPase 5	11
88	0.0001	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
89	0.0001	NM_181751	Gpr119	G-protein coupled receptor 119	X
90	0.0001	BC059027	Mid1	midline 1	X
91	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	17
92	0.0001	NM_008373	Il9	interleukin 9	13
93	0.0001	NM_198166	Uts2d	urotensin 2 domain containing	16
94	0.0001	AK032821	Akap11	A kinase (PRKA) anchor protein 11	14
95	0.0001	NM_147040	Olfr1351	olfactory receptor 1351	10
96	0.0001	NM_177387	Ust	uronyl-2-sulfotransferase	10
97	0.0001	NM_025310	Ftsj3	FtsJ homolog 3 (E. coli)	11
98	0.0001	AK034776	Cnot1	CCR4-NOT transcription complex, subunit 1	8
99	0.0001	AK081719	AK081719	predicted gene, OTTMUSG00000013918	1

100	0.0001	AB010338	Zfp472	zinc finger protein 472	17
101	0.0001	AF193344	Eif2ak4	eukaryotic translation initiation factor 2 alpha kinase 4	2
102	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	4
103	0.0001	NM_027210	Ceacam13	CEA-related cell adhesion molecule 13	7
104	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	10
105	0.0001	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
106	0.0001	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
107	0.0001	NM_030742	V1rd1	vomeronasal 1 receptor, D1	7
108	0.0001	AK080098	LOC675594	similar to very large inducible GTPase 1 isoform A	7
109	0.0001	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
110	0.0001	NM_177919	Tceal5	transcription elongation factor A (SII)-like 5	X
111	0.0001	AK048262	AK048262	NA	8
112	0.0001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
113	0.0001	NM_177314	5330439B14Rik	RIKEN cDNA 5330439B14 gene	6
114	0.0001	NM_007575	Ciita	class II transactivator	16
115	0.0001	NM_183038	Defb39	defensin beta 39	8
116	0.0001	AK053178	Dnahc3	dynein, axonemal, heavy chain 3	7
117	0.0001	U16671	U16671	NA	X
118	0.0001	AK089333	AK089333	predicted gene, ENSMUSG00000070892	4
119	0.0002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	1
120	0.0001	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
121	0.0002	U16670	U16670	NA	2
122	0.0001	BC008537	Zfp292	zinc finger protein 292	4
123	0.0001	AY512949	AY512949	predicted gene, ENSMUSG00000066088	4
124	0.0002	BC054358	Sec31a	SEC31 homolog A (S. cerevisiae)	5
125	0.0002	NM_146522	Olfr854	olfactory receptor 854	9
126	0.0002	AK040149	AK040149	NA	1
127	0.0002	NM_207276	Defb21	defensin beta 21	2
128	0.0001	NM_008146	Golga3	golgi autoantigen, golgin subfamily a, 3	5
129	0.0002	AK078916	Ankhd1	ankyrin repeat and KH domain containing 1	18
130	0.0001	NM_146389	Olfr1350	olfactory receptor 1350	7
131	0.0002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
132	0.0002	AK003837	B3galnt1	UDP-GalNAc:b GlcNAc b 1,3-galactosaminyltransferase 1	3
133	0.0002	AF247132	AF247132	NA	3
134	0.0001	AK122392	Ankrd12	ankyrin repeat domain 12	17
135	0.0002	AK028762	Senp1	SUMO1/sentrin specific peptidase 1	15
136	0.0002	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
137	0.0002	AK087250	AK087250	NA	5
138	0.0002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	18
139	0.0002	NM_145541	Rap1a	RAS-related protein-1a	3
140	0.0002	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
141	0.0002	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
142	0.0002	BC019710	Phf3	PHD finger protein 3	1
143	0.0002	S64760	Ugt1a1	UDP glucuronosyltransferase 1 family, polypeptide A1	1
144	0.0002	AK078821	Qser1	glutamine and serine rich 1	2
145	0.0002	AK014599	Hyal4	hyaluronoglucosaminidase 4	6
146	0.0002	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
147	0.0002	NM_011618	Tnnt1	troponin T1, skeletal, slow	7
148	0.0002	AK046516	AK046516	predicted gene, ENSMUSG00000071543	13
149	0.0002	NM_176967	A430072C10Rik	RIKEN cDNA A430072C10 gene	3
150	0.0002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA

151	0.0002	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
152	0.0002	AK089867	9030025P20Rik	RIKEN cDNA 9030025P20 gene	17
153	0.0002	AK085862	AK085862	predicted gene, ENSMUSG00000054758	10
154	0.0002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
155	0.0002	NM_031167	Il1rn	interleukin 1 receptor antagonist	2
156	0.0002	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
157	0.0002	BC060506	Spag9	sperm associated antigen 9	11
158	0.0002	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
159	0.0002	NM_013621	Olfr69	olfactory receptor 69	7
160	0.0002	AK054346	Oog4	oogenesin 4	4
161	0.0002	AK007169	1700111E14Rik	RIKEN cDNA 1700111E14 gene	6
162	0.0003	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
163	0.0003	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
164	0.0003	U16670	U16670	NA	18
165	0.0003	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
166	0.0003	U16669	U16669	NA	3
167	0.0003	BC022960	BC022960	cDNA sequence BC022960	X
168	0.0003	AK005819	Spata6	spermatogenesis associated 6	4
169	0.0003	U16670	U16670	NA	Y
170	0.0003	NM_172050	Cd300e	CD300e antigen	11
171	0.0003	AY053456	AY053456	NA	2
172	0.0003	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
173	0.0003	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
174	0.0003	NM_010012	Cyp8b1	cytochrome P450, family 8, subfamily b, polypeptide 1	9
175	0.0003	U16671	U16671	NA	8
176	0.0003	NM_199157	Ifnk	interferon kappa precursor	4
177	0.0003	U16670	U16670	NA	3
178	0.0003	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
179	0.0003	NM_028562	1700080E11Rik	RIKEN cDNA 1700080E11 gene	9
180	0.0003	AK047412	C2cd3	C2 calcium-dependent domain containing 3	7
181	0.0003	AK011661	Zfp318	zinc finger protein 318	17
182	0.0003	AK090300	LOC667118	similar to Zinc finger BED domain containing protein 4	1
183	0.0003	U16670	U16670	NA	11
184	0.0003	BC058994	Usp32	ubiquitin specific peptidase 32	11
185	0.0003	AB093258	Dnajc13	DnaJ (Hsp40) homolog, subfamily C, member 13	9
186	0.0003	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
187	0.0003	BC068134	Pftk1	PFTAIRE protein kinase 1	5
188	0.0003	NM_001004194	Nlrp4e	NLR family, pyrin domain containing 4E	7
189	0.0003	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
190	0.0003	BC059873	Hmgcr	3-hydroxy-3-methylglutaryl-Coenzyme A reductase	13
191	0.0003	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
192	0.0003	NM_026375	Ahctf1	AT hook containing transcription factor 1	1
193	0.0003	BC026492	Ddx46	DEAD (Asp-Glu-Ala-Asp) box polypeptide 46	13
194	0.0004	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	4
195	0.0004	AK081351	Gja7	gap junction membrane channel protein alpha 7	11
196	0.0004	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
197	0.0004	NM_026287	4930470P17Rik	NA	2
198	0.0004	NM_016781	Prkag1	protein kinase, AMP-activated, gamma 1	15
199	0.0004	NM_013712	Itgb1bp2	integrin beta 1 binding protein 2	X
200	0.0004	NM_147220	Abca9	ATP-binding cassette, sub-family A (ABC1) 9	11
201	0.0004	NM_019873	Fkbpl	FK506 binding protein-like	17

202	0.0004	NM_009838	Cct6a	chaperonin subunit 6a (zeta)	5
203	0.0004	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
204	0.0004	AK039711	4930519F16Rik	RIKEN cDNA 4930519F16 gene	X
205	0.0004	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
206	0.0004	U16670	U16670	NA	Y
207	0.0004	AB010353	Zkscan3	zinc finger with KRAB and SCAN domains 3	13
208	0.0004	NM_001001738	BC063749	cDNA sequence BC063749	19
209	0.0004	NM_027720	4933434M16Rik	NA	11
210	0.0004	AK004886	Nucb1	nucleobindin 1	7
211	0.0004	NM_017399	Fabp1	fatty acid binding protein 1, liver	6
212	0.0004	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	12
213	0.0005	AK084868	AK084868	NA	9
214	0.0005	NM_080846	Higd1b	HIG1 domain family, member 1B	11
215	0.0005	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
216	0.0005	AK034990	Myef2	myelin basic protein expression factor 2, repressor	2
217	0.0005	AK034679	Ash1l	ash1 (absent, small, or homeotic)-like (Drosophila)	3
218	0.0005	AJ250693	Zranb1	zinc finger, RAN-binding domain containing 1	7
219	0.0005	AK032464	AK032464	NA	2
220	0.0005	AB010329	Zfp715	zinc finger protein 715	7
221	0.0005	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
222	0.0005	BC053524	Ipo7	importin 7	7
223	0.0005	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
224	0.0005	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
225	0.0005	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
226	0.0005	NM_177246	B230220B15Rik	NA	NA
227	0.0005	NM_026335	Lce1h	late cornified envelope 1H	3
228	0.0005	BC023805	BC023805	predicted gene, OTTMUSG00000015730	2
229	0.0005	NM_177200	Svopl	SV2 related protein homolog (rat)-like	6
230	0.0005	NM_177749	Kir3dl1	killer cell immunoglobulin-like receptor 1	X
231	0.0005	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	X
232	0.0005	U16670	U16670	NA	Y
233	0.0005	NM_020008	Clec7a	C-type lectin domain family 7, member a	6
234	0.0005	AK046292	Ndufa10	NADH dehydrogenase (ubiquinone) 1 alpha 10	1
235	0.0005	BC002292	Gpbp1l1	GC-rich promoter binding protein 1-like 1	4
236	0.0005	AK047634	AK047634	predicted gene, ENSMUSG00000058736	5
237	0.0005	U16670	U16670	NA	2
238	0.0005	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
239	0.0005	BC030900	Ece2	endothelin converting enzyme 2	16
240	0.0005	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
241	0.0005	S57425	Ipr	NA	15
242	0.0006	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
243	0.0006	AK016545	4932434E15Rik	RIKEN cDNA 4932434E15 gene	2
244	0.0006	U58494	gag	NA	10
245	0.0006	NM_013697	Ttr	transthyretin	18
246	0.0006	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
247	0.0006	AK014580	4632415L05Rik	RIKEN cDNA 4632415L05 gene	3
248	0.0006	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
249	0.0006	AK129453	Spg11	spastic paraplegia 11	2
250	0.0006	NM_008817	Peg3	paternally expressed 3	7
251	0.0006	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
252	0.0006	NM_010188	Fcgr3	Fc receptor, IgG, low affinity III	1

253	0.0006	NM_146511	Olfr107	olfactory receptor 107	17
254	0.0006	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
255	0.0006	U16670	U16670	NA	13
256	0.0006	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
257	0.0006	NM_172629	9430028L06Rik	NA	18
258	0.0006	AK088735	Rbm16	RNA binding motif protein 16	17
259	0.0006	U16670	U16670	NA	Y
260	0.0006	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
261	0.0007	AK046660	Recql	RecQ protein-like	6
262	0.0006	AK039976	A630038E17Rik	RIKEN cDNA A630038E17 gene	14
263	0.0007	U16670	U16670	NA	2
264	0.0007	NM_007378	Abca4	ATP-binding cassette, sub-family A (ABC1) 4	3
265	0.0007	BC031496	Rnaset2a	ribonuclease T2A	17
266	0.0007	U16670	U16670	NA	3
267	0.0007	AK017442	Krtap2-4	keratin associated protein 2-4	11
268	0.0007	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
269	0.0007	BC002035	Igk-V1	immunoglobulin kappa chain variable 1 (V1)	6
270	0.0007	NM_177246	B230220B15Rik	NA	13
271	0.0007	AK122406	Zdhhc17	zinc finger, DHHC domain containing 17	10
272	0.0007	U16670	U16670	NA	NA
273	0.0007	AK030146	Cdc2l6	cell division cycle 2-like 6 (CDK8-like)	10
274	0.0007	BC057072	Zfp407	zinc finger protein 407	18
275	0.0007	NM_177135	D830030K20Rik	RIKEN cDNA D830030K20 gene	14
276	0.0008	BC048563	1700034E13Rik	RIKEN cDNA 1700034E13 gene	18
277	0.0008	AK037017	Adpgk	ADP-dependent glucokinase	9
278	0.0008	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
279	0.0008	NM_177172	A830054O04Rik	NA	10
280	0.0008	BC006717	Ccpg1	cell cycle progression 1	9
281	0.0008	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
282	0.0008	NM_213616	Atp2b4	ATPase, Ca++ transporting, plasma membrane 4	1
283	0.0008	NM_207651	Slc14a2	solute carrier family 14 (urea transporter) 2	18
284	0.0008	NM_011036	Pap	pancreatitis-associated protein	6
285	0.0008	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
286	0.0008	BC046559	4930485B16Rik	RIKEN cDNA 4930485B16 gene	10
287	0.0008	NM_011867	Slc26a4	solute carrier family 26, member 4	12
288	0.0008	NM_172602	A630038E17Rik	NA	14
289	0.0009	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
290	0.0008	AB010344	Zfp26	zinc finger protein 26	9
291	0.0009	NM_029343	Spata9	spermatogenesis associated 9	13
292	0.0009	BC061169	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
293	0.0009	AK045823	D930020B18Rik	RIKEN cDNA D930020B18 gene	10
294	0.0009	AK044340	Als2cr2	amyotrophic lateral sclerosis 2 chromosome region 2	1
295	0.0009	AB010343	AB010343	predicted gene, ENSMUSG00000063905	13
296	0.0009	AK129457	1500001A10Rik	RIKEN cDNA 1500001A10 gene	5
297	0.0009	AK012781	Rps17	ribosomal protein S17	7
298	0.0009	AK007150	1700109H08Rik	RIKEN cDNA 1700109H08 gene	5
299	0.0009	NM_026352	Ppid	peptidylprolyl isomerase D (cyclophilin D)	3
300	0.0009	BC059060	4933409K07Rik	RIKEN cDNA 4933409K07 gene	4
301	0.0009	NM_177202	A930104D05Rik	RIKEN cDNA A930104D05 gene	2
302	0.0009	AK047105	LOC433577	similar to ORF7	3
303	0.0009	BC061206	Cpa4	carboxypeptidase A4	6

304	0.0009	NM_025782	9130422G05Rik	NA	4
305	0.0009	NM_177197	Idi2	isopentenyl-diphosphate delta isomerase 2	13
306	0.0009	NM_025308	1810007E14Rik	RIKEN cDNA 1810007E14 gene	2
307	0.0009	NM_133200	P2ry14	purinergic receptor P2Y, G-protein coupled, 14	3
308	0.001	NM_146486	Olfr203	olfactory receptor 203	16
309	0.001	AB093242	Ubr4	ubiquitin protein ligase E3 component n-recognin 4	4
310	0.001	NM_029738	Cluap1	clusterin associated protein 1	16
311	0.001	NM_026743	Tspan11	tetraspanin 11	6
312	0.001	AK042615	4930590J08Rik	RIKEN cDNA 4930590J08 gene	6
313	0.001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
314	0.001	U16670	U16670	NA	X
315	0.001	AK032405	6030443O07Rik	RIKEN cDNA 6030443O07 gene	19
316	0.001	U16670	U16670	NA	2
317	0.001	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
318	0.001	AK038266	Rwdd4a	RWD domain containing 4A	8
319	0.001	AK006601	1700034K16Rik	RIKEN cDNA 1700034K16 gene	4
320	0.001	NM_146385	Olfr1347	olfactory receptor 1347	7
321	0.001	AK005957	4932442K08Rik	RIKEN cDNA 4932442K08 gene	17
322	0.001	NM_026596	4930591A17Rik	RIKEN cDNA 4930591A17 gene	2
323	0.001	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
324	0.0011	NM_007964	Evi5	ecotropic viral integration site 5	5
325	0.0011	NM_177335	D930020B18Rik	RIKEN cDNA D930020B18 gene	10
326	0.0011	NM_026386	Snx2	sorting nexin 2	18
327	0.0011	U16670	U16670	NA	NA
328	0.0011	BC049753	Cst8	cystatin 8 (cystatin-related epididymal spermatogenic)	2
329	0.0011	NM_175490	Gpr75	G protein-coupled receptor 75	11
330	0.0011	AK036870	Nck1	non-catalytic region of tyrosine kinase adaptor 1	9
331	0.0011	M38247	Ssty2	spermiogenesis specific transcript on the Y 2	Y
332	0.0011	AK034491	AK034491	NA	9
333	0.0011	AK039283	Hspa4l	heat shock protein 4 like	3
334	0.0011	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
335	0.0011	NM_176829	4931440F15Rik	RIKEN cDNA 4931440F15 gene	11
336	0.0011	AK028672	AK028672	NA	7
337	0.0011	AK032065	6330569M22Rik	RIKEN cDNA 6330569M22 gene	3
338	0.0011	AK044553	Gpr75	G protein-coupled receptor 75	11
339	0.0011	NM_028344	2810449C13Rik	NA	4
340	0.0011	AK045231	2610209M04Rik	RIKEN cDNA 2610209M04 gene	6
341	0.0011	U76209	Neurod4	neurogenic differentiation 4	10
342	0.0011	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
343	0.0011	BC051401	Dnahc3	dynein, axonemal, heavy chain 3	7
344	0.0011	AK032783	Rnf144a	ring finger protein 144A	12
345	0.0011	AK009750	Vps13b	vacuolar protein sorting 13B (yeast)	15
346	0.0011	AK008703	Pik3r4	phosphatidylinositol 3 kinase, regulatory, polypeptide 4	9
347	0.0012	AK082708	AK082708	predicted gene, ENSMUSG00000053270	11
348	0.0012	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
349	0.0012	BC028451	Aggf1	angiogenic factor with G patch and FHA domains 1	13
350	0.0012	AK078951	Mia3	melanoma inhibitory activity 3	1
351	0.0012	AK051815	C330023M02Rik	RIKEN cDNA C330023M02 gene	5
352	0.0012	K01411	Ifna2	interferon alpha 2	4
353	0.0012	AK014534	Pwwp2a	PWWP domain containing 2A	11
354	0.0012	AK014500	Dync2h1	dynein cytoplasmic 2 heavy chain 1	9

355	0.0012	X53654	Pou2f2	POU domain, class 2, transcription factor 2	7
356	0.0012	AK079363	Tial1	Tia1 cytotoxic granule-associated RNA binding like 1	7
357	0.0012	AK029693	Rnf17	ring finger protein 17	14
358	0.0012	BC021423	Zdhhc14	zinc finger, DHHC domain containing 14	17
359	0.0012	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
360	0.0012	NM_028739	4933404G15Rik	NA	16
361	0.0012	NM_177686	Clec12a	C-type lectin domain family 12, member a	6
362	0.0012	U16670	U16670	NA	5
363	0.0012	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
364	0.0012	AK050921	Pwwp2a	PWWP domain containing 2A	11
365	0.0013	NM_173761	Ythdf1	YTH domain family 1	2
366	0.0013	AK044162	D130059P03Rik	RIKEN cDNA D130059P03 gene	6
367	0.0013	AF102539	Olfr60	olfactory receptor 60	7
368	0.0013	NM_010170	F2rl2	coagulation factor II (thrombin) receptor-like 2	13
369	0.0013	AK044167	AU042671	expressed sequence AU042671	5
370	0.0013	NM_028535	1700049E17Rik	NA	NA
371	0.0013	AY140895	AY140895	NA	NA
372	0.0013	NM_177765	Ttll13	tubulin tyrosine ligase-like family, member 13	7
373	0.0013	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
374	0.0013	AK033338	Mll3	myeloid/lymphoid or mixed-lineage leukemia 3	5
375	0.0013	AK012399	2700049A03Rik	RIKEN cDNA 2700049A03 gene	12
376	0.0013	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
377	0.0013	AK082287	Eml5	echinoderm microtubule associated protein like 5	12
378	0.0014	AK007247	D0H6S2654E	DNA segment, human D6S2654E	13
379	0.0014	U16670	U16670	NA	X
380	0.0014	NM_028818	2610511M17Rik	NA	7
381	0.0014	NM_145935	Glyat	glycine-N-acyltransferase	19
382	0.0014	NM_030739	V1rd4	vomeronasal 1 receptor, D4	7
383	0.0014	NM_183166	EG233164	predicted gene, EG233164	7
384	0.0014	AK053272	AK053272	NA	9
385	0.0014	AK010057	Hn1	hematological and neurological expressed 1	11
386	0.0014	NM_176965	Efcab5	EF-hand calcium binding domain 5	11
387	0.0014	NM_018884	Pdzrn3	PDZ domain containing RING finger 3	6
388	0.0014	AK049564	Lims1	LIM and senescent cell antigen-like domains 1	10
389	0.0014	NM_009258	Spink3	serine peptidase inhibitor, Kazal type 3	18
390	0.0014	AK037652	Wdr22	WD repeat domain 22	12
391	0.0015	NM_011294	Sub1	SUB1 homolog (S. cerevisiae)	15
392	0.0015	NM_207162	LOC382133	similar to RIKEN cDNA 1700029H17	Y
393	0.0015	AK017750	Casc5	cancer susceptibility candidate 5	2
394	0.0015	NM_172867	Zfp462	zinc finger protein 462	4
395	0.0015	AK005786	1700008P02Rik	RIKEN cDNA 1700008P02 gene	3
396	0.0015	AB010352	AB010352	predicted gene, ENSMUSG00000070586	5
397	0.0015	NM_205795	Mrgprb4	MAS-related GPR, member B4	7
398	0.0015	BC056637	Lgr4	leucine-rich repeat-G protein-coupled receptor 4	2
399	0.0015	NM_201637	Chd8	chromodomain helicase DNA binding protein 8	14
400	0.0015	AK008287	Polr2k	polymerase (RNA) II (DNA directed) polypeptide K	15
401	0.0015	AK050901	Ep400	E1A binding protein p400	5
402	0.0015	NM_028535	1700049E17Rik	NA	NA
403	0.0015	NM_153102	Zfp352	zinc finger protein 352	4
404	0.0015	BC034550	Dyrk1a	dual-specificity Y-phosphorylation regulated kinase 1a	16
405	0.0015	NM_007977	F8	coagulation factor VIII	X

406	0.0015	AK039283	Hspa4l	heat shock protein 4 like	3
407	0.0016	NM_176975	A430010J10Rik	RIKEN cDNA A430010J10 gene	6
408	0.0016	AK047604	Dlgap4	discs, large homolog-associated protein 4	2
409	0.0016	X59289	Xist	inactive X specific transcripts	X
410	0.0016	M55219	M55219	NA	NA
411	0.0016	S57425	lpr	NA	Y
412	0.0016	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
413	0.0016	BC065123	Baz1a	bromodomain adjacent to zinc finger domain 1A	12
414	0.0016	U22058	Adam4	a disintegrin and metallopeptidase domain 4	12
415	0.0017	BC052528	Rbbp6	retinoblastoma binding protein 6	7
416	0.0017	AF302090	Trim69	tripartite motif-containing 69	2
417	0.0017	BC026926	C87436	expressed sequence C87436	6
418	0.0017	AK086113	Hcfc2	host cell factor C2	10
419	0.0016	NM_008223	Serpind1	serine (or cysteine) peptidase inhibitor, clade D 1	16
420	0.0017	AF132218	Hrc	histidine rich calcium binding protein	7
421	0.0017	BC026868	Slc39a14	solute carrier family 39 (zinc transporter) 14	14
422	0.0017	AY196960	Mageb2	melanoma antigen, family B, 2	X
423	0.0017	AK082130	Gatc	glutamyl-tRNA(Gln) amidotransferase C	5
424	0.0017	AK037168	Gm312	gene model 312, (NCBI)	16
425	0.0017	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
426	0.0017	U16670	U16670	NA	NA
427	0.0018	BC018264	Pip	prolactin induced protein	6
428	0.0018	AK084863	AK084863	NA	16
429	0.0017	AK034060	AK034060	predicted gene, ENSMUSG00000053892	X
430	0.0018	L04851	Ssty2	spermiogenesis specific transcript on the Y 2	Y
431	0.0018	BC006724	Icmt	isoprenylcysteine carboxyl methyltransferase	4
432	0.0018	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
433	0.0018	NM_025738	Cypt6	cysteine-rich perinuclear theca 6	X
434	0.0018	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
435	0.0018	NM_009220	Ssty1	spermiogenesis specific transcript on the Y 1	Y
436	0.0018	NM_134253	Bnipl	BCL2/adenovirus E1B 19kD interacting protein like	3
437	0.0018	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	7
438	0.0018	BC025610	Ttc5	tetratricopeptide repeat domain 5	14
439	0.0018	AK035076	AK035076	NA	2
440	0.0019	BC027360	Ipo8	importin 8	6
441	0.0018	U16670	U16670	NA	2
442	0.0018	NM_019917	Vmn2r26	vomeronasal 2, receptor 26	6
443	0.0019	AK042135	AK042135	predicted gene, OTTMUSG00000000469	13
444	0.0019	AK085040	Ddx51	DEAD (Asp-Glu-Ala-Asp) box polypeptide 51	5
445	0.0019	U16671	U16671	NA	16
446	0.0019	BC042516	Prdm4	PR domain containing 4	10
447	0.0019	AB010347	2810426N06Rik	RIKEN cDNA 2810426N06 gene	7
448	0.0019	AK088963	AK088963	predicted gene, ENSMUSG00000073624	18
449	0.0019	AK129307	Cnot6	CCR4-NOT transcription complex, subunit 6	11
450	0.0019	BC027668	Bcl2l15	Bcl2-like 15	3
451	0.0019	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
452	0.0019	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
453	0.0019	L04850	Ssty2	spermiogenesis specific transcript on the Y 2	Y
454	0.0019	AK033517	Evi1	ecotropic viral integration site 1	3
455	0.0019	NM_147004	Olfr399	olfactory receptor 399	11
456	0.0019	AK018524	Twsg1	twisted gastrulation homolog 1 (Drosophila)	17

457	0.0019	NM_009529	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
458	0.002	BC002302	Rbm16	RNA binding motif protein 16	17
459	0.002	NM_008042	Fprl1	formyl peptide receptor-like 1	17
460	0.002	NM_009596	Abpa	androgen binding protein alpha	7
461	0.002	NM_025847	2610016F04Rik	NA	14
462	0.002	AF298661	Mepe	matrix extracellular phosphoglycoprotein ASARM	5
463	0.002	BC029053	Cab39	calcium binding protein 39	1
464	0.002	NM_010898	Nf2	neurofibromatosis 2	11
465	0.002	NM_146382	Olfr461	olfactory receptor 461	6
466	0.002	AB010367	Zfp420	zinc finger protein 420	7
467	0.002	BC026738	3110043O21Rik	RIKEN cDNA 3110043O21 gene	4
468	0.002	NM_178396	Car12	carbonic anyhydrase 12	9
469	0.0021	NM_025844	Chordc1	cysteine and histidine-rich domain (CHORD) 1	9
470	0.0021	AB010345	Zfp26	zinc finger protein 26	9
471	0.002	BC010304	BC010304	cDNA sequence BC010304	13
472	0.0021	NM_207547	V1rd21	vomeronasal 1 receptor, D21	7
473	0.0021	NM_011730	Slc6a18	NA	13
474	0.002	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
475	0.0021	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
476	0.0021	NM_011468	Sprr2a	small proline-rich protein 2A	3
477	0.0021	NM_027561	4632415L05Rik	NA	3
478	0.0021	AK082921	Pkn2	protein kinase N2	3
479	0.0021	NM_177135	D830030K20Rik	RIKEN cDNA D830030K20 gene	14
480	0.0021	AK033990	Slc30a9	solute carrier family 30 (zinc transporter) 9	5
481	0.0021	AY297108	Gje1	gap junction membrane channel epsilon 1	5
482	0.0022	NM_198961	Vmn2r43	vomeronasal 2, receptor 43	7
483	0.0022	NM_010694	Lcn3	lipocalin 3	2
484	0.0022	U16670	U16670	NA	5
485	0.0022	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
486	0.0022	BC044668	LOC72520	hypothetical gene LOC72520	2
487	0.0022	AK019507	Csnk2a2	casein kinase 2, alpha prime polypeptide	8
488	0.0022	AK078303	Fem1b	feminization 1 homolog b (C. elegans)	9
489	0.0022	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
490	0.0022	AY364010	Nlrp12	NLR family, pyrin domain containing 12	7
491	0.0022	NM_008334	Ifna7	interferon alpha 7	4
492	0.0022	NM_170777	Elof1	elongation factor 1 homolog	9
493	0.0022	NM_183280	RP23-438H3.2	hypothetical protein LOC69357	X
494	0.0022	NM_008118	Gif	gastric intrinsic factor	19
495	0.0022	NM_146956	Olfr525	olfactory receptor 525	7
496	0.0022	AK011082	Trim10	tripartite motif protein 10	17
497	0.0023	NM_010904	Nefh	neurofilament, heavy polypeptide	11
498	0.0023	AK005786	1700008P02Rik	RIKEN cDNA 1700008P02 gene	3
499	0.0023	AK028858	Pbxip1	pre-B-cell leukemia transcription factor interacting protein 1	3
500	0.0023	NM_029948	Pramef12	PRAME family member 12	4
501	0.0024	NM_133771	Memo1	mediator of cell motility 1	17
502	0.0024	M92418	Stfa2	stefin A2	16
503	0.0024	NM_007970	Ezh1	enhancer of zeste homolog 1 (Drosophila)	11
504	0.0024	NM_146588	Olfr1030	olfactory receptor 1030	2
505	0.0024	AB010313	Zfp157	zinc finger protein 157	5
506	0.0024	AK078033	Utp18	UTP18, small subunit (SSU) processome component	11
507	0.0024	BC049586	LOC382133	similar to RIKEN cDNA 1700029H17	Y

508	0.0024	AK087111	Zfyve9	zinc finger, FYVE domain containing 9	4
509	0.0024	AK083645	AK083645	NA	7
510	0.0024	NM_008039	Fpr-rs2	formyl peptide receptor, related sequence 2	17
511	0.0025	AK036630	Slc35b4	solute carrier family 35, member B4	6
512	0.0024	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
513	0.0025	AK033683	Daam1	dishevelled associated activator of morphogenesis 1	12
514	0.0025	NM_025940	NM_025940	predicted gene, ENSMUSG00000063277	14
515	0.0025	NM_177890	EG330513	predicted gene, EG330513	7
516	0.0025	M38248	LOC435023	similar to spermiogenesis specific transcript on the Y 2	Y
517	0.0025	NM_011539	Tbxas1	thromboxane A synthase 1, platelet	6
518	0.0025	M64429	B-raf	NA	6
519	0.0025	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
520	0.0025	NM_011821	Gpc6	glypican 6	14
521	0.0025	BC061169	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
522	0.0025	NM_020572	Aurkc	aurora kinase C	7
523	0.0025	BC057063	Snx25	sorting nexin 25	8
524	0.0026	NM_009529	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
525	0.0026	AK049494	Flvcr2	feline leukemia virus subgroup C cellular receptor family 2	12
526	0.0026	NM_198677	BC061237	cDNA sequence BC061237	14
527	0.0026	NM_011822	Pigq	phosphatidylinositol glycan anchor biosynthesis Q	17
528	0.0026	NM_007609	Casp4	caspase 4, apoptosis-related cysteine peptidase	9
529	0.0026	U16670	U16670	NA	X
530	0.0026	AK044682	Mpp4	membrane protein, palmitoylated 4 (MAGUK p55)	1
531	0.0026	AK029965	AK029965	NA	3
532	0.0026	M36514	Zfp26	zinc finger protein 26	9
533	0.0026	U16670	U16670	NA	11
534	0.0026	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
535	0.0026	NM_146431	Olfr1510	olfactory receptor 1510	14
536	0.0026	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
537	0.0026	BC021493	Kti12	KTI12 homolog, chromatin associated (S. cerevisiae)	4
538	0.0026	BC030042	EG545728	predicted gene, EG545728	5
539	0.0027	NM_152803	Hpse	heparanase	5
540	0.0027	NM_146889	Olfr1302	olfactory receptor 1302	2
541	0.0027	NM_173434	9930111J21Rik	RIKEN cDNA 9930111J21 gene	11
542	0.0028	AK129178	Akap11	A kinase (PRKA) anchor protein 11	14
543	0.0027	BC056221	Zfp583	zinc finger protein 583	7
544	0.0027	AK037032	Cecr2	cat eye syndrome chromosome region, candidate 2	6
545	0.0027	AK003886	Mrpl3	mitochondrial ribosomal protein L3	9
546	0.0027	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
547	0.0028	AK010217	2310079G19Rik	RIKEN cDNA 2310079G19 gene	16
548	0.0028	NM_024172	1500019G21Rik	RIKEN cDNA 1500019G21 gene	7
549	0.0027	U58494	gag	NA	NA
550	0.0027	NM_172759	Ces5	carboxylesterase 5	8
551	0.0027	U10341	Akap4	A kinase (PRKA) anchor protein 4	X
552	0.0027	NM_025540	Sln	sarcolipin	9
553	0.0027	L04849	Ssty2	spermiogenesis specific transcript on the Y 2	Y
554	0.0027	AK040961	Pi15	peptidase inhibitor 15	1
555	0.0027	NM_009529	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
556	0.0027	U16670	U16670	NA	NA
557	0.0028	AK008189	Gsta4	glutathione S-transferase, alpha 4	9
558	0.0028	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA

559	0.0028	NM_008331	Ifit1	interferon-induced protein with tetratricopeptide repeats 1	19
560	0.0029	NM_023524	Tfpt	TCF3 (E2A) fusion partner	7
561	0.0029	AY512910	AY512910	predicted gene, ENSMUSG00000068680	14
562	0.0029	BC029023	Trrap	transformation/transcription domain-associated protein	5
563	0.0029	NM_008645	Mug1	murinoglobulin 1	6
564	0.0029	NM_207162	LOC382133	similar to RIKEN cDNA 1700029H17	Y
565	0.0029	M55219	M55219	NA	NA
566	0.0029	NM_054074	Defb6	defensin beta 6	8
567	0.0029	AK049265	Frs2	fibroblast growth factor receptor substrate 2	10
568	0.0029	BC061169	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
569	0.0029	AK083524	LOC280487	pol polyprotein	13
570	0.003	NM_001002779	A230065C20Rik	NA	14
571	0.003	U16670	U16670	NA	8
572	0.003	X16670	LOC280487	pol polyprotein	13
573	0.003	NM_177397	Atp6v1g3	ATPase, H+ transporting, lysosomal V1 subunit G3	1
574	0.003	NM_025914	Actr6	ARP6 actin-related protein 6 homolog (yeast)	10
575	0.003	AK036232	D12Ertd553e	DNA segment, Chr 12, ERATO Doi 553, expressed	12
576	0.003	AK028427	Zfp346	zinc finger protein 346	13
577	0.0031	AK016661	4933405D12Rik	RIKEN cDNA 4933405D12 gene	3
578	0.0031	AK076353	4732457N14	hypothetical protein 4732457N14	5
579	0.0031	NM_031188	Mup1	major urinary protein 1	4
580	0.0031	AK122436	Camsap1l1	calmodulin regulated spectrin-associated protein 1-like 1	1
581	0.0031	NM_009529	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
582	0.0031	NM_175322	D130072O21Rik	NA	8
583	0.0031	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
584	0.0031	NM_020278	Lgi1	leucine-rich repeat LGI family, member 1	19
585	0.0031	AY512924	EG545510	predicted gene, EG545510	3
586	0.0031	NM_011999	Clec4a2	C-type lectin domain family 4, member a2	6
587	0.0032	NM_146931	Olfr796	olfactory receptor 796	10
588	0.0031	BC042938	Ang4	angiogenin, ribonuclease A family, member 4	14
589	0.0031	NM_138593	Larp7	La ribonucleoprotein domain family, member 7	3
590	0.0032	NM_011300	Rps7	ribosomal protein S7	12
591	0.0032	AK013259	Mup1	major urinary protein 1	4
592	0.0032	AK089801	Cd69	CD69 antigen	6
593	0.0032	AY196960	Mageb2	melanoma antigen, family B, 2	X
594	0.0032	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
595	0.0032	NM_178248	Pramel4	NA	NA
596	0.0032	NM_009596	Abpa	androgen binding protein alpha	7
597	0.0032	L04852	Ssty2	spermiogenesis specific transcript on the Y 2	Y
598	0.0032	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
599	0.0033	NM_054041	Antxr1	anthrax toxin receptor 1	6
600	0.0032	AK078386	Ei24	etoposide induced 2.4 mRNA	9
601	0.0033	BC028949	EG668383	predicted gene, EG668383	12
602	0.0033	NM_028058	Fundc1	FUN14 domain containing 1	X
603	0.0033	AK002444	0610010B08Rik	RIKEN cDNA 0610010B08 gene	2
604	0.0033	NM_172547	9130014G24Rik	RIKEN cDNA 9130014G24 gene	10
605	0.0033	AK004375	Abhd13	abhydrolase domain containing 13	8
606	0.0033	NM_198011	E430018J23Rik	RIKEN cDNA E430018J23 gene	7
607	0.0033	AK010171	Bxdc2	brix domain containing 2	15
608	0.0033	BC006770	BC006770	NA	NA
609	0.0034	BC050791	1700019M22Rik	RIKEN cDNA 1700019M22 gene	12

610	0.0034	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
611	0.0034	AK009856	Hif1an	hypoxia-inducible factor 1, alpha subunit inhibitor	19
612	0.0034	BC066831	Ars2	arsenate resistance protein 2	5
613	0.0034	AK054306	Serinc3	serine incorporator 3	2
614	0.0034	NM_013488	Cd4	CD4 antigen	6
615	0.0034	BC061152	Cyp2d40	cytochrome P450, family 2, subfamily d, polypeptide 40	15
616	0.0034	AK035553	Herc1	hect domain and RCC1 (CHC1)-like domain (RLD) 1	9
617	0.0035	NM_020264	Svs7	seminal vesicle secretory protein 7	9
618	0.0035	AK080305	Cul5	cullin 5	9
619	0.0035	BC061106	Taf1a	TATA box binding protein associated factor, RNA pol I A	1
620	0.0035	AK015144	4930415F15Rik	RIKEN cDNA 4930415F15 gene	11
621	0.0035	NM_153800	Arhgap22	Rho GTPase activating protein 22	14
622	0.0035	NM_198033	Setx	senataxin	2
623	0.0035	NM_053112	Ear10	eosinophil-associated, ribonuclease A family, member 10	14
624	0.0036	NM_008352	Il12b	interleukin 12b	11
625	0.0035	BC049586	LOC382133	similar to RIKEN cDNA 1700029H17	Y
626	0.0035	NM_031188	Mup1	major urinary protein 1	4
627	0.0036	NM_026649	4930441O14Rik	RIKEN cDNA 4930441O14 gene	13
628	0.0036	NM_175693	B230220N19Rik	NA	NA
629	0.0036	NM_001001335	Plekha8	pleckstrin homology domain containing, family A 8	6
630	0.0036	BC006775	Rlf	rearranged L-myc fusion sequence	4
631	0.0036	AK076593	4930467E23Rik	RIKEN cDNA 4930467E23 gene	8
632	0.0036	AK013166	2810426N06Rik	RIKEN cDNA 2810426N06 gene	7
633	0.0036	BC004690	Cep290	centrosomal protein 290	10
634	0.0036	NM_172448	Rnf43	ring finger protein 43	11
635	0.0037	AK045649	Herc1	hect domain and RCC1 (CHC1)-like domain (RLD) 1	9
636	0.0037	AK006494	Ssty2	spermiogenesis specific transcript on the Y 2	Y
637	0.0037	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
638	0.0037	AK002773	Vnn1	vanin 1	10
639	0.0037	BC055684	Zfp445	zinc finger protein 445	9
640	0.0037	AK034651	Tbc1d15	TBC1 domain family, member 15	10
641	0.0038	NM_011295	Rps12	ribosomal protein S12	10
642	0.0038	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
643	0.0038	NM_009529	Slx	Sycp3 like X-linked, ENSMUSG00000073257	X
644	0.0038	U16670	U16670	NA	NA
645	0.0038	NM_008741	Nsg2	neuron specific gene family member 2	11
646	0.0039	AK086722	Map2k6	mitogen activated protein kinase kinase 6	11
647	0.0039	NM_011082	Pigr	polymeric immunoglobulin receptor	1
648	0.0038	U16670	U16670	NA	X
649	0.0039	AK122531	5830417I10Rik	RIKEN cDNA 5830417I10 gene	3
650	0.0039	U16670	U16670	NA	9
651	0.0039	BC049626	Sly	Sycp3 like Y-linked	Y
652	0.0039	NM_008089	Gata1	GATA binding protein 1	X
653	0.0039	NM_009260	Spnb2	spectrin beta 2	11
654	0.004	AK081107	AK081107	predicted gene, ENSMUSG00000055849	13
655	0.004	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
656	0.004	AK084162	Cblb	Casitas B-lineage lymphoma b	16
657	0.004	NM_207162	LOC382133	similar to RIKEN cDNA 1700029H17	Y
658	0.004	NM_019746	Pdcd5	programmed cell death 5	7
659	0.004	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
660	0.0041	NM_023662	Pcm1	pericentriolar material 1	8

661	0.0041	BC064813	Inpp4b	inositol polyphosphate-4-phosphatase, type II	8
662	0.0041	BC023707	Zc3h13	zinc finger CCCH type containing 13	14
663	0.0041	AK017232	Ttc18	tetratricopeptide repeat domain 18	14
664	0.0041	NM_183190	Ms4a5	membrane-spanning 4-domains A 5	19
665	0.0041	NM_029842	Jmjd5	jumonji domain containing 5	7
666	0.0041	AK039310	AK039310	predicted gene, ENSMUSG00000052663	19
667	0.0041	AK030890	Stau1	staufen (RNA binding protein) homolog 1	2
668	0.0041	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
669	0.0041	AK051942	LOC433461	hypothetical gene supported by AK051942	2
670	0.0041	NM_207227	Olfr1373	olfactory receptor 1373	11
671	0.0041	AK006494	Ssty2	spermiogenesis specific transcript on the Y 2	Y
672	0.0042	NM_178697	Clca5	chloride channel calcium activated 5	3
673	0.0042	NM_178050	Arl6ip2	ADP-ribosylation factor-like 6 interacting protein 2	17
674	0.0042	AK028528	Srpk2	serine/arginine-rich protein specific kinase 2	5
675	0.0042	NM_019940	Zfp111	zinc finger protein 111	7
676	0.0042	BC059715	1700010D01Rik	RIKEN cDNA 1700010D01 gene	X
677	0.0042	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
678	0.0042	NM_023289	Ceacam11	CEA-related cell adhesion molecule 11	7
679	0.0042	NM_146955	Olfr60	olfactory receptor 60	7
680	0.0043	BC056476	E130319B15Rik	RIKEN cDNA E130319B15 gene	2
681	0.0043	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
682	0.0043	BC023501	Fastkd1	FAST kinase domains 1	2
683	0.0043	NM_008412	Ivl	involucrin	3
684	0.0043	AK042925	Ebf1	early B-cell factor 1	11
685	0.0043	NM_008372	Il7r	interleukin 7 receptor	15
686	0.0043	NM_181412	Zbed4	zinc finger, BED domain containing 4	15
687	0.0044	U16670	U16670	NA	2
688	0.0044	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
689	0.0044	NM_011887	Scn11a	sodium channel, voltage-gated, type XI, alpha	9
690	0.0044	AK044024	Eml5	echinoderm microtubule associated protein like 5	12
691	0.0044	BC040459	Ahnak	AHNAK nucleoprotein (desmoyokin)	19
692	0.0044	AK014581	D19Ertd652e	DNA segment, Chr 19, ERATO Doi 652, expressed	19
693	0.0044	BC068018	Zfp654	zinc finger protein 654	16
694	0.0044	NM_153524	Mrgpra4	MAS-related GPR, member A4	7
695	0.0044	BC027795	Zfp294	zinc finger protein 294	16
696	0.0044	NM_009230	Soat1	sterol O-acyltransferase 1	1
697	0.0045	AK008249	Mnat1	menage a trois 1	12
698	0.0044	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
699	0.0045	AK004123	Zmym1	zinc finger, MYM domain containing 1	4
700	0.0045	NM_146515	Olfr99	olfactory receptor 99	17
701	0.0045	AY040842	5830417I10Rik	RIKEN cDNA 5830417I10 gene	3
702	0.0045	AK049464	Ranbp2	RAN binding protein 2	10
703	0.0045	AK020456	9430034F23Rik	RIKEN cDNA 9430034F23 gene	11
704	0.0045	AK078437	Psmb6	proteasome (prosome, macropain) subunit, beta 6	11
705	0.0045	AK122576	Negr1	neuronal growth regulator 1	3
706	0.0045	NM_147094	Olfr606	olfactory receptor 606	7
707	0.0045	AK021168	Pkp4	plakophilin 4	2
708	0.0045	NM_011312	S100a5	S100 calcium binding protein A5	3
709	0.0046	U96708	Serpinb9f	serine (or cysteine) peptidase inhibitor B 9f	13
710	0.0046	AK036156	AK036156	NA	7
711	0.0045	AB005909	Dmbt1	deleted in malignant brain tumors 1	7

712	0.0046	AJ278769	Gphn	gephyrin	12
713	0.0046	AK037896	AK037896	NA	13
714	0.0046	AB010353	Zkscan3	zinc finger with KRAB and SCAN domains 3	13
715	0.0046	AK006494	Ssty2	spermiogenesis specific transcript on the Y 2	Y
716	0.0046	AK006226	1700021O21Rik	RIKEN cDNA 1700021O21 gene	5
717	0.0046	AK035923	Dennd4a	DENN/MADD domain containing 4A	9
718	0.0045	NM_021713	Myg1	melanocyte proliferating gene 1	15
719	0.0047	NM_080844	Serpinc1	serine (or cysteine) peptidase inhibitor C 1	1
720	0.0047	U16671	U16671	NA	7
721	0.0047	AK085082	EG546150	predicted gene, EG546150	9
722	0.0047	NM_017478	Copg2	coatomer protein complex, subunit gamma 2	6
723	0.0047	NM_172740	B230312I18Rik	NA	7
724	0.0047	BC027050	Pde6c	phosphodiesterase 6C, cGMP specific, cone, alpha prime	19
725	0.0047	NM_145707	Obox3	oocyte specific homeobox 3	7
726	0.0047	AF104414	Lats1	large tumor suppressor	10
727	0.0047	AK005740	1700007N14Rik	RIKEN cDNA 1700007N14 gene	14
728	0.0048	AK049517	Sgol1	shugoshin-like 1 (S. pombe)	17
729	0.0048	D00315	D00315	NA	4
730	0.0048	BC027125	4932438A13Rik	RIKEN cDNA 4932438A13 gene	3
731	0.0048	NM_010382	H2-Eb1	histocompatibility 2, class II antigen E beta	17
732	0.0047	NM_145597	Tmem161a	transmembrane protein 161A	8
733	0.0048	BC011285	Mobkl1b	MOB1, Mps One Binder kinase activator-like 1B	6
734	0.0048	NM_008430	Kcnk1	potassium channel, subfamily K, member 1	8
735	0.0049	NM_177078	Adrbk2	adrenergic receptor kinase, beta 2	5
736	0.0049	AK045941	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	NA
737	0.0049	AK014399	Nrg3	neuregulin 3	14
738	0.0049	NM_199068	Foxk1	forkhead box K1	5
739	0.0049	X16670	LOC280487	pol polyprotein	13
740	0.0049	NM_172855	Galnt5	N-acetylgalactosaminyltransferase 5	2
741	0.0049	U16672	L1Md-A1	L1 repeat, A subfamily, member 1	7
742	0.0049	NM_183258	2610001J05Rik	NA	6

[a]HSF1 target promoters found in all three replicates, ranked according to the average $\log_2$-ratios and P-value, [b]the P-value for each HSF2 target promoter. The data was filtered with P-value < 0.005, [c]gene identification number, [d]gene name abbreviation, [e]chromosomal locations derived from the publicly available annotation databases.

Supplemental table S2. The chromosomal distribution of HSF1 target genes.

Chr.[a]	Pop. frac.[b]	Study frac.[c]	P-value[d]	e-score[e]
1	1257	22	0.995322	1
2	1945	32	0.999827	1
3	1071	33	0.328743	1
4	1303	27	0.966413	1
5	1300	31	0.858821	1
6	1191	35	0.429999	1
7	2584	88	0.037674	0.829
8	1101	15	0.999657	1
9	1273	32	0.778031	1
10	1035	26	0.759112	1
11	1663	35	0.975837	1
12	730	19	0.675656	1
13	925	27	0.459133	1
14	787	25	0.302125	1
15	839	13	0.994800	1
16	700	15	0.892902	1
17	1056	27	0.731179	1
18	557	9	0.977227	1
19	748	15	0.937602	1
X	808	28	0.156774	1
Y	105	42	2.06E-37	4.53E-36
Un	3277	146	1.12E-08	2.46E-07

[a]Chromosome, [b]fraction of genes located on a certain chromosome, of the total number of genes on the array (26129), [c]fraction of HSF1 target genes located on a certain chromosome, of the total number of HSF1 target genes analyzed in this study (742, with a P-value < 0.005), [d]the probability of HSF1 occupancy on the promoters in each chromosome by random chance. [e]Bonferroni corrected P-value. Un indicates undefined chromosomal location.

Supplemental table S3. Common HSF1 and HSF2 target promoters.

No.[a]	Gene ID[b]	Abbrevation[c]	HSF2 rank[d]	HSF1 rank[d]	Chr.[e]
1	U16671	NA	149	1	6
2	L1Md-A1	L1 repeat, A subfamily, member 1	18	2	7
3	Obox1	oocyte specific homeobox 1	367	3	7
4	L1Md-Tf29	L1 repeat, Tf subfamily, member 29	5	9	NA
5	gag	NA	108	11	4
6	U16670	NA	1	22	3
7	LOC280487	pol polyprotein	27	26	13
8	Fem1b	feminization 1 homolog b (C. elegans)	162	31	9
9	Gsdmc2	gasdermin C2	142	33	15
10	D830030K20Rik	alpha28-takusan RIKEN cDNA D830030K20 gene	14	50	14
11	Etohd2	ethanol decreased 2	197	52	13
12	Zc3h11a	zinc finger CCCH type containing 11A	535	55	1
13	AK082647	NA	498	56	2
14	Rfc2	replication factor C (activator 1) 2	311	68	5
15	Erp27	endoplasmic reticulum protein 27	417	70	6
16	LOC435023	similar to spermiogenesis specific transcript on the Y 2	23	80	Y
17	Ssty2	spermiogenesis specific transcript on the Y 2	32	105	Y
18	Ugt1a1	UDP glucuronosyltransferase 1 family, polypeptide A1	133	143	1
19	Tnnt1	troponin T1, skeletal, slow	492	147	7
20	BC022960	cDNA sequence BC022960	98	167	X
21	AY053456	hypothetical protein, withdrawn	79	171	2
22	LOC667118	similar to Zinc finger BED domain containing protein 4	430	182	1
23	Nlrp4e	NLR family, pyrin domain containing 4E	153	188	7
24	Higd1b	HIG1 domain family, member 1B	505	214	11
25	lpr	NA	265	241	15
26	Slx	predicted gene, ENSMUSG00000073257, Slx	58	292	X
27	4933409K07Rik	RIKEN cDNA 4933409K07 gene	54	300	4
28	Idi2	isopentenyl-diphosphate delta isomerase 2	105	305	13
29	P2ry14	purinergic receptor P2Y, G-protein coupled, 14	217	307	3
30	4930590J08Rik	RIKEN cDNA 4930590J08 gene	529	312	6
31	Olfr1347	olfactory receptor 1347	68	320	7
32	Olfr60	olfactory receptor 60	485	367	7
33	1700049E17Rik	NA	198	370	NA
34	AY140895	NA	399	371	NA
35	Glyat	glycine-N-acyltransferase	515	381	19
36	EG233164	predicted gene, EG233164	231	383	7
37	M55219	NA	159	410	NA
38	AK088963	predicted gene, ENSMUSG00000073624	82	448	18
39	Evi1	ecotropic viral integration site 1	461	454	3
40	Sprr2a	small proline-rich protein 2A	330	476	3
41	LOC72520	hypothetical gene LOC72520	487	486	2
42	NM_025940	predicted gene, ENSMUSG00000063277	103	514	14
43	Aurkc	aurora kinase C	84	522	7
44	BC061237	cDNA sequence BC061237	109	526	14
45	EG545728	predicted gene, EG545728	39	538	5
46	4933405D12Rik	RIKEN cDNA 4933405D12 gene	230	577	3
47	Ang4	angiogenin, ribonuclease A family, member 4	55	587	14
48	Pramel4	NA	540	595	NA
49	EG668383	predicted gene, EG668383	3	601	12
50	0610010B08Rik	RIKEN cDNA 9130014G24 gene	83	603	10

51	BC006770	NA	48	608	NA
52	4930467E23Rik	RIKEN cDNA 4930467E23 gene	30	631	8
53	Sly	Sycp3 like Y-linked	22	651	Y
54	Ahnak	AHNAK nucleoprotein (desmoyokin)	237	691	19
55	Serpinb9f	serine peptidase inhibitor, clade B, member 9f	122	711	13

[a]Common HSF1 and HSF2 target promoters found in all three replicates, ranked according to the average $\log_2$-ratios and P-value, [b]gene name abbreviation [c]ranking of HSF1 target genes, [d]ranking of HSF2 target genes, [e]chromosomal locations derived from the publicly available annotation databases.