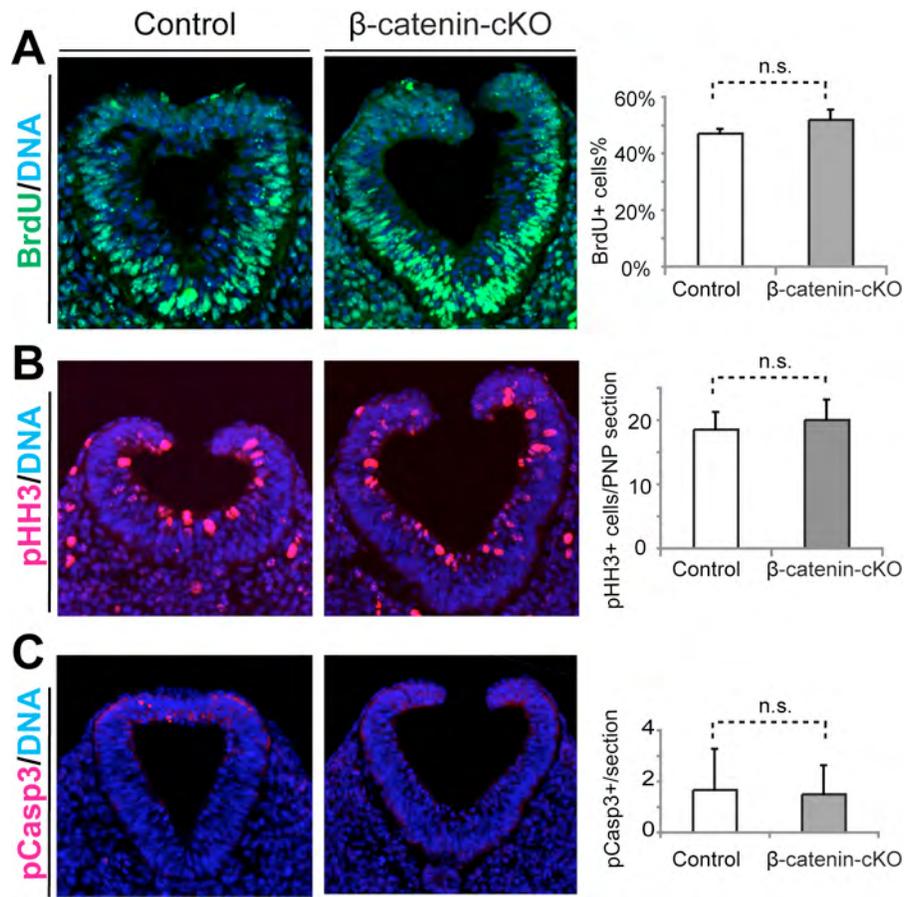


**Figure S2. Wholemount *in situ* hybridization results for representative Wnt/PCP signaling genes at E9.5 embryos.** There were no obvious changes of the expression patterns of *Ptk7* (A-B'), *Celsr1* (C-D'), *Vangl2* (E-F'), and *Dvl2* (G-H') in the  $\beta$ -catenin cKO mutants. Dashed lines in the wholemount embryos indicate the approximate regions of the transverse sections of the posterior neuropore. Arrowheads indicate the dorsal midline of the closing neural folds.



**Figure S3. Proliferation and apoptosis in the normal control and  $\beta$ -catenin cKO PNPs at E9.5.** (A) BrdU incorporated cells and their percentages. (B) Phospho-histone H3 (pHH3) immunolabeled cells and their percentages. (C) Phospho-caspase3 (pCasp3) immunolabeled cells and their percentages. Positive cells were counted and divided with the total cells in the transverse PNP sections around the closure site. n.s., no significant difference ( $P>0.05$ ).

Table S1. Primers for synthesizing antisense RNA probes used for wholemount *in situ* hybridization and primers for real-time PCR as well as ChIP PCR.

<i>In situ</i> probes	Forward primer	Reverse primer	Notes
<i>Axin2</i>	GCTATGAAGAGGACCCACAAAC	CTTCCTCTAGCTGTGCCAAAGT	spanning exons 6 and 7
$\beta$ -catenin	CACGACTAGTTCAGCTGCTTGT	TCCACACATGAACATCTCCTTC	Allen Brain Atlas ( <a href="http://www.brain-map.org">www.brain-map.org</a> )
<i>Cdx2</i>	AGATTCCTCTCCTCCTACCCAC	ACAACACAGACATACATTCCGC	Allen Brain Atlas
<i>Cdx4</i>	AGTTTACAGGGACCTCAGGATG	CAAGAGAAACCAGTGACTCGC	Allen Brain Atlas
<i>Celsr1</i>	GTATGAGCTGCGTCTGAATGAG	GTCCTCATAGTCCAGTTCCGTC	Allen Brain Atlas
<i>Dvl2</i>	TCCAGTGGGGCTTCAGAC	GGGGTGGAGGCATCATAA	Allen Brain Atlas
<i>Fgf8</i>	CAGGTCCTGGCCAACAAG	GAGCTCCCGCTGGATTCCT	Allen Brain Atlas
<i>Fgf18</i>	CTTTCTACTGCTGTGCTTCCAG	TCACCTCCTAGAGAGAGGCAAG	Allen Brain Atlas
<i>Lmx1a</i>	CAGACACCAACTGTACAGCAAA	TCTAGAATTCCATCCACCACG	Allen Brain Atlas
<i>Lmx1b</i>	CTCACCACCAGCTGCTACTTC	GGTGAGGGAGGTATCACTATCAA	Allen Brain Atlas
<i>Mesp2</i>	ATTGTCCCCAAATACAGTCACC	AGTATGGAACGACCCTCTCAC	spanning exons 1 and 2
<i>Msx1</i>	CTACAGCATGTACCACCTGAC	TGGTCCTGGGAAAGTCTCTTTA	similar to Allen Brain Atlas sequence
<i>Pax3</i>	ACTGTCTGTGATCGGAACACT	CTAGAACGTCCAAGGCTTACT	spanning exons 3 to 8 (genepaint.org)

<i>Ptk7</i>	CTTTATCAAGGAGCCGTCCTC	TCCTTGCTACAACAACATCCTG	spanning exons 2 to 5
<i>T</i>	CATAGCTGTGACTGCCTACCAG	CACATGGAGGAAAGTTCAAT	spanning exons 3 to 8
<i>Tbx6</i>	TGCTGAGGCCTACCTTCTACAC	ATTCGCACTAAGGTGAGAGCTG	spanning exons 7 and 8
<i>Vangl2</i>	AACAGCAGCCTTACCATACCAT	CAGATGGGAAAAACTGAGGAAG	spanning exons 7 and 8
<i>Wnt5a</i>	TTCGTGTGCAAATAGTGGTGT	TCTGGGTTAGGGAGTGTCTCAT	similar to Allen Brain Atlas sequence
Q-PCR			
<b>β-catenin</b>	TCAGAGACAAATTGCTCAAGGA	TTTTCTCGCTTTCTTCTGCTTC	spanning exons 3 and 4
<i>Axin2</i>	AGTGAGACGCTCTCCCTCACCA	GAAACGGGCATAGGTTTGGTGGAC	
<i>Gapdh</i>	TGCTGAGTATGTCGTGGAGTCT	CATATTTCTCGTGGTTCACACC	spanning exons 2 and 3
ChIP			
<i>Pax3</i>	CTATTAGTAAAGATGCTGCTATT	AGTCTCATTTCTTGTCTTTTAAC	spanning the AS1 binding site
<i>Cdx2</i>	TACGAGCTTCCTCCTTCCAA	AGGCGTTTGCAAGTCTCTTC	spanning the Tcf/Lef1-binding site