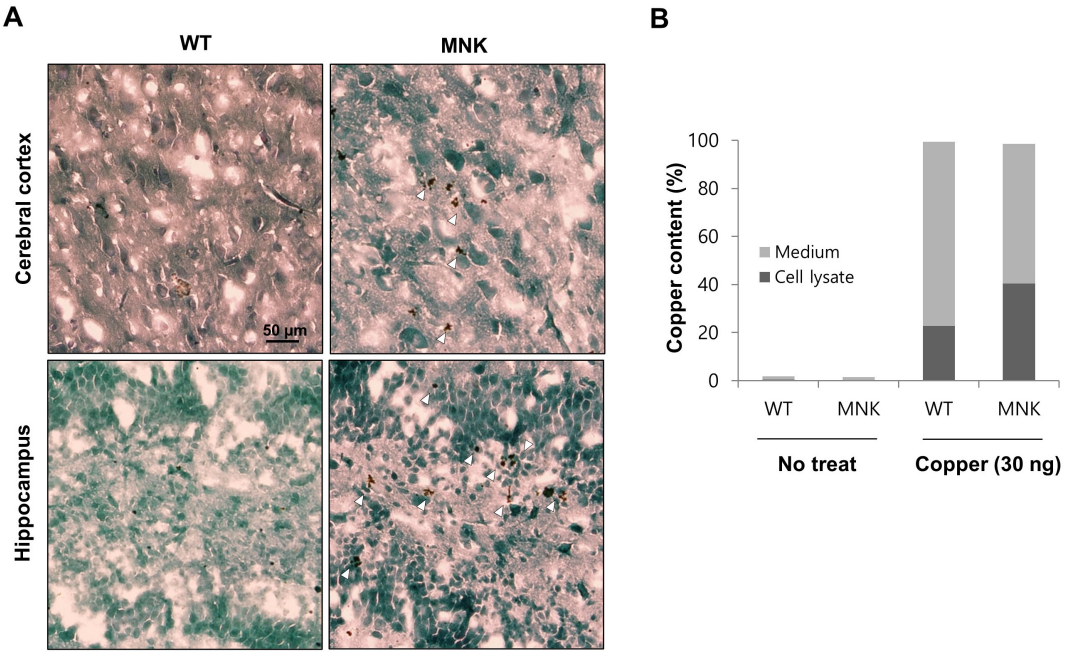

Fig. S1. Abnormal copper accumulation in the brain of MNK mice. (A) Copper accumulation visualized with Rhodanine staining was increased in cerebral cortex in P13 brain of MNK mice compared with that of wild type. Methylene blue was counterstained to visualize cells. White arrowheads indicate copper accumulated cells. (B) Copper accumulation in MNK derived NSCs. Copper was accumulated in NSC lysates of MNK mice compared with those of wild type after copper treatment (30 ng) during 4 day culture period. Copper concentrations were measured by ICP-MS. Plasma mass spectrometer was used to measure trace element of coppers.

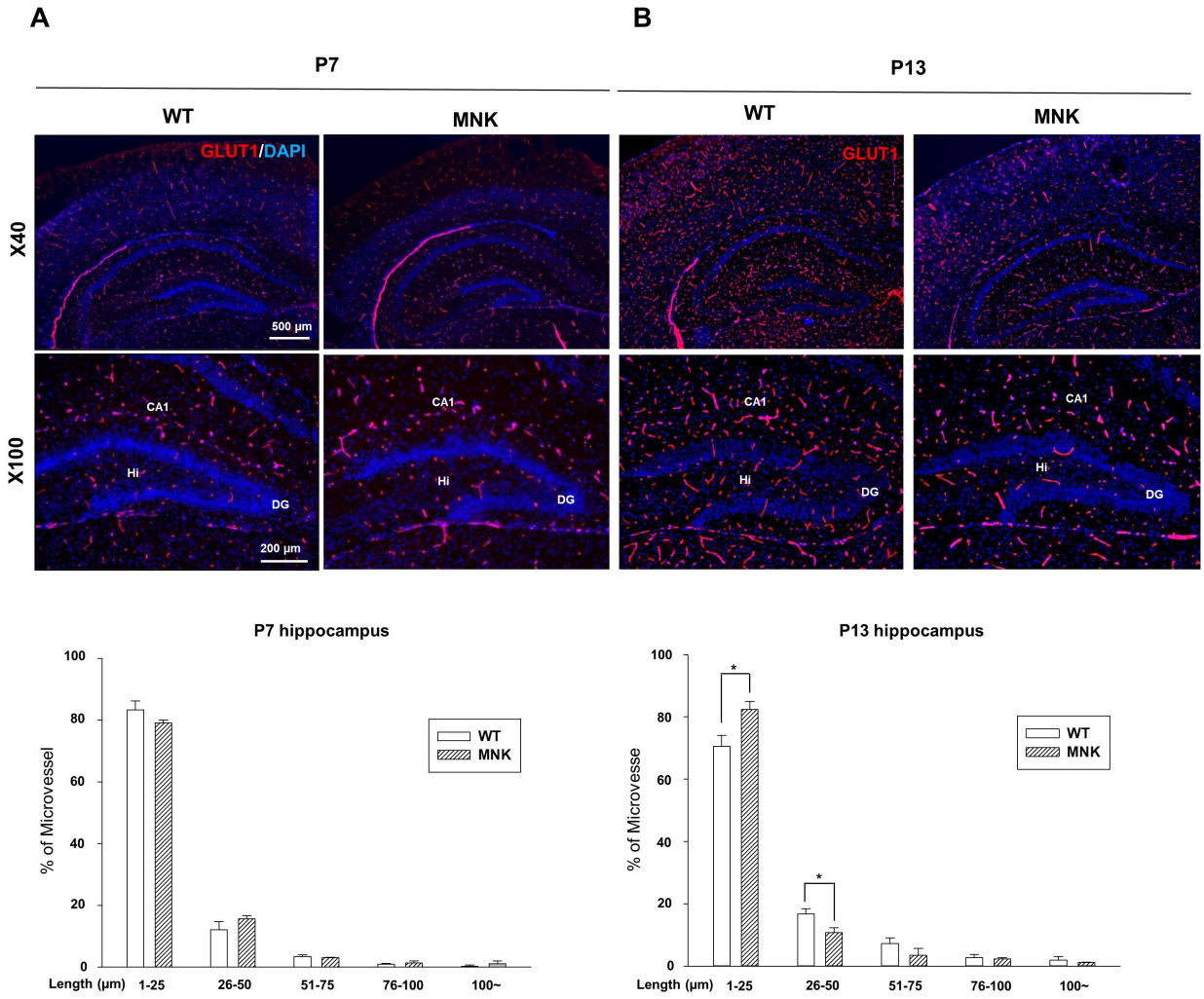

Fig. S2. Cerebral hippocampal blood vessels of MNK mice are decreased during postnatal brain development. (A) Microvessel marker GLUT1 and nuclear counterstaining (DAPI, Blue) were performed during postnatal brain development. At P7, number and distribution of cerebral hippocampal microvessel were not different between wild type and MNK mice. (B) Number of cerebral hippocampal blood vessels at P13 was markedly decreased in the MNK mice compared to that of wild type. Scale bar 250 μm (upper), 100 μm (lower). Metamorph analysis indicate that the number of blood vessels less than 25 μm length was increased in the P13 hippocampus. *$p<0.05$ by t-test. CA, Cornu ammonis; Hi, Hilus; DG, dentate gyrus.

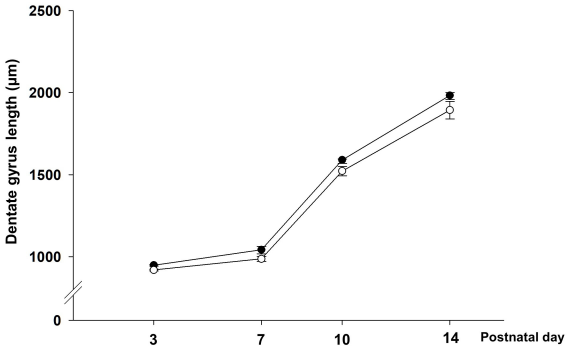

Fig. S3. Length of the dentate gyrus in MNK mice is not reduced during postnatal brain development. Metamorph analysis revealed that total length of dentate gyrus was not statistically different between MNK and wild type mice during postnatal brain development (P3～P14). n=4 each, by t-test.