Resting state functional connectivity

Aneurysmal subarachnoid hemorrhage (SAH) leads to significant long-term cognitive deficits, which can be associated with alterations in resting state functional connectivity (RSFC). However, modalities such as fMRI-which is commonly used to assess RSFC in humans-have practical limitations in small animals. Therefore, Chung et al. used non-invasive optical intrinsic signal imaging to determine the effect of SAH on RSFC in mice up to three months after prechiasmatic blood injection. They assessed Morris water maze (MWM), open field test (OFT), Y-maze, and rotarod performance from approximately two weeks to three months after SAH. Compared to sham, they found that SAH reduced motor, retrosplenial, and visual seed-based connectivity indices. These deficits persisted in retrosplenial and visual cortex seeds at three months. Seed-to-seed analysis confirmed early attenuation of correlation coefficients in SAH mice, which persisted in predominantly posterior network connections at later time points. Seed-independent global and interhemispheric indices of connectivity revealed decreased correlations following SAH for at least one month. SAH led to MWM hidden platform and OFT deficits at two weeks, and Y-maze deficits for at least three months, without altering rotarod performance. In conclusion, experimental SAH leads to early and persistent alterations both in hemodynamically derived measures of RSFC and in cognitive performance [1].

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Chung DY, Oka F, Jin G, et al. Subarachnoid hemorrhage leads to early and persistent functional connectivity and behavioral changes in mice [published online ahead of print, 2020 Sep 16]. J Cereb Blood Flow Metab. 2020;271678×20940152. doi:10.1177/0271678×20940152