AMERICAN OTOLOGICAL SOCIETY

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Predoctoral Fellow

John Hopkins University

"Identifications of Biomarkers in Human Plasma for Diagnosis of Vestibular Migraine"

FELLOWSHIP GRANT 2021

Amount Awarded by AOS: $30,000

Ongoing Funding: A Grant from the Blaustein Pain Research Fund at Johns Hopkins is supporting the ongoing work. $39,500, Jan 1 – Dec 31, 2026

PUBLICATIONS:

Krishnan PS, Zamuner FT, Jenks CM, Xie JY, Zhang L, Lehar M, Fedarko NS, Brait M, Carey JP. Detection and Quantification of Calcitonin Gene-Related Peptide (CGRP) in Human Plasma Using a Modified Enzyme-Linked Immunosorbent Assay. J Vis Exp. 2023 Jun 16;(196). doi: 10.3791/64775. PMID: 37395575.

RESEARCH SUMMARY:

Our research team developed and validated a novel protocol for quantifying calcitonin gene-related peptide (CGRP) in human plasma as a biomarker for migraine activity.

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	Absorbance (OD)	Interpolated concentration (pg/ml)	Percent yield
Un-spiked control	-0.0434	Does not fall on curve (i.e. ~0)	
Spiked at 200 pg/ml	0.2712	214.7±23.4	107.4%
Spiked at 100 pg/ml	0.0966	102.7±2.35	102.7%
Spiked at 50 pg/ml	0.0205	55.1±12.65	110.2%

Table: Using a modified ELISA protocol with additional steps of protein extraction with a polar sorbent and blocking of non-specific binding, CGRP yields are excellent.

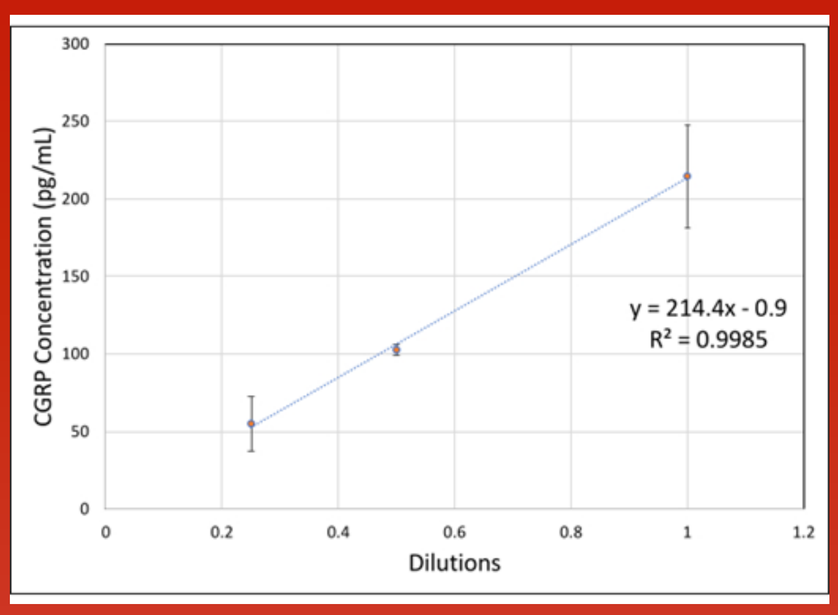

Figure: Linearity of dilution plot over 1:1, 1:2, and 1:4 dilutions. This indicates that the assay method is accurate across a range of CGRP concentrations.

OUTCOMES:

Publication of the technique in *J Vis Exp*. 2023 Jun 16;(196). doi: 10.3791/64775. PMID: 37395575.

FURTHER FUNDING HAS ENABLED US TO EXPAND OUR RESEARCH TO:

Our research team is currently studying techniques for quantifying CGRP in tears at various time points in the course of a migraine episode. We believe that the closer location of the sampling site to the trigeminal ganglion and more rapid capture of the biomarker will yield an assay that reflects disease activity in conditions like vestibular migraine.

LAY SUMMARY OF FINDINGS AND IMPLICATIONS OF THIS RESEARCH:

We found that this plasma CGRP has such a short half-life that, when assayed in blood drawn from the antecubital vein, it does not serve as a good indicator of disease activity at the level of the inner ear. However, the techniques developed in this project have proved critical to the development of a parallel assay for tears.