Format

Presentation title: Clinical Utility of the Plasmatic Quantification of S100B for the Early Detection of Brain Damage After TBI using POC Biosensors.

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Presentation type: (Oral presentation)

Abstract (250-300 words):

About half of all trauma-related deaths are caused by TBI, representing in severe cases mortality of 37% and a significant cause of disability associated with high annual costs to the healthcare system. Since delays in the clinical identification of neurological impairment during the acute phase lead to higher mortality among TBI patients, predicting TBI evolution immediately after trauma is a crucial key point in the management, allowing an adequate classification of the severity before the appearance of clinical or imaging indicators.

Neuronal damage secondary to TBI requires therapeutic decisions based on the timely identification of clinical deterioration. Changes in plasmatic S100B levels are associated with TBI severity and patient outcome. S100B has been studied mainly to support the need to perform a CT in mild TBI and to monitor patients with moderate to severe TBI, as a predictor of outcome and elevation of the ICP. However, despite the available evidence as a valuable tool, S100B is rarely used among clinicians who manage patients with TBI.

The S100B quantification is often difficult since standard immunoassays are time-consuming, costly, and require extensive expertise. Our work aims to fill this gap, focusing on the manufacture, evaluation, and validation of an electrochemical immunosensor for the label-free detection of S100B in plasma using disposable electrodes based on low-cost materials. Biosensor response was studied using an impedance signal from electrochemical tests of plasmatic S100B between 10 to 1000pg/mL, which are levels in a clinically relevant range. Higher impedance values were observed with increasing S100B concentration in both platforms, supporting this approach as a promising strategy for developing an S100B point-of-care biosensor as a potential tool for prognosis in TBI.

Further studies are necessary to assess the biosensor response using samples from multiple individuals, and its performance against the gold standard technique in clinical trials.

Biography (150-200 words):

Alexander Rodríguez obtained his MD from Universidad Metropolitana, Colombia (2011) and the MSc (2017) and PhD (2021) degree in Biomedical Sciences from Universidad del Norte, Colombia, where he received the Recognition of Scientific Merit and thesis laureate magna-cum-laude. Currently, Professor of Anatomy and Physiology and an active member of the Biotechnology Research Group in the Medicine Department at Universidad del Norte, Colombia. He has eight years of clinical experience in critical care and trauma and two years in bone marrow transplantation, as well as seven years in research on biosensors development of brain injury-related biomarkers with high skills in electrochemical detection methods, biofunctionalization techniques, and physics-chemical nanomaterial characterization. The focus of his research is to develop an early neuronal injury detection method that can be added as a predictive tool to clinical and imaging variables in traumatic and ischemic brain injury.