

Supplementary Table1. Genotypes of born pups from *Mettl14* +/- $\times$ *Mettl14* +/- crosses.

Litter #	Litter size	<i>mettl14</i> +/+	<i>mettl14</i> +/-	<i>mettl14</i> -/-
1	5	3	2	0
2	7	3	4	0
3	6	1	5	0
4	5	1	4	0
5	5	0	5	0
6	7	2	5	0
7	13	4	9	0
8	3	1	2	0
9	5	1	4	0
10	2	1	1	0
Total	58	17	41	0

Supplementary Table2. Genotypes of E7.5, E8.5, and E9.5 embryos from *Mettl14* +/- × *Mettl14* +/- crosses.

Litter #	Litter size	<i>mettl14</i> +/+	<i>mettl14</i> +/-	<i>mettl14</i> -/-
1	6	3	1	2
2	11	2	5	4
3	8	3	4	1
4	10	0	7	3
5	8	3	4	1
6	9	2	3	4
Total	52	13	24	15

Supplementary Table7. List of primers used in this study

For gene targeting	Primers sequence (5'→3')
M14-L50F	tcga accgg tgaagggctttgctttctgtgttactgcttctgatgccaaactgtattca
M14-L50R	ctag tgaaatacaagtggcatcagaagcagtaacacagaaagcaaagcccttcaccggt
LoxP-LF	ctagt ATAACTTCGTATAATGTATGCTATACGAAGTTAT
LoxP-LR	agct ATAACTTCGTATAGCATACATTATACGAAGTTATa

For genotyping		Primers sequence (5'→3')
Screen positive ES clones	M14-cF	CCAGTCCTTCACAAGCCGGTCAGTATTGCA
	SA-R	AAACCCTGGACTACTGCGCCCTACAGATCT
	UtpA	CTTCCGAGGGACACTAGGCTGACTCCAT
	M14-cR	TGGGCCACATAGCAAGTTCAGTCTGTCAGTCT
Mettl14 locus	M14-F1	GAAGGGCTTTGCTTTCTGTG
	M14-R1	AGCAACACCACCCTTAGCAC
	M14-R2	CACTTCACTTCCACCCACTTT
Cre transgene	oIMR1084	GCGGTCTGGCAGTAAAACTATC
	oIMR1085	GTGAAACAGCATTGCTGTCACTT
Internal control	oIMR7338	CTAGGCCACAGAATTGAAAGATCT
	oIMR7339	GTAGGTGGAAATTCTAGCATCATCC
X chromosome	ns18	GGTAACAATTTTCCCGCCATGTG
	ns19	GGAAATAAACGGAACGCAGTACC
Y chromosome	Zfy1.8b	GACTAGACATGTCTTAACATCTGTCC
	YNLS.5	CCTATTGCATGGACAGCAGCTTATG

For RT-qPCR		
Gene		Primers sequence (5'→3')
18s	Forward	GCTTAATTTGACTCAACACGGGA
	Reverse	AGCTATCAATCTGTCAATCCTGTC
Mettl14	Forward	CTGAGAGTGCGGATAGCATTG
	Reverse	GAGCAGATGTATCATAGGAAGCC

Alkbh5	Forward	AGTTCCAGTTCAAGCCCATC
	Reverse	GGCGTTCCTTAATGTCCTGAG
Fto	Forward	TCACAGCCTCGGTTTAGTTC
	Reverse	GCAGGATCAAAGGATTTCAACG
P300	Forward	GTTCTCCCTTACAGCAGCAACA
	Reverse	GCAGAGGATTCATGTTCTGCAAG
CBP	Forward	CACAGCTAATGGCAGCTTTCAT
	Reverse	CTGGCACTATTTTGTTGTTGCT
Egr2	Forward	TTGACCAGATGAACGGAGTG
	Reverse	TGCCCATGTAAGTGAAGGTC
Egr3	Forward	TCGGTAGCCCATTACAATCAG
	Reverse	AGCGAACTTTCCCAAGTAGG
Kif26a	Forward	GCTTTTGATGCCATCTTCCC
	Reverse	TGGTGTATGATTTGCCGAGG
Gas7	Forward	CAGGAAACAGAGCAAGGAAAAC
	Reverse	TCTTGTCCGCCCAAAGTAG
Pdgfrb	Forward	AGTGATGTCTGGTCTTTTGGG
	Reverse	TGGCATTGTAGAACTGGTCG

For ChIP-qPCR		
Egr2	Forward	CCGTAGAACAGAATCACACCC
	Reverse	TTCCAATGTAGCGACTCTGC
Egr3	Forward	TCTTTTCCCTTCCAGTGCC
	Reverse	TGTGAAAGGGTGGAATGGG
Kif26a	Forward	CTAACTTTTGTGCGAGCGTG
	Reverse	GGTTGGAGATGGGACAGTAAG
Gas7	Forward	CCTGTGCGAGTTCTGGAG
	Reverse	GAGAGGCCGAATTGTGGG
Pdgfrb	Forward	GAAACAGTCCAGAGCCAGAG
	Reverse	TCCTCACTCCAAAAGCATCC