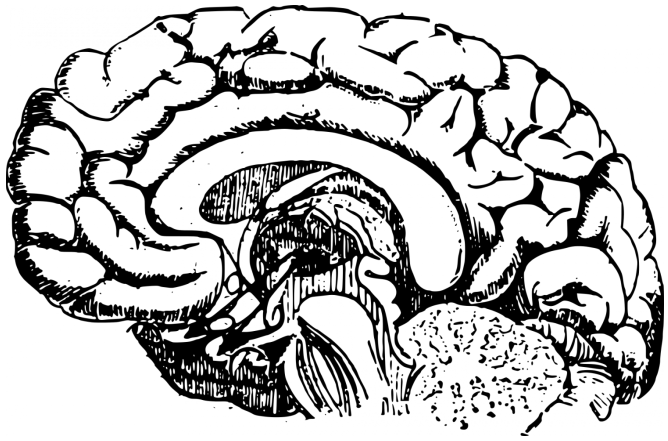
Chinese scientists decipher origins of repopulated microglia in brain and retina

1 March 2018



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The regenerative capability of the central nervous system (CNS) is largely limited due to its intrinsic properties and external environment. Traditional thinking holds that once the brain is injured, it is impossible to repair and restore the tissue to normal. However, this notion has been challenged by a recent study.

Microglia are long-lived myeloid cells in the central nervous system (CNS). Elmore and Green et al. reported newly discovered microglial progenitor cells in *Neuron* in 2014. This finding showed for the first time microglial progenitors in the adult brain, providing potential insights for regenerative medicine. However, the origin of repopulated microglia is still hotly debated, and the source of repopulated microglia remains highly controversial.

Recently, a research paper entitled "Repopulated microglia are solely derived from the proliferation of residual microglia after acute depletion" was published in *Nature Neuroscience* by the laboratory of Bo Peng at the Shenzhen Institutes of Advanced Technology (SIAT) of the Chinese Academy of Sciences. In this paper, PENG and his colleagues successfully deciphered the origin of repopulated microglia in the brain by a series of fate mapping approaches.

Researchers first excluded the blood origin of repopulated microglia via parabiosis, a surgical approach generating chimeric mice with exchanged blood cells (Figure 1a). They then demonstrated that repopulated microglia were NOT differentiated from Nestin-positive progenitor cells (Figure 1b).

They also proved that astrocytes, oligodendrocyte precursor cells (OPCs) and neurons were not the precursor cells of repopulated microglia (Figure 1c). In contrast, ALL repopulated microglia in the brain were derived from the proliferation of the few microglia surviving after pharmacological ablation (