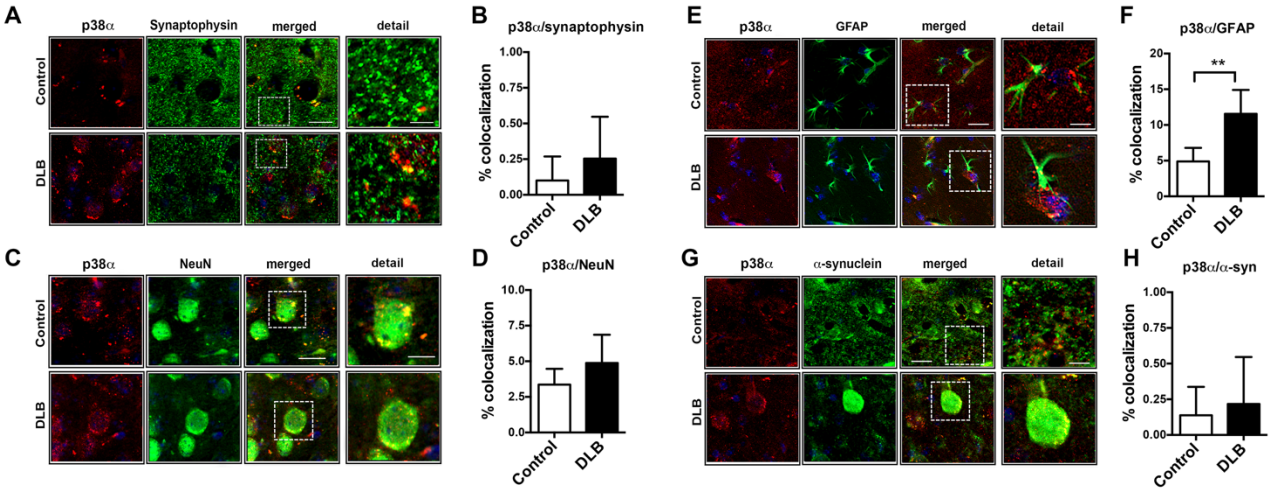
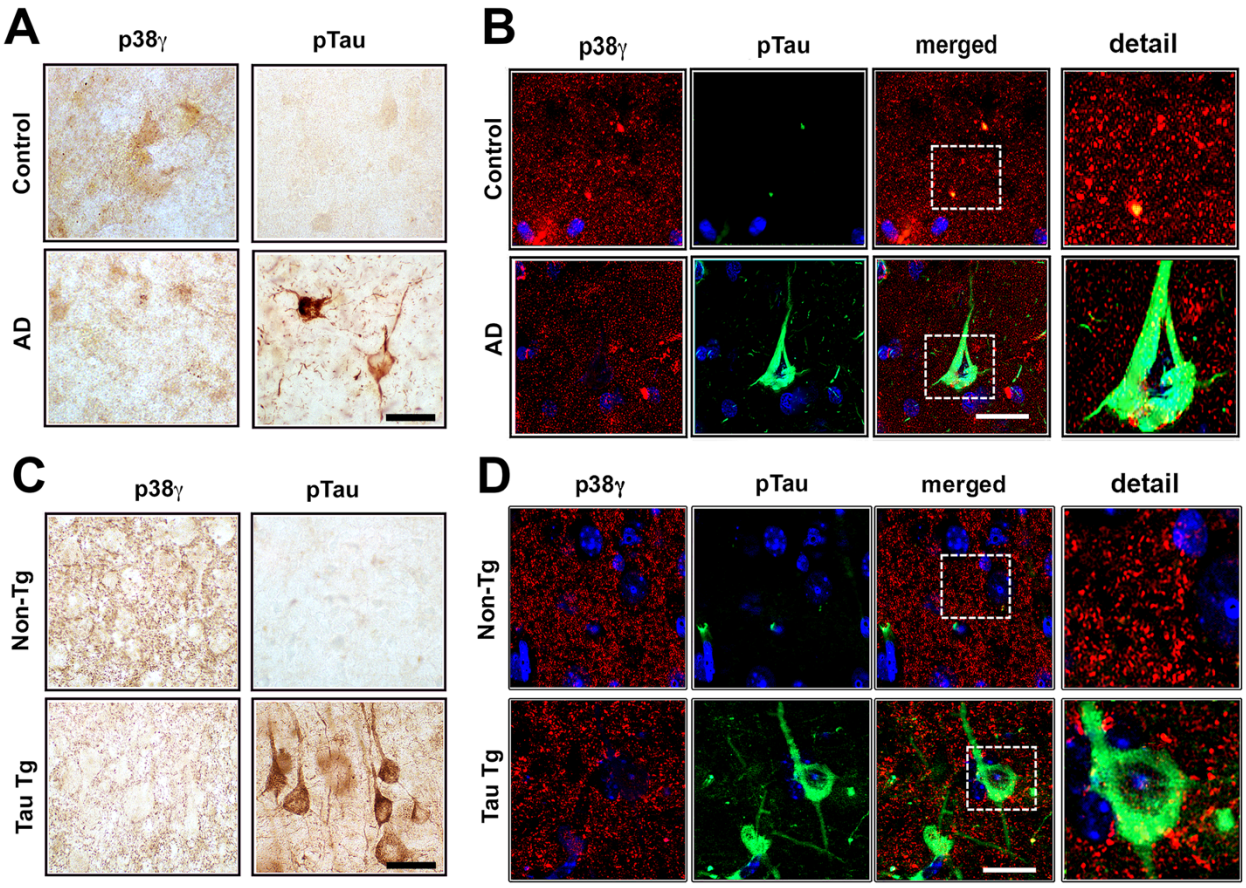
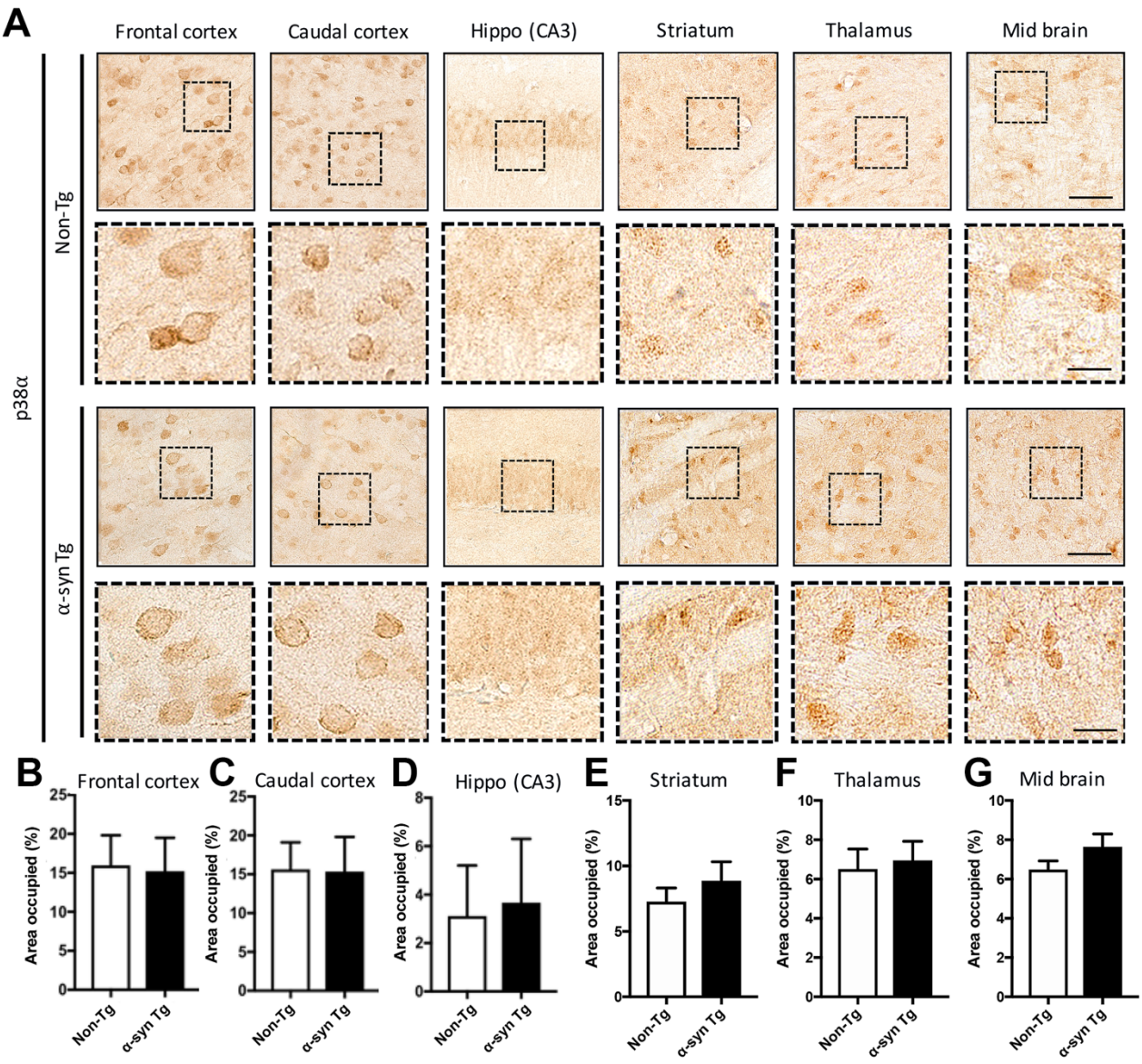


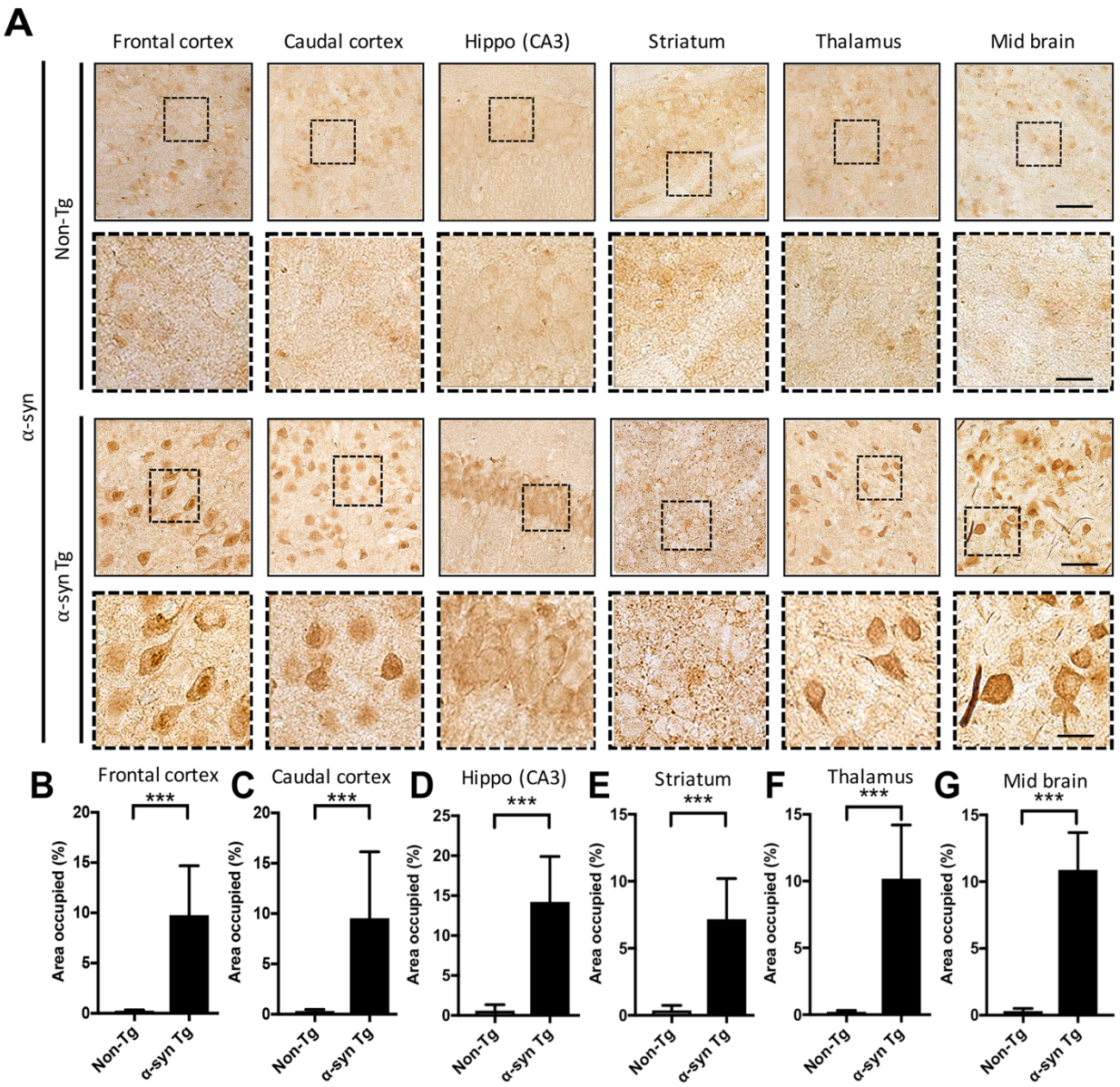
Supplementary Figure 1. Double immunohistochemical analysis of p38α cellular localization in DLB and control brains. Vibratome sections from the frontal cortex were double immunofluorescence labeled with antibodies against p38α (red) and neuronal and glial cell markers (green) and analyzed with Apotome II mounted in a Carl Zeiss AxioImager Z1 microscope. Far right (detail): enlarged image of the area contained in the dotted square. **(A)** p38α (red) and the pre-synaptic marker synaptophysin (green); **(B)** image analysis showing low levels of colocalization of p38α to synapses; **(C)** p38α (red) and the neuronal marker NeuN (green); **(D)** image analysis showing modest localization of p38α in neurons; **(E)** p38α (red) and the astroglial cell marker GFAP (green); **(F)** image analysis showing increased localization of p38α to astroglia in DLB cases; **(G)** p38α (red) and α-synuclein (green); **(H)** image analysis showing minimal colocalization of p38α to Lewy bodies in DLB cases. Scale bars are 10 μm in the standard panels and 5 μm in the zoomed panels (detail). Image analysis represents % colocalization between the two markers. n = 8 for control and n = 12 for DLB (**$p < 0.05$).



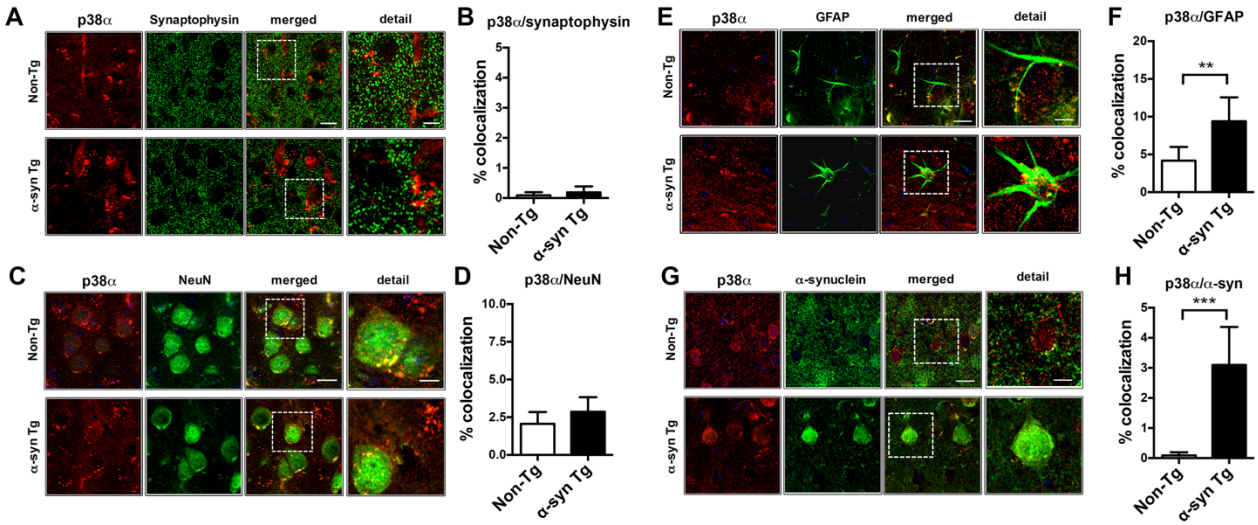
Supplementary Figure 2. Immunohistochemical analysis of the distribution of p38γ in AD and 3RTau Tg mice. Vibratome sections from the frontal cortex were immunolabeled with antibodies against pTau (AT8) and p38γ and developed with DAB. **(A)** Representative bright field microscopic images (630X) (scale bar = 20 μm) of human brains from healthy controls and AD patients immunostained with antibodies against pTau (top) and p38γ (bottom). **(B)** Vibratome sections from the frontal cortex of human control and AD cases were double immunofluorescence labeled with antibodies against p38γ (red) and pTau (AT8) markers (green) and analyzed with Apotome II mounted in a Carl Zeiss AxioImager Z1 microscope. Far right (detail): enlarged image of the area contained in the dotted square. **(C)** Representative bright field microscopic images (630X) (scale bar = 20 μm) of non-Tg and 3RTau Tg mice immunostained with antibodies against pTau (top) and p38γ (bottom). **(D)** Vibratome sections from brains of non-Tg and 3RTau Tg mice were double immunofluorescence labeled with antibodies against p38γ (red) and pTau (AT8) markers (green) and analyzed with Apotome II mounted in a Carl Zeiss AxioImager Z1 microscope. Far right (detail): enlarged image of the area contained in the dotted square.



Supplementary Figure 3. Immunohistochemical analysis of the distribution of p38α in brains in non-Tg and α-syn Tg mouse brains. Sagittal vibratome sections from complete right hemibrains were immunolabeled an antibody against p38α and developed with DAB. **(A)** Panels with a solid outline show representative low power bright field microscopic images (200x) (scale bar = 100 μm) of non-Tg (top) and α-syn Tg (bottom) mouse brains immunostained with p38α; panels with a dotted outline show enlarged images (630X) (scale bar = 20 μm) of the indicated region of interest. **(B-G)** Image analysis of % area occupied by p38α-immunostained cells in the frontal cortex **(B)**, caudal cortex **(C)**, hippocampus **(D)**, striatum **(E)**, thalamus **(F)** and mid brain **(G)**. n = 6 per group.



Supplementary Figure 4. Immunohistochemical analysis of the distribution of α-synuclein in non-Tg and α-syn Tg mouse brains. Sagittal vibratome sections from complete right hemibrains were immunolabeled with an antibody against total mouse and human α-syn (Syn-1 BD) and developed with DAB. **(A)** Panels with a solid outline show representative low power bright field microscopic images (200x) (scale bar = 100 μm) of non-Tg (top) and α-syn Tg (bottom) mouse brains immunostained with Syn-1; panels with a dotted outline show enlarged images (630X) (scale bar = 20 μm) of the indicated region of interest. **(B-G)** Image analysis of percent area occupied by α-syn-immunostained cells in the frontal cortex **(B)**, caudal cortex **(C)**, hippocampus **(D)**, striatum **(E)**, thalamus **(F)** and mid brain **(G)**. n = 6 per group (***$p < 0.001$).



Supplementary Figure 5. Double immunohistochemical analysis of p38α cellular localization in non-Tg and α-syn Tg mouse brains. Vibratome sections of murine brains were double immunofluorescence labeled with antibodies against p38α (red) and neuronal and glial cell markers (green) and analyzed with Apotome II mounted in a Carl Zeiss AxioImager Z1 microscope. Far right (detail): enlarged image of the area contained in the dotted square. **(A)** p38α (red) and the pre-synaptic marker synaptophysin (green); **(B)** image analysis showing low levels of colocalization of p38α to synapses; **(C)** p38α (red) and the neuronal marker NeuN (green); **(D)** image analysis showing modest localization of p38α to neurons; **(E)** p38α (red) and the astroglial cell marker GFAP (green); **(F)** image analysis showing increased localization of p38α to astroglia in α-syn Tg mice; **(G)** p38α (red) and α-synuclein (green); **(H)** image analysis showing some colocalization of p38α to α-syn aggregates in the cytoplasm in α-syn Tg mice. Scale bars are 10 μm in the standard panels and 5 μm in the zoomed panels. Image analysis represent % colocalization between the two markers. n = 6 per group (**$p < 0.01$, ***$p < 0.001$).