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**Supplementary Figure 1.** Flowchart of study design.

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**Supplementary Figure 2.** Perfusion MRI shows high test-retest repeatability in quantifying cerebral blood flow (CBF) metrics in mouse brain. Pearson correlation between repeated measurements of CBF, \*\*\* *p* < 0.001, n = 17.



**Supplementary Figure 3.** Quantification of baseline cerebral blood volume (CBV0) in brain of the untreated and noscapine-treated non-transgenic littermates (NTL) and arcA mice, respectively. Not significant, two-way ANOVA with post hoc Turkey’s correction for multiple comparison; CBF, cerebral blood flow. NTL (n = 8), NTL noscapine (n = 9), arcAβ (n = 9), arcAβ noscapine (n = 11).



**Supplementary Figure 4.** Quantification of regional cerebral vascular reactivity in mouse brains. **(a-f)** The levels of late ∆CBV (40-46.7 minutes) in six brain regions (motor cortex, sensory cortex, hippocampus, thalamus, striatum and cerebellum) of untreated and noscapine-treated non-transgenic littermates (NTL) and arcA mice, respectively; \* *p* < 0.05, \*\*\* *p* < 0.001, Two-way ANOVA with Turkey *post hoc* multiple comparison; CBV: cerebral blood volume; ∆CBV: percentage change in cerebral blood volume; NTL (n = 8), NTL noscapine (n = 9), arcA (n = 9) and arcA noscapine (n = 11).