

## LEVELS OF SEROTONIN AND INTERLEUKIN 6 IRAQI AUTISTIC CHILDREN

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### ABSTRACT

Autism is a neurodevelopmental disorder specified by higher frequency of serotonin aberration, the inflammatory factors in Autism Spectrum Disorder (ASD) that may predispose to the disorder attract a great attention, Therefore, the goal of this study was to estimate serotonin 5-HT and interleukin6 IL6 in sample of Iraqi autistic children. Thirty blood samples from autistic children were examined to measure the level of interleukin6 and serotonin compared with matched healthy control. Serotonin level and IL6 of autistic children was elevated when compared with healthy control.

**Keywords:** Autism, Serotonin, Interlukin6

### INTRODUCTION

Autism Spectrum Disorder defined by Christensen (2016) as a strongly heterogeneous, brain-based developmental disorder affecting nearly 1.5% of the population. Likewise, American Psychiatric Association (2013) confirmed that initial diagnostic indicators consist of impairments in social communication and reciprocity further-more presence of repetitive behaviors also restricted patterns of interests. Hanley and Freedman (1977) stated that serotonin or 5-hydroxytryptamine (5-HT) is neurotransmitter originate from tryptophan and found mainly in gastrointestinal tract, central nervous system (CNS) and blood platelets, it coordinates a variety of behavioral autonomic, beside cognitive functions. Feldman *et al.*, (1997) found that serotonin has been linked to a wide assortment of behaviors including feeding, social hierarchies, body weight regulation, aggression, obsessive compulsive disorder, suicidality, alcoholism, affective disorders and anxiety. Harris and Cohen (1985); Carley and Radulovacki (1999); Strecker *et al.*, (1999) and Kim *et al.*, (2005) said that (5-HT) has been associated to motor system function, in addition to respiratory stability, wake cycles, sleep, circadian rhythms. Anderson (2002) reported that hyper serotoninemia is regarded to be one of the most well replicated findings in biological psychiatry in autism. Janusonis (2008) Confirmed that biological causes of platelet hyper serotoninemia still ambiguous.

Vargas *et al.*, (2005) and Li *et al.*, (2009) stated that there is a noticeable difference in inter-lukine-6 in the brain of autistic children when they compared to healthy children. Van Wagoner and Benveniste (1999) elucidated that Interlukine -6 raised in the cerebral spinal fluid furthermore brain homogenites in the presence of brain

injury or inflammation. Wei *et al.*, (2011) illustrated that increased Intrlukine-6 in the brain of children with autism could modify neural cell adhesion, migration and cause an imbalance of excitatory and inhibitory circuits. The objective of this study is to estimate serotonin blood level and IL-6 in serum of autistic disorder and compare them with normal children.

### MATERIAL AND METHODS

**Subjects:** Thirty children with autism and thirty healthy matched control, aged 5-7 years, 25 males and 5 females. Children were selected after clinical evaluations.

**Blood collection:** Venous blood samples were collected in test tubes from each group. The serum was obtained by putting three ml of each blood sample in a clean dry plain tube and allowed to clot at 37 °C for 20–30 minutes, centrifuged at 3000 rpm for 15 minutes. Measurement of serum serotonin concentration was determined using a serotonin ELISA kit (Demeditec Diagnostics GmbH, Germany). Serum IL6. Concentration was determined using Human IL6 Picokine ELISA Kit Boster/ USA.

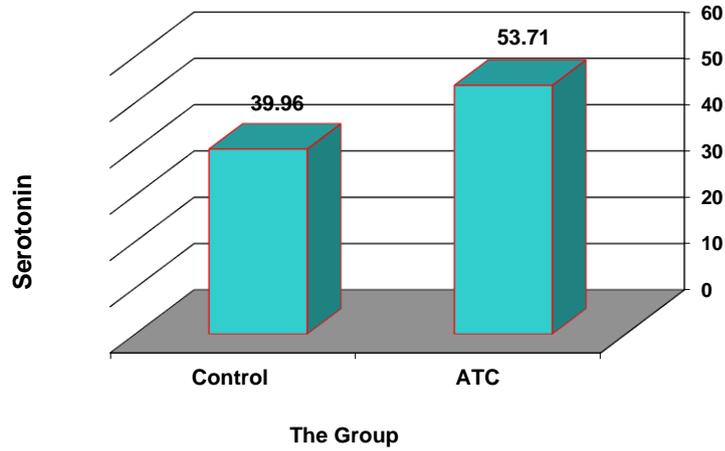
**Statistical analysis:** The statistical analysis system-SAS (2012) program was used to effect of difference factors in study parameters. T-test was used to significant compare between means in this study.

### RESULTS AND DISCUSSION

There were statistically significant differences ( $P < 0.05$ ) between the two groups, children with autism exhibited an elevated serotonin concentration with range 24.557–222.397, whereas the control children showed a concentration of 19.2 57- 67.975. There were no differences between children at the sex level. The result was represented in Table 1 and figure 1.

**Table 1:** Compare between Autistic children (ATC) and control in Serotonin

The Group	No.	Mean ± SE of Serotonin
Control	30	39.96 ± 2.31
ATC	30	53.71 ± 7.04
T-Test	---	12.854 *
P-value	---	0.0489 *
* (P<0.05).		



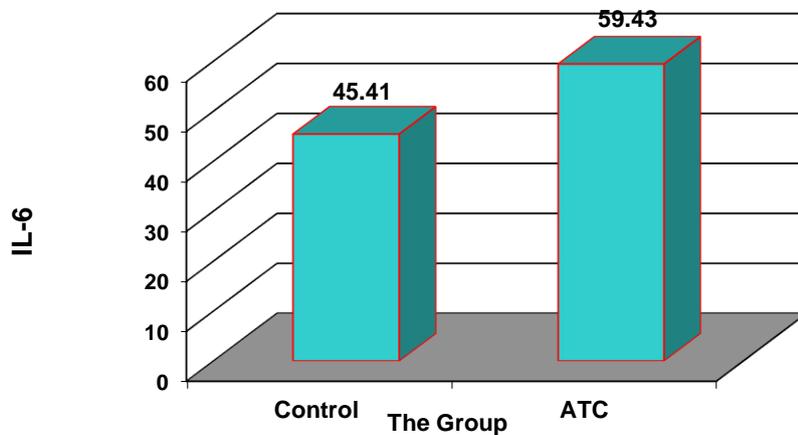
**Figure 1:** compared between Autistic children and control in Serotonin

The children with autism exhibited an increased IL-6 concentration with range 24.791- 132.161, while the control children display concentration of 13.13-66.488), with significant difference's (P<

0.01), also there were no differences between children at the sex level. The result as shown in table 2 and figure 2.

**Table 2:** Compare between Autistic children (ATC) and control in IL-6

The Group	No.	Mean ± SE of IL-6 ( )
Control	30	45.41 ± 2.25
ATC	30	59.43 ± 4.51
T-Test	---	10.102 **
P-value	---	0.0073
** (P<0.01).		



**Figure 2 :** compared btwen Autistic children and control in IL6

The result of this study demonstrated that there were significant differences ( $P < 0.05$ ) in serotonin levels between autistic and healthy children. Changes in serotonin levels during development have profound effects on these processes and on overall brain development (Whitakar, 2001). Hyper serotoninemia could be caused by a decreased ability of the platelets to bind serotonin or due to overall increased levels of serotonin in the body (Anderson *et al.*, 2011). Hanley and Freedman (1977), Schain and Freedman (1961) found that altered serotonin level in the blood were the first biomarker found in autism studies. Christopher *et al.*, (2017) explained that increased whole blood serotonin, or hyper serotoninemia, was the first biomarker specified in autistic children and is present in more than 25% of affected children, the serotonin system is a logical candidate for involvement in autism due to its pleiotropic function across multiple brain systems both dynamically and across development, similarly Ashwood *et al.*, (2011); Goines and Ashwood (2013); Ricci *et al.*, (2013) elucidated that growing bodies of evidences contribute immunological disturbances in autism spectrum disorder and have confirmed cytokine aberration in the peripheral blood of autistic children. Emanuele *et al.*, (2010); Ashwood *et al.*, (2011); Malik *et al.*, (2011) observed that there is significant growing in the plasma level of IL-6 in autism compared with healthy developing controls. Li *et al.*, (2009), Wei *et al.*, (2011) stated that elevated IL-6 is found in postmortem brain specimens from autistic children. Vargas *et al.*, (2005) have proved that IL-6 was elevated in the anterior cingulate gyrus of autistic brains and in the cerebrospinal fluid of autistic individuals. Okada *et al.*, (2007); Ashwood *et al.*, (2008) demonstrated that IL-6 levels are related with core deficits of autism spectrum disorder or impairments in associated behaviors and/or onset patterns of autism.

#### CONCLUSION

The present study found that the levels of serotonin and IL-6 in autistic children were higher than in healthy children, on the other hand there were no statistically worthy variance between the groups with regard to the discrimination of sex.

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