As skin and brain cells are both neural crest derivatives, biomarkers for neurologic disease may be present in the skin prior to evidence of neurologic symptoms. The pathologic marker of Alzheimer’s disease (AD) is the presence of phosphorylated Tau protein (p-Tau) aggregates in brain structures devoted to memory, such as the hippocampus. Our previous studies have demonstrated that Alzheimer’s and Parkinson’s patients have seven times more p-Tau staining in their skin compared to control patients. Since punch biopsies are invasive as a screening test, a more suitable alternative for AD detection may be a buccal swab.

**Background**

To elucidate if Tau pathology from the brain is connected to peripheral tissues through neural pathways or via independent expression in non-neural tissues.

**Objective**

In the first experiment, buccal swabs from 18 patients (11 AD, 7 control) were collected and stained with PHF (paired helical filament) and Tau-AT8 monoclonal antibodies. In the second experiment, hippocampal and brainstem samples from ten cadavers with neurodegenerative diseases including AD were collected and immunostained with PHF (paired helical filament) monoclonal antibodies for p-Tau to identify Tau pathology. The hippocampus and brainstems samples from each respective brain were then compared.

**Results**

In the first experiment, p-Tau immunostaining was significantly higher (p=0.04) in buccal swabs from AD (median 45%, range 17-98%, n= 11) than from healthy controls (median 18%, range 0-48%, n=7).

**Discussion/Conclusion**

In addition to our previous findings of Tau immunopositivity in epidermal cells, these results demonstrate the presence of p-Tau immunoreactivity in oral mucous cells. This result supports the hypothesis that Tau proteinopathy is not only expressed in neurons, but also in other cells of ectodermal origin. Interestingly, Tau immunopositivity was not found in brainstems of cadavers with a history of neurodegenerative disease, despite the presence of positive neurofibrillary tangles in the hippocampal area. Therefore a potential pathway of Tau pathology connecting the brain with the periphery requires further study. These results support the hypothesis that the skin reflects the changes that are occurring in the hippocampus.

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**Disclosures**

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