Exploring the Oral Microbiome of Older Adults with Mild Cognitive Impairment

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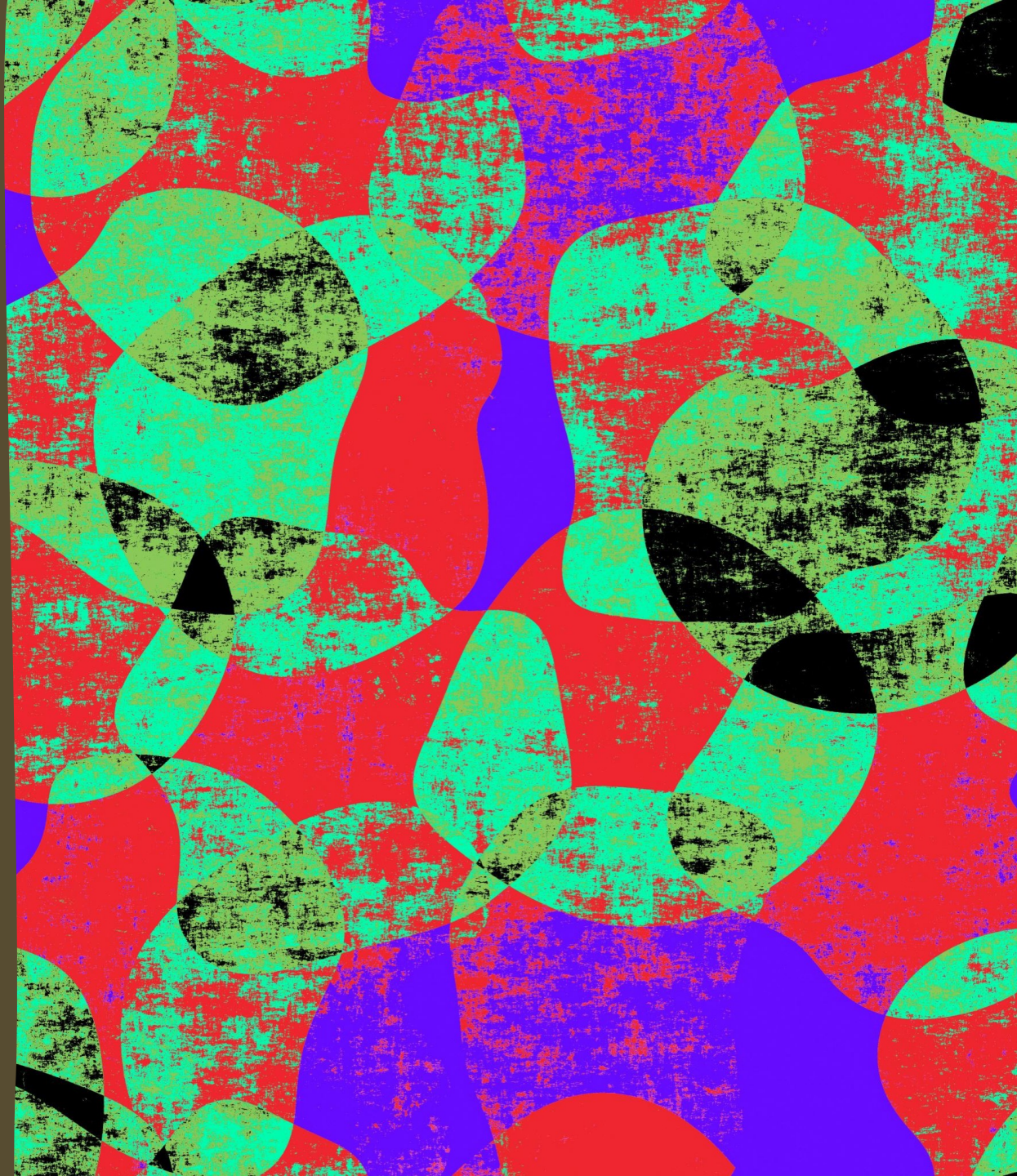


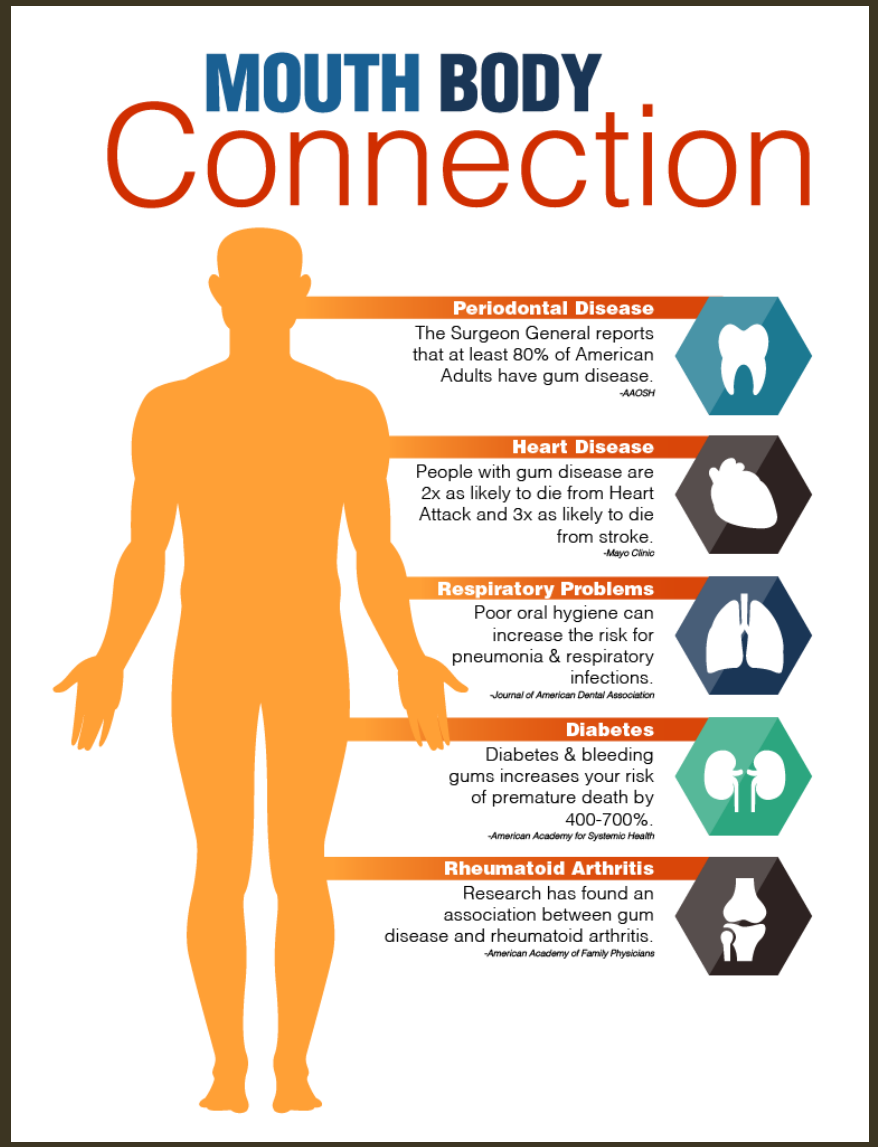
Acknowledgments

Emory ADRC P50 AG025688

Parent Study: Relationship of the Gut Microbiome to Neurodegeneration in Alzheimer's Disease (PI's Corwin, Lah, & Vaccarino)

Emory Integrated Genomics Core

Emory Integrated Computational Core



Oral-Systemic Connection

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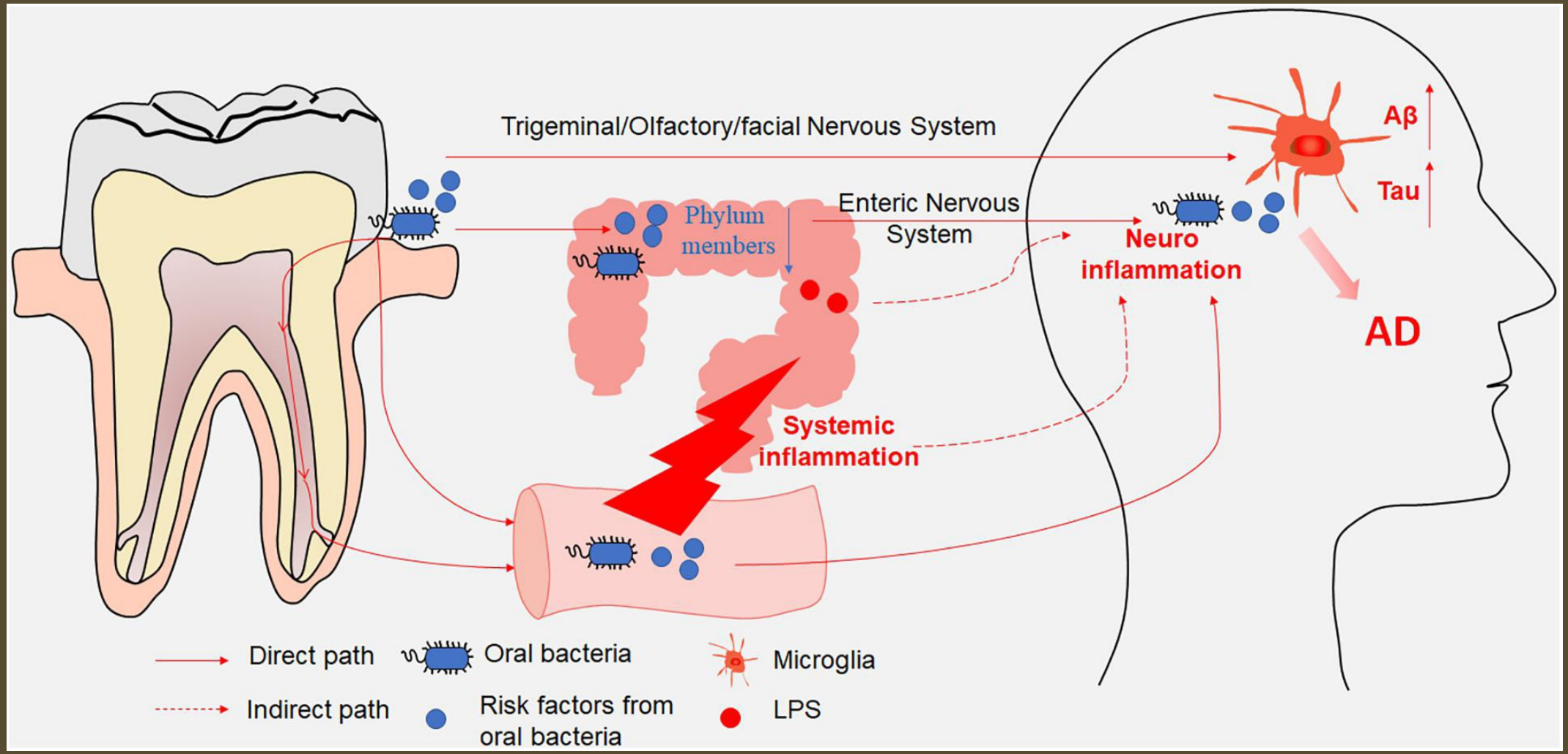
Hypothesized mechanisms

Kong, W., Lan, F., Awan, U. F., Qing, H., & Ni, J. (2021). The oral-gut-brain AXIS: the influence of microbes in Alzheimer's disease. *Frontiers in Cellular Neuroscience*, *15*, 633735.



Aims

Aim 1: Characterize and compare the composition and diversity of the oral microbiome in patients diagnosed with MCI and their aged-matched controls.

Aim 2: Explore associations between the composition of the oral microbiome, systemic inflammation, neuroinflammation, and the presence of MCI.

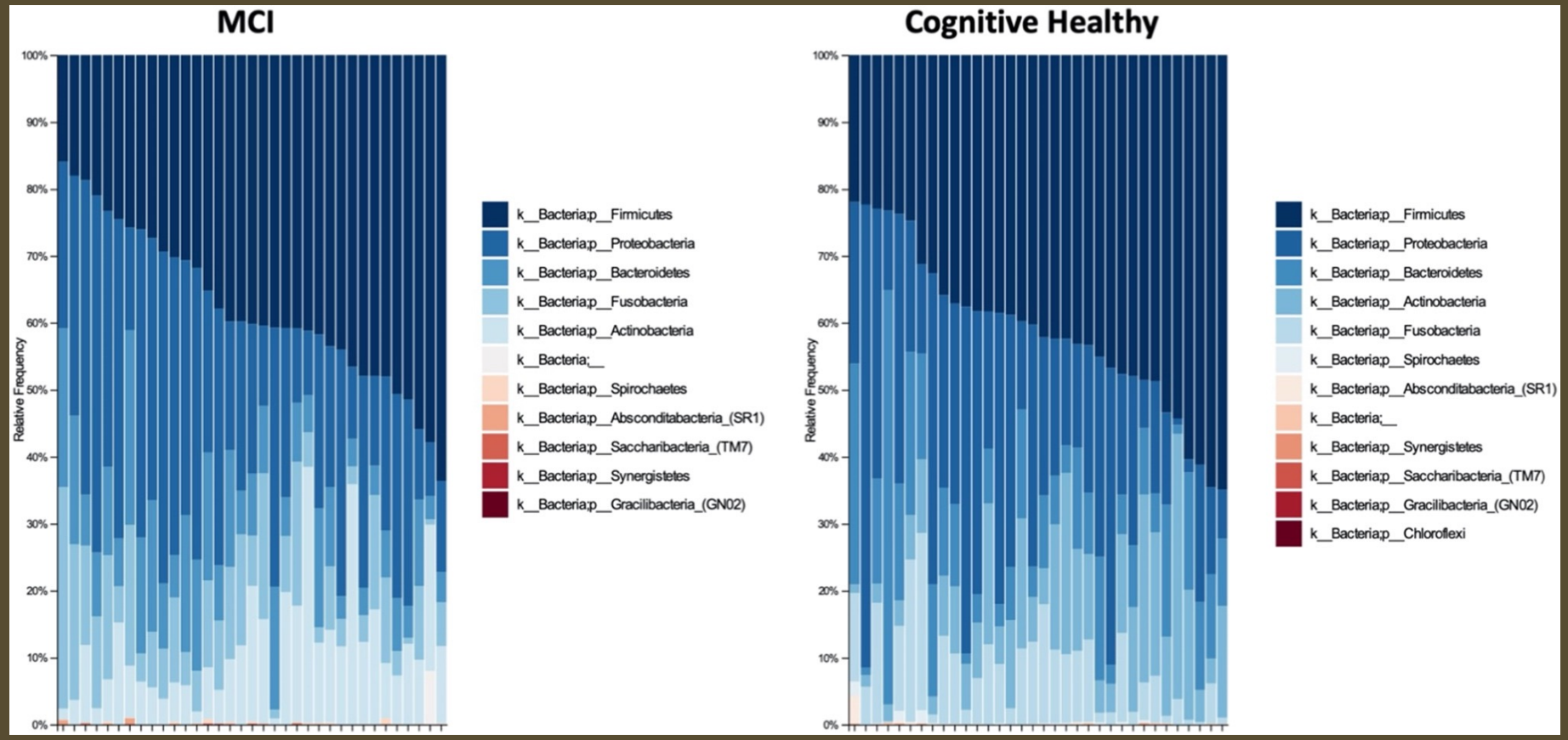
Methods

Comparative descriptive design:	• N = 68 • Two groups (MCI vs. Control)
Oral Microbiome	• Soft tissue samples collected using sterile swabs • V4 amplicons sequenced on a Miseq.
Systemic inflammatory markers: CRP and LPS	
CSF assay	• Aβ42, total-Tau, and phospho-Tau • Olink inflammation panel targeting 91 inflammatory markers

	Control (N = 34) n(%)	MCI (N = 34) n(%)
Gender		
Male	13 (38.2)	14 (41.2)
Female	21 (61.8)	20 (58.8)
Current Smoker		
No	33 (97.1)	32 (94.2)
Yes	1 (2.9)	1 (2.9)
Missing	0	1 (2.9)
Dentist		
No	25 (73.5)	23 (67.7)
Yes	9 (26.5)	10 (29.4)
Missing	0	1 (2.9)
Brushed Teeth		
Yes	34 (100)	33 (97.1)
No	0	1 (2.9)
Floss		
Yes	29 (85.3)	30 (88.3)
No	5 (14.7)	3 (8.8)
Missing	0	1 (2.9)
Mouthwash		
Yes	22 (64.7)	17 (50)
No	12 (35.3)	15 (44.1)
Missing	0	2 (5.9)
Antibiotics		
Yes	5 (14.7)	6 (17.7)
No	29 (85.3)	27 (79.4)
Missing	0	1 (2.9)
Gingivitis		
Yes	0	1 (2.9)
No	34 (100)	33 (97.1)

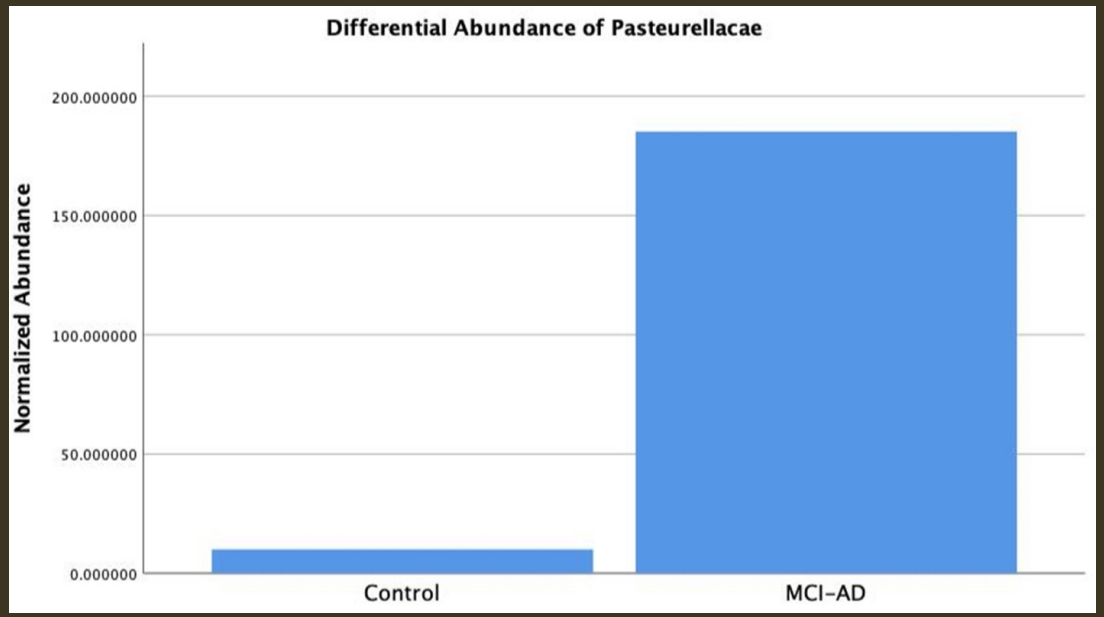
Results

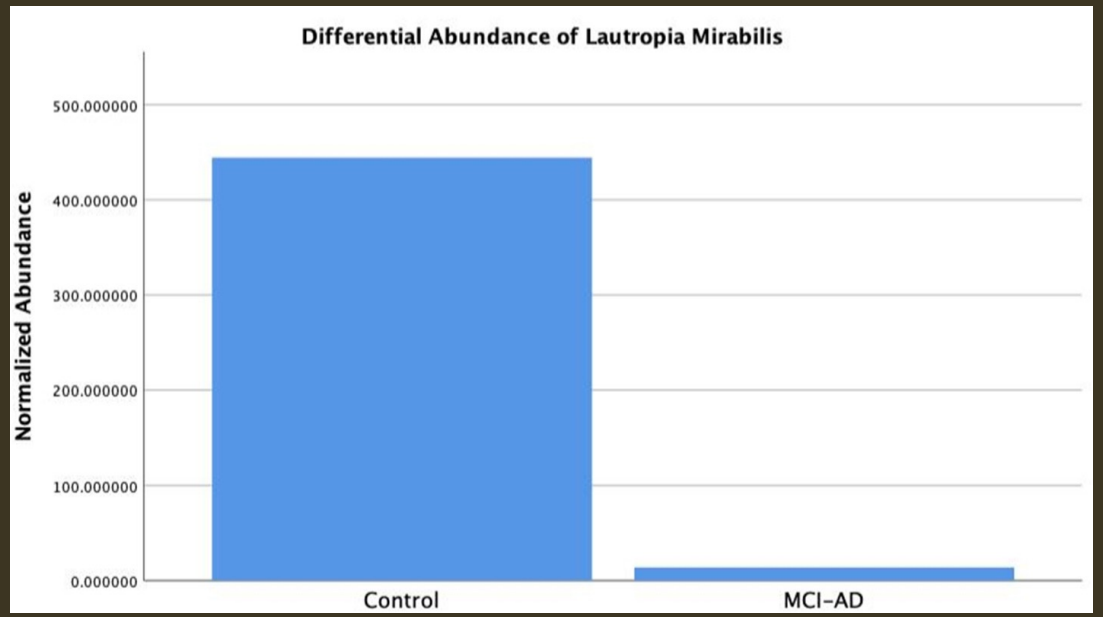
Overall Taxonomic Composition



Differential Abundance

- *Pasteurellacae* more abundant among MCI-AD
- *Lautropia Mirabilis* more abundant among Controls





Association between microbiome features and neuroinflammatory markers

	Pasteurellacae	*L. mirabilis*
IL17A	–0.081	–0.128
IL20RA	–0.078	0.213
IL1α	0.674**	0.087
TSLP	0.621**	–0.201
IL10RA	0.630**	–0.070
IL13	0.611**	–0.015

** $p < .01$.

Limitations

- No clinical diagnosis of oral health/disease
- Oral microbiome sampling
- Oral microbiome resolution
- Limited sample size

Conclusion

- There is evidence for:
  - An oral microbiome association with MCI
  - An association between the oral microbiome and neuroinflammation