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Salivary α-Amylase: A Reliable Stress Biomarker

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In the current fast mechanical lifestyle, stress has become an unavoidable pervasive phenomenon for every individual. Persistent stress can precipitate, perpetuate, and exacerbate both physical and psychological illness with a high-risk possibility of negative consequences.[1,2] Human saliva is the most researched essential body fluid and has established its pivotal role as a safe and reliable indicator of stress. Saliva-based diagnostics have made the fluid important to reveal the connection of salivary changes in all aspects to systemic health status. Researchers also have more attraction toward the salivary biomarker as the salivary sample collection is a noninvasive procedure and is easier to collect and serve as a fast route for biomarker-related research investigations.

Recently, in the field of stress research, salivary α-amylase (sAA) has evolved as a reliable and valid marker of autonomic nervous system activity. Therefore, in behavioral medicine, it is considered as a more reliable and an important biomarker.[3] sAA is the most abundant protein, comprising 10 to 20% of the total protein content.[4] sAA can be altered due to various environmental factors. It was reported that the activation of the noradrenergic pathways alters sAA levels.[5] sAA levels drop after awakening and increase during the daytime. Occupational stress and lower efficacy at the workplace are responsible for the higher levels of sAA during the day but lower at night.[6] The level of stress could be different among males and females, and hence, sAA could also show alterations.

It has been shown that sAA increases in reaction to both physical and mental exposures such as venipuncture,[7] watching an eye video surgery,[8] as well as a stress intervention using the Trier social stress test research on prospective military recruits regarding the possible impact of fitness level in relation to psychosocial stress. Their responses were assessed following endurance run using heart rate and sAA measures. Good results at the run turned out to be a predictor of lower autonomous nerve system response as determined by the cardiac response curves and the sAA level.[9]

Additionally, following a thorough subjective and objective assessment by qualified psychologists, patients diagnosed with persistent psychosocial stress have exhibited considerably increased sAA in contrast to those who do not. Significantly greater sAA levels are present in patients with oral symptoms such as recurrent aphthous ulcers or dry mouth, regardless of whether or not they were part of the stress group. These results were explained by the hypothesis that sAA is a biomarker for psychological stress, but it is not a sign that stress causes alterations in mucosa.[10] An increased sAA pattern was furthermore observed in girls who have experienced sexual abuse and have posttraumatic stress disorder (PTSD). The elevated sAA in PTSD patients was considered, along with other symptoms including hyperarousal, flashbacks, nightmares, etc., to be a sign of enhanced sympathetic nervous system activity in this patient group.[11]

The purpose of this letter is to sincerely help naive researchers, by providing them with the information they need to look into sAA, and we anticipate that it will guide them on the right path for a noble cause.

Ethical Approval

IEC/AIIMS/Kalyani/certificate/2024/054.

Conflict of Interest

None declared.

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