Association between salivary alpha-amylase and selective attention performance in healthy children

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Introduction

Executive functioning is the result of the combined action of a complex set of high-level cognitive processes that emerge during childhood. These executive functions enable a child to manage challenging problems and regulate their emotional behaviour. Several studies have related the biomarker salivary Alpha-Amylase (sAA) to better executive functioning.

sAA is a non-invasive biomarker that has been associated with improved executive function (according with its direct association with the total score of ENFEN) and working memory (WM) performance (according with an inverse association with auditory-verbal test of WISC 5) in recent studies conducted in our laboratory.

The main aim of this study was to examine the association between selective attention performance and sAA in a sample of 63 children (38 boys). The BMI for the entire sample was 14.32 and the mean age (in months) was 119.21.

Material & Methods

Selective attention was assessed by means of D2 test, a neuropsychological tool employed with this purpose in clinical settings. Three parameters were derived: (a) number of correct responses, (b) number of errors of omission and (c) number of errors of commission (see Figure 1). SAA activity, output and salivary flow rate (SFR) were measured as follows: baseline (10 minutes prior to testing), one minute prior to testing and one minute after the end of the test (see Figure 2 and Figure 3). Mean levels of these three parameters were calculated to conduct the correlational studies.

Results

Our statistical analyses revealed exclusively an association among delta sAA output and the number of commission errors but not with the number of correct responses or the number of omission errors (see Box 1). These results could suggest that an increased activity in Locus Coeruleus-Noradrenaline (LC-NE) System could be interfering the cognition and arousal regulation capacities of participants as suggest our previous findings on working memory. In this sense, SAA activity could be employ as a marker of impulsivity.

Conclusions

- $r_{\text{SAA_correct responses}} = 0.134$, $p = 0.458$
- $r_{\text{SAA_errors_of_omission}} = 0.063$, $p = 0.728$
- $r_{\text{SAA_errors_of_commission}} = 0.257$, $p = 0.093$

- $r_{\text{SAA_correct responses}} = 0.191$, $p = 0.304$
- $r_{\text{SAA_errors_of_omission}} = -0.076$, $p = 0.685$
- $r_{\text{SAA_errors_of_commission}} = 0.370$, $p = 0.041$

Figure 1: Main statistical results in our study.