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Is there any relationship between mercury from dental amalgams and Alzheimer's disease?: role of mercury and peripheral CCL2 chemokines as biomarkers of disease progression

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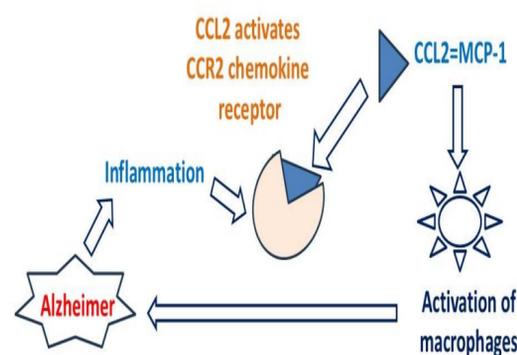
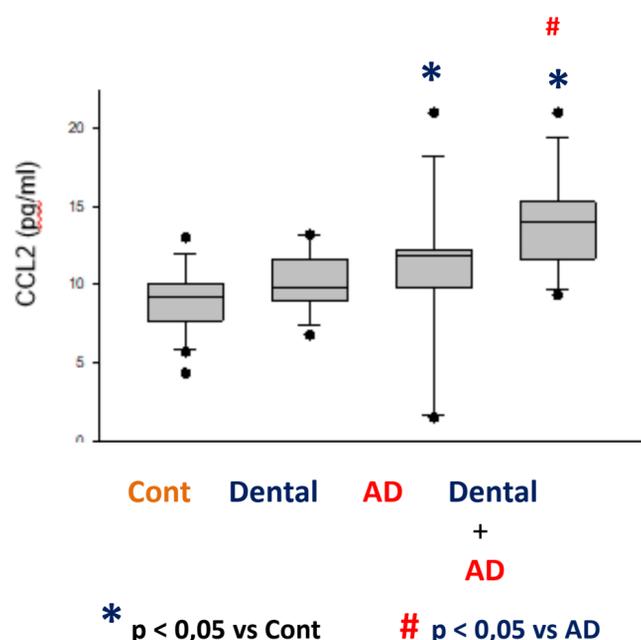
INTRODUCTION

- The mercury from long-term dental amalgams may contribute to the pathophysiology of AD
- Exposure to mercury has long been considered a potential risk factor for neurodegenerative diseases, including AD
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- Amyloid beta and hyperphosphorylated tau accumulation are detected in the brain of AD patients
- Mercury exposure can lead to oxidative stress and inflammation
- Overexpression of monocyte chemoattractant protein-1=CCL2 in β -amyloid precursor protein transgenic mice show accelerated diffuse β -amyloid deposition
(Yamamoto *et al.* *Am Pathol* 2005; 166: 1475–1485)

AIM

- ❖ To determine whether peripheral CCL2 chemokine and mercury levels differ between AD patients with long-term dental amalgams compared to patients without AD

Increased CCL2 chemokine levels in patients with Alzheimer (AD) and long-term dental amalgams



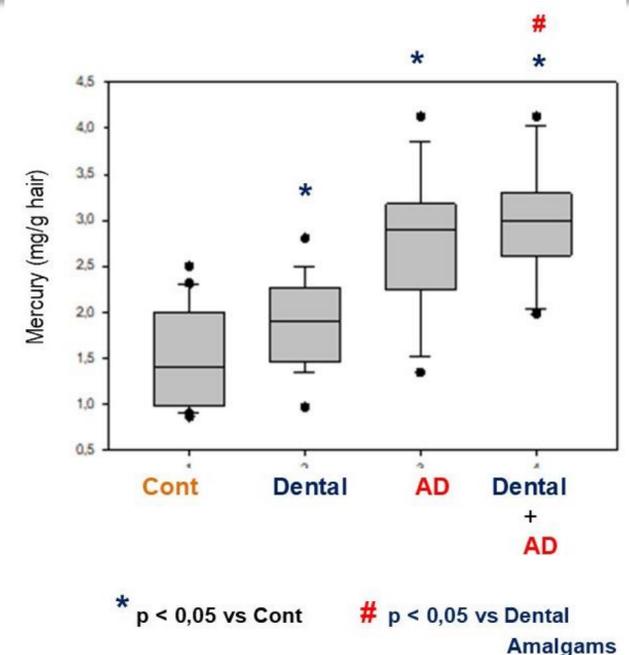
Mercury increase in patients with Alzheimer (AD) and long-term dental amalgams (Dental)

- Mercury levels were quantified by ICP-MS (in hair: $\mu\text{g/g}$), systemic CCL2 chemokine levels by ELISA, and cognitive impairment was evaluated in the Mini Mental Test in patients.
- Increased CCL2 systemic levels and high mercury levels were observed in patients with AD and long-term dental amalgams compared to those with long-term dental amalgams (without AD)

r Spearman correlations between CCL2, mercury and cognitive dysfunction

- The peripheral CCL2 ligand correlated with mercury levels in the AD+Dental amalgams group (r Spearman, $r = 0.45$, $p < 0.05$)
- In this study group (AD + Dental), mercury levels correlated with their mini mental scores
- However, these correlations were absent in the rest of groups.

Mercury levels in patients with/without Alzheimer (AD) and/or long-term dental amalgams



- ❖ **Cont:** age matched controls (without dental amalgams, non dental amalgams (n = 42)
- ❖ **Dental:** patients with long-term dental amalgams (n = 42)
- ❖ **AD:** patients with Alzheimer (without dental amalgams, n = 55)
- ❖ **Dental + AD:** patients with Alzheimer (AD) and long-term dental amalgams (n = 13)

CONCLUSION

- ❖ AD patients with long-term dental amalgams have elevated MCP-1 systemic levels and cognitive dysfunction in the Mini Mental test