And they showed more activation in the bilateral precuneus (Brodmann area 7) only during emotional empathy task. There was no brain region more activated in control subjects during cognitive empathy task. But while carrying out emotional empathy task, control subjects exhibited greater neural activities in the left middle frontal gyrus (Brodmann area 46) and right anterior cingulate gyrus (Brodmann area 32) than ASD subjects.

**Conclusion:** This fMRI study suggested that the brain regions associated with cognitive and emotional empathy in ASD differed from those in healthy individuals. The results of this study might provide some explanation for impaired empathic ability in autism. Further research will be needed to investigate more definite neurobiology of ASD in terms of empathy.

**PM344**

**Association between peripheral cytokine levels and cognitive abilities in children with autism spectrum disorder**

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**Abstract**

**Objective:** Accumulating data in the literature suggest that cytokines may be one of the factors influencing cognitive development of autism spectrum disorder (ASD). The present study investigated whether cytokines influence cognitive development in children with ASD.

**Methods:** The Wechsler Intelligence Scale for Children (WISC-III or WISC-IV depending on the time of testing) was administered to 14 children with ASD (9 boys and 5 girls; mean age (standard deviation) = 11.6 (2.1) years). The serum levels of 10 cytokines (granulocyte macrophage colony-stimulating factor, interferon-γ, interleukin (IL)-1β, IL-2, IL-4, IL-5, IL-6, IL-8, IL-10, and tumor necrosis factor-α) were examined using the Human Ultrasensitive Cytokine Magnetic 10-Plex Panel for the Luminex platform. Each serum sample was assayed in duplicate, and all samples were run on the same assay. The relationships between WISC scores and serum levels of the cytokines were examined.

**Results:** The serum level of IL-6 was significantly negatively correlated with IQ in children who were administered the WISC-III (p < 0.001) as well as those administered the WISC-IV (p < 0.01). Significant correlation of serum IL-6 levels with IQ was also observed when children administered the WISC-III and those administered the WISC-IV were analyzed together (p < 0.001). No other cytokines were significantly correlated with IQ.

**Conclusions:** The present results suggest that peripheral IL-6 levels are negatively correlated with cognitive development in children with ASD. Although the mechanisms underlying the association between cytokines and cognitive development remain to be clarified, our preliminary findings add to the evidence that cytokines may be involved in the neural development of ASD.

**PM345**

**Resveratrol Suppresses Neuroinflammation in the Experimental Paradigm of Autism Spectrum Disorders**

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**Abstract**

**Objective:** Neuroinflammation triggered by the stimulation of matrix metalloproteinases and the subsequent release of pro-inflammatory cytokines, as a result of oxidative stress and mitochondrial dysfunction, leads to neuronal dysfunction and is one of the probable mechanisms involved in the pathogenesis of autism spectrum disorders (ASD). The aim of the present study was to explore the ameliorative potential of resveratrol on neuroinflammation in the experimental paradigm of neuroinflammatory model of ASD in rats.

**Method:** 1M Propanoic acid (PPA)(4µl) was infused over 10 minutes into the anterior portion of the lateral ventricle to induce ASD like symptoms in rats. Resveratrol (5, 10 and 15mg/kg) was administered starting from the 2nd day of the surgery and continued upto 28th day. Rats were tested for various behavioral paradigms such as social interaction, stereotypy, locomotor activity, anxiety and novelty, depression, spatial learning and memory, repetitive and pervasive behaviour between the 7th day and 28th day. In addition, biochemical tests for oxidative stress, mitochondrial complexes, TNF-α and MMP-9 were also assessed.

**Results:** Intracerebroventricular injection of propanoic acid produced neurological, sensory, behavioural, biochemical and molecular deficits which were assessed as endophenotypes of autism spectrum disorders. Continued treatment with resveratrol for four weeks restored, significantly and dose dependently, all these endophenotypes in PPA induced ASD in rats.

**Conclusion:** The major finding of the study is that resveratrol restored the core and associated symptoms of autistic phenotype by suppressing oxidative-nitrosative stress, mitochondrial dysfunction, TNF-α and MMP-9 expression in PPA induced ASD in rats. Therefore, resveratrol might serve as an adjunct therapeutic agent for amelioration of neurobehavioural and biochemical deficits associated with autism spectrum disorders.

**Keywords:** Autism spectrum disorders (ASD), resveratrol, neurobehavioural, oxido-nitrosative stress, TNF-α, MMP-9

**PM346**

**Social defeat stress as juveniles impairs persistent social behaviors and neurogenesis**

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**Abstract**

**Objective:** Adverse childhood experiences, including physical abuse, often have negative physical and mental health consequences later in life. In the present study, we investigated the influence of social defeat stress as juveniles on emotional behaviors, and also the causal role of glucocorticoids in neurogenesis of mice exposed to the stress.

**Methods:** The juvenile and adult male C57BL/6j mice were exposed to social defeat stress induced by exposure to an aggressive ICR mouse for 1, 5, or 10 consecutive days. We assessed social behaviors, serum glucocorticoid levels, and hippocampal neurogenesis in mice exposed to social defeat stress. Mifepristone, a glucocorticoid receptor antagonist, was administrated 15 min prior to each social defeat stress trial for 10 consecutive days.