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Supplemental Information

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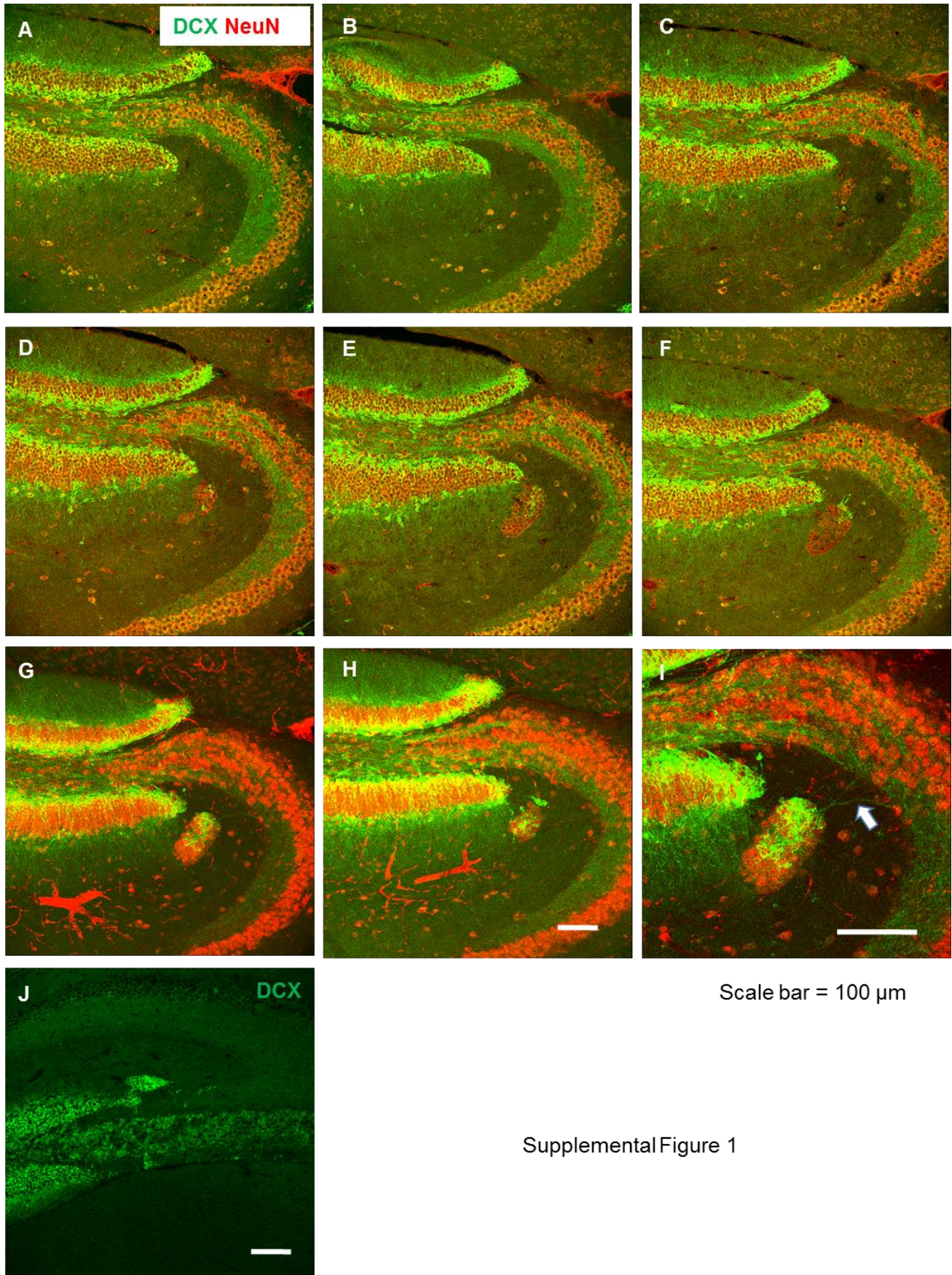
Supplemental Figure and Text

BACE1 deficiency causes abnormal neuronal clustering in the dentate gyrus

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Supplemental Figure 1: The presence of neuronal clusters near the mossy fiber side of the DG molecular layer. Continuous brain sections [14- μm (**A-F**) and 50- μm (**G-H**) thick] from one-month-old BACE1-null mice were labeled with DCX and NeuN antibodies. DCX⁺ clusters were sporadically found in the DG molecular layer, which is close to mossy fibers. The inset in **G** is shown in **I**. In another case, clusters are shown in connection with the GCL (**J**), likely due to a break from GCL or incomplete fusion with GCL. Scale bar is 100 μm .

Supplemental Table 1: Summary of doublecortin-positive clusters seen in BACE1-null mice and related analyses

Phenotype	BACE1 ^{+/+}	BACE1 ^{-/-}
Doublecortin-positive neuronal clusters in SPZ/MZ of dentate gyrus	<p>Positive: 6 of 49 BACE1^{+/+} mice. (ages from P6 to P11)</p> <p>The number of clusters in BACE1^{+/+} mice was small and mostly small in size.</p> <p>Clusters have not been detected in mice older than 1 month (12 examined).</p>	<p>Positive: 65 out of a total of 68 BACE1^{-/-} brains (ages P6 to 11M).</p> <p>Negative: 1 from 11M and 2 from P3 brains.</p> <p>Easy to detect in sagittal sections: for example, lateral 0.36 mm-1.92 mm in P20 mice.</p> <p>Some immature clusters in SPZ/MZ can differentiate into mature neurons and may exist throughout life (age of the oldest mice examined in this study was 11M).</p>
Pseudo dentate gyrus	Never detected.	<p>Detected in 6 out of 29 BACE1^{-/-} brains.</p> <p>The age range examined was P11 to 6M (1 in 7 P11, 1 at P20, 2 at P30, 1 at P60, and 1 at P180).</p> <p>The pseudo dentate gyrus was most likely found in brain sections between lateral 0.84 mm to lateral 1.92 mm*.</p>
Reelin-positive cells in the dentate gyrus	<p>The majority of reelin-positive cells resides in the SPZ/MZ region.</p> <p>The number decreased sharply during postnatal development.</p>	<p>The expression and distribution pattern of reelin-positive cells were similar to those in WT mice.</p> <p>The number of reelin-positive cells was similar between WT and BACE1^{-/-} mice in 3 different age groups.</p> <p>DCX-positive clusters were always adjacent to reelin-positive cells, and no reelin-positive cells in clusters were labeled.</p>