Differential glial responses to intracerebral hemorrhage between young and middle-aged mice

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Aging is one of the major risk factors to worse mortality rate and neurobehavioral deficits after intracerebral hemorrhage (ICH). Previous research has demonstrated that aged ICH rodents show exacerbated ICH pathology, and recently, mid-life cardiovascular factors are implied to be an independent predictive factor for later-life mild cognitive impairment and dementia. However, no study has ever compared ICH pathology between young vs middle-aged mice. In this study, therefore, we used 2-month and 8-month old mice to examine whether 8-month old mice show different patterns of glial responses after ICH. ICH was induced by unilateral microinjection of 0.025 U type VII collagenase (0.5 uL) into the right side of brains of male C57Bl/6J mice. One or 8 days after collagenase injection, animals were sacrificed, and the brains were subjected to immunostaining using an astrocyte maker GFAP antibody. In the peri-lesion area, the number of GFAP-positive cells in 8-month old mice was decreased compared to the one in 2-month old mice. These data may suggest that glial responses after brain injury are already changed even in the middle-aged mice. Future studies are warranted to examine how these mid-life glial changes affect later-life neurological and cognitive dysfunction after ICH.