



**Autism Treatment Trust**

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## **Autism and Testosterone**

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I think it is important to voice a scientific view that differs markedly from that of Simon Baron-Cohen of the Cambridge Autism Research Unit who has, according to recent media reports, been calling for a debate on pre-natal screening for autism.

Several aspects need to be taken into account in this important matter: Is the issue of elevated testosterone in autism valid? Is elevated testosterone specific to autism? What are the consequences for individuals with autism and future families contemplating pregnancy, particularly in light of recent media coverage depicting autism as a serious debilitating condition? What other issues in autism are being overlooked with the endorsement of this speculative hypothesis?

First of all, it is by no means proven that an excess of testosterone is implicated in autism. Whilst the recent study from Auyeung et al. conducted on 235 non-autistic children suggests that there is a relationship between higher levels of testosterone and higher autism trait quotients, it should be highlighted that the quotient of autism that was measured in this study relied on the use of two parental questionnaires (the Childhood Autism Spectrum Test and the Child Autism Spectrum Quotient) and not gold standard psychometric measurements of autism, which are based on observations made by trained psychologists and paediatricians. The study seemed to rely on earlier research that suggested a link between autism and high levels of testosterone, but these were equally controversial. One piece of research, also conducted by Simon Baron-Cohen, suggested that individuals with high functioning autism have a low empathy quotient, and this was attributed to excess maleness, i.e. testosterone. However, the empathy test used for these studies relied essentially on measuring empathy within a social context, which, not surprisingly people with Asperger's are poor at, as they frequently do not have full social understanding irrespective of their empathic abilities. A second type of research, also led by Simon Baron-Cohen suggested that the ratio between the length of the second and fourth digit (2D:4D) in people with autism is indicative of an abnormally high level of embryonic exposure to testosterone. These abnormalities in 2D:4D ratios have not been replicated by others, and are, at best, very indirect evidence of testosterone secretion. In fact, other genetic factors are also known to influence this ratio.

Whilst some individuals with autism may indeed have abnormal steroid metabolism, and present with excessive androgen levels, as measured in blood and urine samples, these abnormal findings appear to be by no means representative of the autistic children seen today, especially children who have experienced regressive autism, characterised by a loss of

already acquired skills in the areas of communication, socialisation and behaviour. Many of these children present with a failure to thrive physically, and are often under weight and have delayed maturation, which is hardly compatible with excess testosterone.

It should be noted that testosterone is implicated in a wide variety of biological and behavioural processes. It is required for normal development, sexual maturation and sexual activity, and in many aspects of human behaviour, in addition to being potentially neuro-protective. A study, also from Cambridge University, Published in 2008, in the 'Proceedings of the National Academy of Sciences', showed that males working as stock traders had higher testosterone levels. Traders with elevated testosterone were found to be more confident and have a risk-taking appetite, which is hardly compatible with autistic traits. Other studies have found that elevated testosterone increases the secretion of the non-amyloidogenic APP fragment, and decreases the secretion of Amyloid beta peptides suggesting that testosterone supplementation in elderly men may be protective in the treatment of Alzheimer Disease. It therefore seems that a pre-natal test for testosterone in itself is insufficiently specific and sensitive as a method of predicting the likelihood of developing autism.

It is of great concern that studies on testosterone and autism are being misinterpreted, leading to the use of therapies aimed at disturbing steroid hormone production in individuals with autism. Currently, many autistic children may be being treated, without proof of safety and scientific and medical evidence of benefit, with a view to reducing their hormonal secretion of testosterone (Lupron Therapy, Spironolactone). The rationale behind advocating these therapies appears to be based on a misunderstanding of autistic behaviours and without systematic laboratory evidence of abnormal testosterone levels.

It is premature and ethically wrong to call for a debate on pre-natal screening with the potential for pregnancy termination when there is not even a sound scientific basis for the autism/testosterone theory. Autistic individuals would be better served by being assisted in reaching their fullest health and well being. The issues of autism that urgently need addressing today concern: A) a plausible explanation for the 7-10 fold rise in autism rates seen in the last 10-15 years; B) a better understanding of the novel gut and immune pathologies identified in autism; and C) the interplay of environmental and genetic factors that are implicated in regressive autism. It is also essential that more effort is made to provide better education services and improved support for families.

Simon Baron-Cohen's latest effort is a distraction from the real issues.

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