1. No.
   2017T003

2. Title
   Impact of cigarette somking on the development and clinical outcome of ischemic stroke

3. Period
   2017-2021

4. Summary
   We examined the effects of cigarette smoking on post-stroke functional recovery. Using clinical data of 10,825 stroke patients registered in the Fukuoka Stroke Registry, we revealed that smoking is associated with an increased risk of unfavorable functional outcomes at 3 months after acute ischemic stroke. Among former smokers, the odds ratio of poor functional outcome was higher in those who quit smoking within 2 years of stroke onset, suggesting that the effects of smoking on the outcome is reversible. Using mouse stroke models, we found that survival or recruitment of microvascular pericyte around endothelial tubes within infarct areas could be a crucial factor determining post-stroke functional outcomes. The pericytes around endothelial tubes contributed to post-stroke recovery of blood flow, enabling blood-derived macrophages infiltrate into infarct areas. The infiltrating macrophages played important roles in removing cellular and myelin debris and promoted intra-infarct fibrotic response by stimulating pericyte-derived fibroblast-like cells. Various neurotrophic factors, produced by reciprocal interaction between pericytes and macrophages within infarct areas, could promote neural restoration in peri-infarct areas leading to functional recovery. Smoking may reversibly impair the functions of pericyte and macrophage and hamper post-stroke functional recovery: indeed, we found that acrolein, a cigarette smoke extract, induced ferroptotic death of pericytes.