

## Supplementary File 1: Primer sets used for genotyping and RT-qPCR

### Primers for genotyping

Gene	Forward Primer	Reverse Primer
<i>Cc2d2a</i>	TGTCCTGGAGCTCCCTTCTA	TGCAGGCAATTTCTCTGTTG (wt)
		CTTCACATCCATGCTGAGGA (mut)
<i>Cre</i> (generic)	ACATTTGGGCCAGCTAAACAT	CGGCATCAACGTTTTCTTTT
<i>Islet1:cre</i>	CATTTCACTGTGGACATTACTCCC	ATCTTCAGGTTCTGCGGGAA
<i>mTmG</i>	CTCTGCTGCCTCCTGGCTTCT	CGAGGCGGATCACAAGCAATA (wt)
		TCAATGGGCGGGGGTCGTT (gt)
<i>Ptch1</i>	GCCTGAAGAACGAGATCAGC (mut)	GTTTCCCAGCTTCCCTTTTC (mut)
	AGGGCTTCTCGTTGGCTACAA (wt)	CTGCGGCAAGTTTTTGGTTG (wt)
<i>R26-EYFP</i>	AAAGTCGCTCTGAGTTGTTAT	TAAGCCTGCCCAGAAGACTC (wt)
		GAAAGACCGCGAAGAGTTTG (mut)
<i>Sox1:cre</i>	GGCCCTCTCTTTGCGGTA	GGCAAACGGACAGAAGCATT
<i>Tctn2</i>	AGTGTGTCCTACTTAGGGCTTTTG (wt)	TCCTTCAGTGGTGAACCTCAAC (wt)
	CAGCAAGAACCATGTCTGGA (mut/cond)	CTTCAGTGGTGAACCTCAACG (mut)
		ACGGGTGTCCTACATCCAAG (cond)
<i>Tmem231</i>	TCTAGGGAAACCTGGAGAAAC	GCATGCAAGGACTTAACCACT (wt)
		AGCTAGCTTGCCAAACCTACA (mut)
<i>Tmem67</i>	GGGTGGGATTAGATAAATGCCTGCTCT	GGCTATGGGTAGAATATTGTTCCAG (wt)
		GGACCTGGCGATTTGACGTCCTCA G (mut)

**wt = wild-type allele**

**mut = mutant/null allele**

**cond = conditional allele**

**gt = gene trap**

### Primer sets used for RT-qPCR

Gene	Forward Primer	Reverse Primer
<i>Actb</i>	TTCTTTGCAGCTCCTTCGTT	ATGGAGGGGAATACAGCCC
<i>Gli1</i>	GGTGTGCCTATAGCCAGTGCCTC	GTGCCAATCCGGTGGAGTCAGACC C
<i>Hprt</i>	TCCTCCTCAGACCGCTTTT	CATAACCTGGTTCATCATCGC
<i>Ptch1</i>	CTCCTCATATTTGGGGCCTT	AATTCTCGACTCACTCGTCCA
<i>Shh</i>	CCAATTACAACCCCGACATC	GGCCAAGGCATTTAACTTGT
<i>Ubc</i>	TCCAGAAAGAGTCCACCCTG	GACGTCCAAGGTGATGGTCT