

**Table S1. Statistics for High-Throughput Sequencing Datasets, Related to Experimental Procedures**

Library	Total reads	$\leq 4$ alignments	0 alignments	$> 4$ alignments
H3K4me3 IP 24 hpf	12,189,261	8,449,068	1,832,467	1,907,726
H3K4me3 IP 72 hpf	16,657,288	10,559,648	1,358,270	4,739,370
H3K4me3 IP Adult	9,146,789	5,487,668	1,114,291	2,544,830
H3K36me3 IP 24 hpf	12,939,306	6,834,681	1,008,475	5,096,150
H3K36me3 IP 72 hpf	19,956,175	11,589,103	1,813,807	6,553,265
H3K36me3 IP Adult	13,666,859	7,521,044	1,429,574	4,716,241
Input 24 hpf (control for H3K4me3)	9,961,209	4,877,619	1,762,600	3,320,990
Input 24 hpf (control for H3K36me3)	10,886,048	5,726,839	924,820	4,234,389
Input 72 hpf (control for H3K4me3)	17,892,954	9,105,274	1,891,952	6,895,728
Input 72 hpf (control for H3K36me3)	19,069,127	10,872,021	1,459,677	6,737,429
Input Adult	14,041,883	7,523,101	1,537,844	4,980,938
Strand-specific RNA-Seq 24 hpf	37,203,901	18,307,186	5,337,724	13,558,991
Strand-specific RNA-Seq 72 hpf	37,004,726	15,410,622	3,787,831	17,806,273
3P-Seq 24 hpf	22,448,667	13,179,736	8,524,042	744,889
3P-Seq 72 hpf	20,914,473	17,818,974	1,984,988	1,110,511
3P-Seq Adult	18,445,044	14,743,023	2,493,766	1,208,255

**Table S4. Spatial Expression of lincRNAs Analyzed Using In Situ Hybridization, Related to Figure 2**

lincRNA	Genomic location	Expression at 24 hpf	Expression at 72 hpf
<i>malat1</i>	chr14:48566202-48573730	ubiquitous, enriched in the brain, mucous cells	brain, mucous cells
<i>linc-mipep1</i>	chr10:40425061-40428902	enriched in the brain, spinal cord, blood vessels	enriched in the brain
<i>linc-bin2a</i>	chr23:33944861-33952782	lens	n/d
<i>linc-cldn7a</i>	chr7:23796995-23800090	pronephros, cranial ganglia	n/d
<i>linc-gtf2f2b</i>	chr9:19526783-19529739	cranial ganglia	n/d
<i>linc-epb4.114</i>	chr10:1734816-1745335	enriched in CNS	Brain
<i>linc-srd5a2a</i>	chr1:51582321-51592093	cranial ganglia, nose	n/d
<i>linc-prr14</i>	chr3:32992137-32996372	n/d	n/d
<i>linc-agpat3</i>	chr1:47327616-47330238	n/d	n/d
<i>linc-mettl3</i>	chr7:23027784-23042820	n/d	specific hindbrain neurons
<i>linc-csnk1a1</i>	chr14:40176987-40183099	n/d	cartilage of the jaw, nose epithelium
<i>cyrano</i>	chr13:33484735-33491213	brain, notochord,	brain, notochord, spinal cord
<i>linc-loc100001135</i>	chr7:4334540-4358502	n/d	n/d
<i>linc-onecut1</i>	chr18:37186817-37191791	n/d	n/d
<i>linc-pou3f3b-2</i>	chr6:14538090-14542184	n/d	n/d
<i>linc-meis1</i>	chr13:5245604-5250645	n/d	n/d
<i>linc-arid4a</i>	chr17:11281895-11282994	brain, eye, spinal cord	n/d
<i>linc-setd1ba</i>	chr10:43348128-43351841	specific neurons	specific neurons
<i>megamind</i>	chr17:22517187-22519802	brain, eye	brain
<i>linc-trpc7</i>	chr14:1668370-1672051	brain, notochord	brain, notochord
<i>linc-elovl1a</i>	chr2:19346942-19351962	specific face neurons	n/d
<i>linc-plcb2</i>	chr17:2208928-2210522	n/d	n/d
<i>linc-tbx2b</i>	chr15:26704323-26717885	dorsal retina, ear	n/d
<i>linc-roghi</i>	chr3:36765129-36766960	n/d	n/d

n/d, not detected.

**Table S5. Number of Embryos in *cyrano* and *megamind* Experiments, Related to Figures 5 and 6**

Experiment	wild type	mutant
Control <i>cyrano</i> MO1	32	0
Control <i>cyrano</i> MO2	45	0
Conserved site <i>cyrano</i> MO	6	69
Splice <i>cyrano</i> MO	25	157
Splice <i>cyrano</i> MO + RFP RNA	7	53
Splice <i>cyrano</i> MO + zebrafish <i>cyrano</i> RNA	50	54
Splice <i>cyrano</i> MO + mouse <i>cyrano</i> RNA	21	11
Splice <i>cyrano</i> MO + human <i>cyrano</i> RNA	27	34
Splice <i>cyrano</i> MO + <i>cyrano_mut_a</i> RNA	19	45
Splice <i>cyrano</i> MO + <i>cyrano_mut_b</i> RNA	22	57
Splice <i>cyrano</i> MO + <i>cyrano_mut_a+b</i> RNA	13	80
Splice <i>cyrano</i> MO + <i>cyrano</i> conserved site RNA	5	26
Splice <i>cyrano</i> MO + hybrid 1 RNA	16	65
Control <i>megamind</i> MO1	46	0
Control <i>megamind</i> MO2	61	0
Conserved site <i>megamind</i> MO	10	83
Splice <i>megamind</i> MOs	19	174
Splice <i>megamind</i> MOs + RFP <i>megamind</i> RNA	5	39
Splice <i>megamind</i> MOs + zebrafish <i>megamind</i> RNA	53	60
Splice <i>megamind</i> MOs + mouse <i>megamind</i> RNA	32	15
Splice <i>megamind</i> MOs + human <i>megamind</i> RNA	35	43
Splice <i>megamind</i> MOs + <i>megamind_stop</i> RNA	38	38
Splice <i>megamind</i> MOs + <i>megamind_frameshift</i> RNA	25	29
Splice <i>megamind</i> MOs + <i>megamind_mut_a</i> RNA	20	35
Splice <i>megamind</i> MOs + <i>megamind_mut_b</i> RNA	27	32
Splice <i>megamind</i> MOs + <i>megamind_mut_a+b</i> RNA	8	72
Splice <i>megamind</i> MOs + <i>megamind</i> conserved site RNA	9	47
Splice <i>megamind</i> MOs + hybrid 2 RNA	16	107

**Table S6. Morpholino Sequences and Concentrations, Related to Experimental Procedures**

Morpholino	Sequence (5'→3')	Targeting description
<i>cyrano</i> e1i1 MO (5.5 ng)	AACACTCATCCC <del>G</del> CACTTACCGTCA	<i>cyrano</i> intron 1 5' splice site
<i>cyrano</i> e2i2 MO (5.5 ng)	TGCTGTTTTTTGATGACCTACCTGGT	<i>cyrano</i> intron 2 5' splice site
<i>cyrano</i> i2e3 MO (5.5 ng)	TCATCTGCACAGAATGGACATTTGA	<i>cyrano</i> intron 2 3' splice site
<i>cyrano</i> conserved site MO (5 ng)	ATTGGTGATTTTGTGTTTTTGCGA	<i>cyrano</i> conserved site in exon 3
<i>cyrano</i> control MO1 (4 ng)	ATTGGT <u>C</u> ATTTT <u>C</u> TT <u>C</u> TTT <u>A</u> T <u>C</u> CGA	Same as <i>cyrano</i> conserved site MO but with five mismatches (underlined)
<i>cyrano</i> control MO2 (4 ng)	ACTAGGAATAATCTACCCACAGCTC	Non-conserved region in <i>cyrano</i> exon 3
<i>megamind</i> e1i1 MO (1.6 ng)	GTAGAAAAACTGGCCCCCACCTTCT	<i>megamind</i> intron 1 5' splice site
<i>megamind</i> i2e3 MO (1.6 ng)	ATGAAAATAGGGAGTCTTACCCTAC	<i>megamind</i> intron 2 3' splice site
<i>megamind</i> conserved site MO (5 ng)	TGATCCCCAGAAGGGCCAATATGGA	<i>megamind</i> conserved site in exon 3
<i>megamind</i> control MO1 (4 ng)	TG <u>T</u> G <u>C</u> CCCA <u>C</u> AAGG <u>C</u> CCAATAT <u>C</u> G <u>A</u>	Same as <i>megamind</i> conserved site MO but with five mismatches (highlighted)
<i>megamind</i> control MO2 (4 ng)	GCATTTTCCTTTGCACAGAAACAAC	Non-conserved region in <i>megamind</i> exon 3

**Table S7. Oligonucleotide Sequences, Related to Experimental Procedures**

Amplicon	PCR primer pairs (5'→3').
Insert for in situ probe template	
<i>malat1</i>	GACGTTTTCCGTTGGTTATACAAAGGTT AGTTGTAACACATTTACATTATAGCTGGC
<i>linc-mipep</i>	GCTCAACACAGTGTGCGACTGTTTTTTCAGCGT TCAGAACGCTTTACAACATAAAGAGATC
<i>linc-bin2a</i>	GGTCATCGCCCTGATCCTGCTGACCCT ACAAGGAACATAATATTGTAACCCTGCACAAAACAC
<i>linc-cldn7a</i>	CTTCCGACTAGCGCCGAACAAACCGACACAGA AATGTCAAGGTAGACTCCAGTTACCAAG
<i>linc-gtf2f2b</i>	TCGAAGAATAGCTTGAAGAAACAGACGCAATCCCTG ACTGCAGCATTTCATGGTTCGGGTGCTC
<i>linc-epb4.114</i>	GACTTTAATCTGCTCCTTGGTAAGGAAGCTCAG TGCTCCGACCGTCTTGGATTTCTGAGTTTCGC
<i>linc-srd5a2a</i>	AGGACCCAAAATGGTGGCGGCGTGAGTGAAAAC TAATACGACTCACTATAGGAGCCGCGCAGGCTGAGCGACGTACGACAC
<i>linc-prr14</i>	GCACTGTGAAACTGTTTATGACT AATGAATGCCTTAATACTCTCAGGATGGC
<i>linc-agpat3</i>	GAAGTCGTTACACAAACCGTCTGTCCAAGCAGA ATTACACAGTGATGCCATAATCAATTCAAC
<i>linc-mettl3</i>	GCTGAACGAGTCTCTCTACATCACCAGTGA ACACTGGCCAATGCCTACTTTGCACACTG
<i>linc-csnk1a1</i>	CAACACCTGCTGAGTTTCCCCTCTAAACTCGCTCA TGGCATATTTATGGTTATTAGTTGTATTGACTGGACAGC
<i>cyrano</i>	GGTAATCACTATTAGTTGATGATAACGTCATAGCATGCT AGTCACAACACTGGTCCACTCATAGATTTAGTGTC
<i>linc-loc100001135</i>	CTCGAAGCCTGTCTTATTCATCTATCTCCTCACTTACGGT TCTCACAGTTGATATAAACAGAGTGCCATTGTGC
<i>linc-onecut1</i>	GCACGGATAACAGAATCTAGAGGCGAGAGACAAGCA ATTGTTGTGCTATTAAGAGTAACGAACCAAGCCATC
<i>linc-pou3f3b-2</i>	CAGGGAGAGGGGCCTCCTTTCTACACTGGACCCA ATGACCGTACATGAAAGAAGAGGGTGGAGAACAGGTTTC
<i>linc-meis1</i>	GCTGTGGTTCAGAAGTCAAACGGAGGTCATCCTTTAT TGAAATGCAAATTCCGTTACTTAAACTTTC
<i>linc-arid4a</i>	CCTATATGACTGCTTCAGCTCAGCATTGACTAGGTTGCA TCCACAGAAACGACATAAAGACGCCATTACCGTTGC
<i>linc-setd1ba</i>	GCCTTTAAGTACAATTATTGTTTCCTCACTGTGT

	ACTACACAAAATAGATTAGAATCCACATTTATTATAG
<i>megamind</i>	GCACATCTGTAGGGCTTCTACACCCACAGAAAAAGCGGA AGATGGGTTTCAGAGTCTAACATTCTTCTCTGTTAATTC
<i>linc-trpc7</i>	GTGAGGATACTGCGAGCCGTCATGCGCGCTCGCTGATCTTC TCAGTATATACAGACAAATCAGCGAGTTTCAGTCCACGCTGGTC
<i>linc-elovl1a</i>	GGTTGGGAAGCGCAACATAAACTGCATGCTAACAAACAAT TCAGAAAATGTAAAGACTACAGTGAAAACAGGTGTGGAC
<i>linc-plcb2</i>	GATATTTGACCTCAGAAACATCTCAGTCTTCA AGCCCATGCAAGCTTTGTATTTTCTTAAAAAGCTCGCGTC
<i>linc-rogdi</i>	GCGGGACCATTCTGACTGAAGTCATGGACAAAAGCA TCATACAAATAATGTCATCCATTCAAAACATTCCAAC
<i>linc-tbx2b</i>	GATACACAGACAACCAAGACTTAAGATTATTGACGTGTA TAAACGCACACATGATGTTTCGCAGTGCAGTTTGTGGAAC
Insert for expression constructs	
Zebrafish <i>megamind</i> full-length	GCAATGCACGGCGCTCTCAGGCTCCGAGACGGGACCTATA GTATGTAATCATGTATCAATACAAAAGCATTTCCTTTGCA
Zebrafish <i>cyrano</i> full- length	GACCGAAATGGCGTAACGCGCAGTCGAGCACCGCAGCAGCGCA TACAAAACCATGCGGGACGCTTCTGTAGTGCATAGATCA
<i>cyrano</i> conserved site for the hybrid 1 construct	GGAAGATCTGTATATTGTACAAACAAGTGACAAGTTGTTTCGCA GGAAGATCTACCCTAAAGCAAGCACATGAACTATAACATC
<i>megamind</i> conserved site for the hybrid 2 construct	ACTAGTAGGCCTGTAAAGAGGAGCGAGAGGAGTCCATA ACTAGTAGGCCTTTGTGTAGATGTAAACAAACACAATGACGAAGAG
T7 in vitro transcription templates	
<i>cyrano</i> conserved site	TAATACGACTCACTATAGGGGTATATTGTACAAACAAGTGACAAGTTGTTC GCA ACCCTAAAGCAAGCACATGAACTATAACATC
<i>megamind</i> conserved site	TAATACGACTCACTATAGGGGTAAAGAGGAGCGAGAGGAGTCCATA TTGTGTAGATGTAAACAAACACAATGACGAAGAG
<i>cyrano</i> RNA-blot probe	CCTCAATGACTGGAATGCAA TTCTAATACGACTCACTATAGGAAGAGCAAAAAGCCCTGCATA
qRT-PCR	
Zebrafish <i>cyrano</i>	ACAAACCAAGACAGGCAGTGGCA TGCAACTCAATAGCACCCCGCT
Zebrafish <i>megamind</i>	GCAATGCACGGCGCTCTCAGGCTCCGAGACGGGACCTATA GCATTTTCCTTTGCACAGAAACAACGTGTCTGACACTGCACT
<i>β-actin1</i>	CTCTTCCAGCCTTCCTTCCT CTTCTGCATACGGTCAGCAA

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