ALTERATIONS OF CIRCULATING MIRNAS AND MICROBIOME STRUCTURE IN SALIVA OF AUTISTIC CHILDREN ARE ASSOCIATED WITH COGNITIVE IMPAIRMENTS: POTENTIAL CROSS-TALKING AND DIAGNOSTIC APPLICATIONS

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Recent evidence revealed that salivary molecules, as well as bacterial populations, can be perturbed by several pathological conditions, including neuro-psychiatric diseases. This relationship could be exploited to unveil new pathological mechanisms of elusive diseases, such as Autistic Spectrum Disorder (ASD) (1). We used a combined approach of miRNA expression profiling and microbiome analysis on saliva from 53 ASD and 27 NC children to investigate salivary ASD-related miRnome and microbiome alterations and their association with neuropsychological parameters.

After discovery and validation analysis, we demonstrated that 5 salivary miRNAs were statistically altered in ASD patients compared to NCs. Specifically, miR-29a-3p, -141-3p were upregulated, while let-7b-5p, miR-16-5p, -451a were downregulated in ASD saliva. The 16S rRNA microbiome sequencing analysis revealed statistically significant differences of abundance at the genus and species levels. In particular, Rothia, Filifactor, Actinobacillus, Weeksellaceae, Ralstonia, Pasteurellaceae and Aggregatibacter were increased in ASD patients, while Tannerella, Moryella and TM7-3 were decreased. Variations of both miRNAs and microbes were statistically correlated to ASD related neuropsychological scores. Interestingly, we also found a negative correlation between miR-141-3p expression and Tannerella abundance. Univariate ROC curve analysis for miRNAs and bacteria showed moderate but significant AUCs; however, multivariate ROC curves, evaluating the combination of all miRNAs and bacteria, increased the predictive performance to discriminate ASD patients. In this study, we report that a potential cross-talking between salivary miRNAs and resident bacteria alterations could exist: these findings could pave the way to further dissect ASD molecular bases (2).

References

(1) Cirnigliaro et al., Frontiers in Molecular Neuroscience, 2017

(2) Ragusa et al., Molecular Autism, 2019 (Submitted)