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Beneficial effect of probiotics supplementation on the long-term development of cognitive dysfunction following AKI

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Objectives : Several epidemiological studies suggest that long-term survivors of acute kidney injury (AKI) have an increased risk of cognitive dysfunction, including dementia. Recent research has identified kidney-gut crosstalk mediated by immune function in AKI. Furthermore, the gut dysbiosis, which refers to the disruption of the gut microenvironment, has emerged as a significant complication of AKI. We hypothesize that alleviating gut dysbiosis with probiotics may help mitigate cognitive dysfunction following AKI.
Methods : Using a mouse long-term AKI survival model (one year after kidney ischemia-reperfusion injury (IRI)), subjects were divided into two groups: one group received phosphate-buffered saline for control, while the other was administered probiotics. Functional and structural brain alterations were assessed one year post-IRI via behavioral tests (Y maze test) and immunohistochemistry analysis.
Results : One year after kidney IRI, spontaneous alternation, which reflects short-term memory and cognitive function, was assessed using the Y maze test. In both the sham and IRI groups, the probiotics-treated group tended to show improved cognitive function compared to the non-treated group. Furthermore, in the IRI group, probiotics administration significantly alleviated the decline in spontaneous alternation. In immunohistochemistry analysis, no significant differences were identified among groups.
Conclusions : This study suggests that oral administration of probiotics may represent a potential strategy for preventing and treating long-term cognitive dysfunction in AKI.