

Treponema denticola found to induce Alzheimer-like tau hyperphosphorylation in mice

June 25 2022

A study investigating the role of *Treponema denticola* (*T. denticola*) in Alzheimer's disease (AD) pathogenesis will be presented by Zhiqun Tang of the West China Hospital of Stomatology at Sichuan University, China at the 100th General Session and Exhibition of the IADR, to be held in conjunction with the 5th Meeting of the IADR Asia Pacific Region. The Interactive Talk presentation, "Treponema Denticola Induces Alzheimer-like Tau Hyperphosphorylation in Mice", will take place on Saturday, June 25th, 2022 during the "Biological Impact of Ageing" session.

Tau hyperphosphorylation is the key characteristic pathological hallmarks of Alzheimer's disease (AD). Recently studies showed periodontitis and periodontal pathogen are significant risk factors for AD. *Treponema denticola* (*T. denticola*), as the main periodontal pathogen of periodontitis, has been reported a possible link with AD, however, the role of *T. denticola* in AD [pathogenesis](#) is still unclear.

In this study, twenty 8-week-old male C57BL/6 [mice](#) were orally administered *T. denticola* for 24 weeks. *T. denticola* DNA in the hippocampi of mice was determined by PCR. The levels and localization of tau phosphorylated at Thr181, Thr231 and Ser396 were examined by western blotting and immunohistochemistry. The activation of microglia and the levels of IL-1 β and TNF- α were respectively detected by immunohistochemistry and ELISA. BV2 cells were co-cultured with *T.*

denticola, then, the activation of BV2 cells was evaluated by immunofluorescence and the expression levels of IL-1 β , TNF- α in BV2 cells were measured by qRT-PCR and ELISA. The supernatant from BV2 cells simulated by T. denticola was used to stimulate N2a cells, the levels of hyperphosphorylated tau protein at Thr181, Thr231 and Ser396 in N2a cells were detected by western blotting.

Orally administered T. denticola colonized the [brain tissue](#), promoted the hyperphosphorylation of tau protein at Ser396, Thr181 and Thr231 in the processes of neurons, activated the microglia and increased the levels of IL-1 β and TNF- α in the hippocampi of mice. In vitro, T. denticola directly induced the BV2 cells activation and increased the expression levels of IL-1 β and TNF- α . Furthermore, the levels of hyperphosphorylated tau protein at Thr181, Thr231 and Ser396 in N2a [cells](#) were increased. This study found T. denticola could invade the hippocampi of mice and promote the hyperphosphorylation of tau protein at Ser396, Thr181 and Thr231 by activating the neuroinflammation in the hippocampi of mice.

More information: [View this Interactive Talk in the IADR General Session Virtual Experience Platform.](#)

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