

Towards Precision Medicine, February, 2020

Julie A. Saugstad, PhD., Professor of Anesthesiology and Perioperative Medicine, OHSU School of Medicine, Professor of Molecular and Medical Genetics, OHSU School of Medicine. *MicroRNA Biomarkers for AD: Performance in MCI and TBI.*

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Dr. Saugstad presented on the discovery and validation of new miRNA biomarkers for Alzheimer's disease and related dementias.

MicroRNAs are molecules that regulate mRNA in different ways. Saugstad's team used lumbar puncture to obtain CSF from participants with Alzheimer's disease and then multiplied the available microRNAs in CSF with quantitative PCR.

The microRNAs were then assessed for their power in predicting the classification of a participant into an AD or non-AD group and assigned a predictive score. The pooling of these candidate microRNA biomarkers seemed to improve the accuracy of the predictive model. A similar additive effect was seen when candidate microRNA biomarkers were paired with participant APOE status, or with the biomarkers amyloid beta 42 and T-tau. These effects were even more pronounced in the context of MCI classification.

Saugstad is now working to improve the performance and specificity of CSF microRNAs in blood plasma for classifying patients into severities of cognitive impairment and neurodegenerative etiology. Saugstad hopes to explore microRNA specificity for Lewy Body dementia, frontotemporal dementia, and other neurodegenerative etiologies. She also aims to investigate the involvement of certain microRNAs in blast-induced traumatic brain injury.

Saugstad is also working on validating changes in the expression of predicted Alzheimer's disease microRNA targets, characterizing role for extracellular vesicles and microRNAs in Alzheimer's disease pathophysiology, and scrutinizing sex differences in extracellular vesicles and microRNAs in Alzheimer's disease.

#### Group Discussion:

In a group discussion, Dr. Ellen Wijsman raised concerns about proving statistical significance when pooling variables to increase predictive power. The potential for cross-referencing microRNA data with data from single cell transcriptomics was also discussed. Dr. Wijsman also made an effort to debunk the common misconception that women are more likely to develop Alzheimer's disease than men.