1. No.
   2019G018

2. Title
   Development of a novel therapy for prevention of intracerebral hemorrhage in smokers

3. Period
   2019-2023

4. Summary
   Tobacco smoking, along with hypertension, diabetes, and dyslipidemia, is considered a risk factor for stroke, however, the influence of unknown environmental factors, including microbiome, are unknown even now. In this study we aimed to investigate the impacts of the oral or gut microbiome, including specific strains of cariogenic bacteria, on stroke onset and complications. We identified a significant association between between intracerebral hemorrhage and the presence of *Streptococcus mutans* harboring collagen binding protein, Cnm, in the oral cavity, independent of smoking. Using clinically isolated Cnm-positive *S. mutans*, we conducted infection experiments on rodent model, demonstrating intracerebral hemorrhage. Furthermore, we explored how the microbe invade vascular endothelial cells, leading to the blood-brain barrier disruption. Additionally, to understand the potential impact of oral and intestinal microbiota on stroke pathology, we conducted a comprehensive stroke microbiome study. This research revealed that the convergence phenomena of the oral and gut microbiome occurred and ectopic colonization of oral *Streptococcus* species in the gut microbiome was specific phenomena in patients with stroke. In our studies, oral pathobionts may be the possible therapeutic targets for smokers to prevent stroke.