Salivary Immunological Biomarkers Associated with ACEs and Caries in Children

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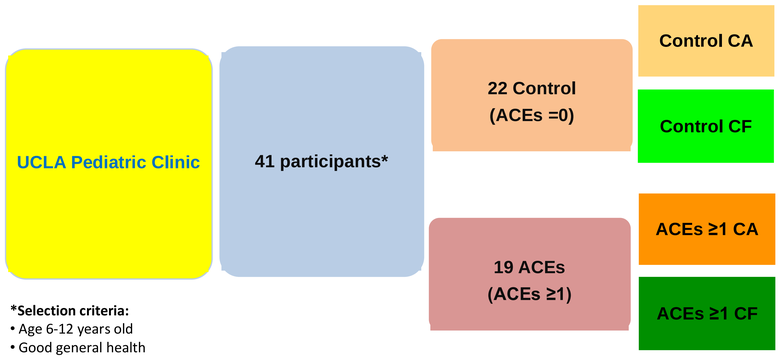
Introduction

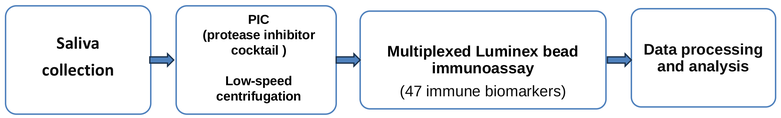
Adverse childhood experiences (ACEs), traumatic experiences encountered from 0-17 years old, can profoundly impact health and well-being into adulthood. ACEs function as biological stressors that affect neuroendocrine–immune (NEI) system responses. The salivary induction of NEI stress response markers may alter the oral microbiome. They are linked to elevated stress hormones like cortisol and immune response changes, but their impact on oral health is unknown.

This preliminary cohort explored salivary immunological biomarkers associated with ACEs and dental caries in pediatric patients.

Materials & Methods



***Selection criteria:**
- Age 6-12 years old
- Good general health
- Absence of:
  - chronic systemic diseases or other medical conditions
  - use of antibiotics within 30 days from the start of treatment



Results

Five of the 47 immunological biomarkers analyzed were below the detection level. The analysis revealed that several immune molecules exhibited statistically significant differential expression. Important immune mediators such as Fractalkine, G-CSF, IL-1β, IL-1RA, IL-8, IP-10, and TNF-α were significantly elevated, which may be related to caries experience. High levels of IL-10 and TGF-α may be associated with ACEs. Additionally, increased levels of Ftl-3L, MIP-1β, TGF-α, and TNF-α may indicate ACE-induced caries biomarkers.

Table 1. Demographics, caries experience, and ACEs were collected from the preliminary clinical study

Characteristic	Control CA (n=13)	Control CF (n=9)	ACEs CA (n=12)	ACEs CF (n=7)
Gender				
Female	6	2	7	3
Male	7	7	5	4
Ethnicity				
Hispanic	9	6	5	2
Non-Hispanic	4	3	7	5
Age				
	8.7 ± 1.6	8.0 ± 2.1	8.9 ± 2.1	9.1 ± 2.1
dmft/ DMFT index (± SE)				
	6.0 ± 1.1	0.0 ± 0.0	6.6 ± 1.4	0.0 ± 0.0
ACEs score (± SE)				
	0.0 ± 0.0	0.0 ± 0.0	2.8 ± 0.7	2.6 ± 0.5
ACEs domains				
Abuse	-	-	2	4
Neglect	-	-	2	2
House dysfunction	-	-	11	5

ACE's - Adverse Childhood Experiences
Control - ACEs= 0
ACEs - ACEs ≥ 1
CA - Caries affected
CF - Caries free

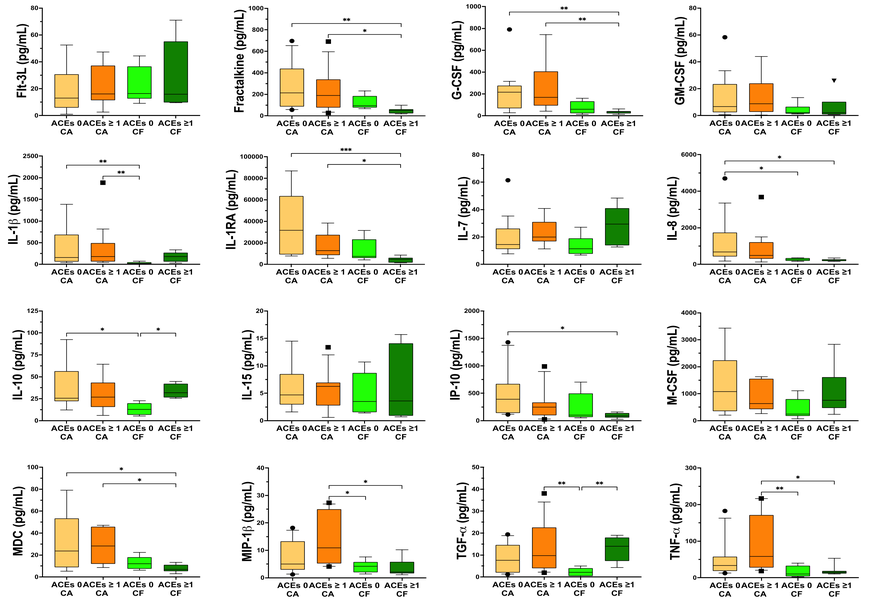


Figure 1 - Salivary immunological biomarker associated with caries and ACEs in children. Statistical analysis was conducted using one-way ANOVA and Kruskal-Wallis multiple comparison tests to identify significant differences between the groups. Significant results are indicated with the following notation: *p < 0.05, **p < 0.005, ***p < 0.0005.

Conclusion

Preliminary data suggest that the host's inflammatory response and growth factor activation play key roles in dental caries. Further analysis is needed to understand the influence of ACEs on these mechanisms. The future goal of this study is to further evaluate associations among ACEs, dental caries, the oral microbiome, and salivary stress and immunological markers.

References

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2. Xu, L. *et al.* Dynamic Alterations in Salivary Microbiota Related to Dental Caries and Age in Preschool Children With Deciduous Dentition: A 2-Year Follow-Up Study. Front Physiol. 2018;9:342. Epub 2018/04/20. doi: 10.3389/fphys.2018.00342. PubMed PMID: 29670544; PMCID: PMC5893825.

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