Expression of soluble epoxide hydrolase (sEH) in Alzheimer's disease

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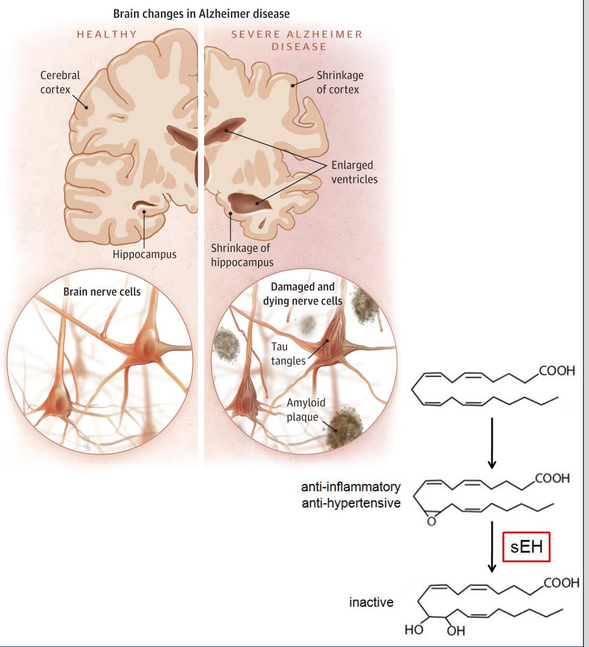
INTRODUCTION

• Alzheimer's disease (AD) is the leading cause of dementia worldwide[1].

• It has been suggested that the anti-inflammatory benefits of omega-3 fatty acids limit the damage of neuroinflammation and amyloid plaque formation leading to AD[2].

• Soluble epoxide hydrolase (sEH) has been demonstrated to play a significant role in metabolizing omega-3 fatty acids and reducing their biological activity[3].



OBJECTIVE

We hypothesize that altered quantity and distribution of sEH aggravates deleterious neuroinflammation and therefore contributes to AD pathogenesis.

MATERIALS & METHODS

sEH polyclonal antibody was used to investigate changes in distribution and quantity of sEH in 20 normal aged brains versus 20 AD brains.

• Brain samples were obtained from autopsies of subjects who had been longitudinally followed by the UC Davis Alzheimer's Disease Center. Hippocampus and temporal gyrus samples were embedded in paraffin blocks and sectioned to 4 µm.

• DAB immunohistochemistry was performed with conditions optimized for the sEH polyclonal antibody.

• Whole slide imaging was done by the Aperio digital pathology slide scanner.

• Positive staining was quantified blindly by ImageJ thresholding.

RESULTS

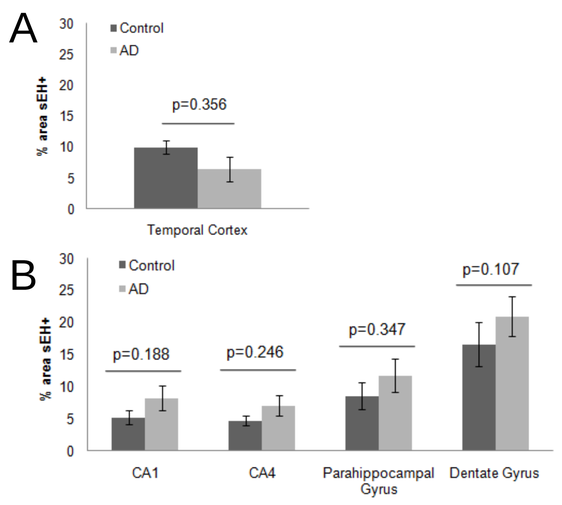


Figure 1: ImageJ quantifications of sEH expression. (A) temporal cortex section, (B) hippocampus section.

RESULTS

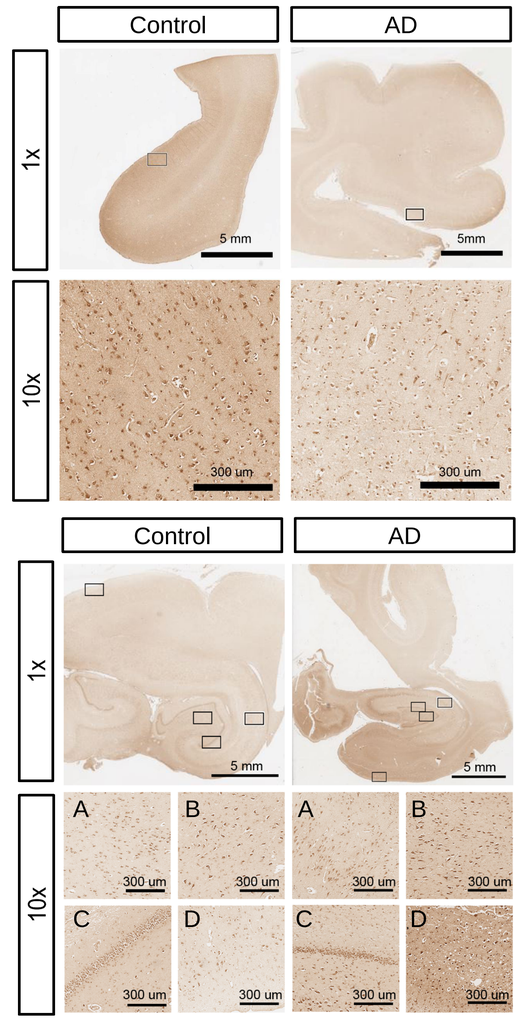


Figure 2: DAB immunohistochemistry on temporal gyrus and hippocampus sections. (A) CA1 region, (B) CA4 region, (C) dentate gyrus, (D) parahippocampal gyrus.

CONCLUSIONS

• Based on analysis of the preliminary cases and controls, sEH appears to be increased in AD hippocampi and decreased in AD temporal cortex.

• If there is indeed an association between heightened sEH levels and AD pathogenesis in the hippocampus, this supports the idea of a protective benefit in sEH inhibitor drug therapy.

• Ongoing work: 1) increase sample size of cases and controls analyzed, and 2) confirm analysis with Western Blot and ELISA.

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ACKNOWLEDGMENTS

This study was supported by the Stowell Endowed Medical Student Pathology Research Fellowship, the UC Davis School of Medicine Medical Student Research Fellowship Program, the UC Davis Alzheimer's Disease Center, and the UC Davis Department of Pathology and Laboratory Medicine.