

## The Increase of AMP-activated Protein Kinase during Physical Activities can Reduce Symptoms of Autistic Children

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### Abstract

Autism spectrum disorders (ASD) are one of the neurodevelopmental disorders. About one-five of children diagnosed with ASD have regression autism. Adenosine monophosphate (AMP)-activated protein kinase (AMPK) is precisely control the balance of ATP metabolism in mitochondria, the organelle that show dysfunction in regressive autism. Studies have shown that this sensor kinase can be effective in axonal growth. It has been suggested that exercise is one of the most powerful factors that increase mitochondrial activity and the amount of AMPK. Above the mentioned, we hypothesized that the physical activities can increase mitochondrial activity and reduce the symptoms of autistic children.

**Keywords:** Autism spectrum disorders; Adenosine monophosphate; Threonine protein kinase

### Description

Autism spectrum disorders (ASD) are one of the neurodevelopmental disorders. About one-five of children diagnosed with ASD have regression autism-a normal development until age 1 and 2 which followed by a regression that significantly characterized by an impaired language abilities [1]. Some of the children with ASD have co morbidities such as mitochondrial dysfunction which is more common in children with regressive autism [2]. Mitochondria are organelles that produce adenosine triphosphate (ATP), the energy porter in cells. The balance between production of ATP and its consumption is precisely controlled by adenosine monophosphate (AMP)-activated protein kinase (AMPK), the serine/threonine protein kinase that works as a key regulator and sensor [3]. In autistic patients as regards abnormality in axonal-path finding [4], studies have shown that this sensor kinase can be effective in axonal growth [5]. It has been suggested that exercise is one of the most powerful factors that increase mitochondrial activity [6] and the amount of AMPK [7]. Some studies indicate physical exercises for improving performance of patients. There are studies which showed that physical activities can reduce stereotypic behaviors in both autistic and mentally retarded adults [8]. It is also suggested that the best time for intervention and treatment of children with ASD is an age between 2 and 4 years [9]. On the other hand, dominance of playing video games among children, which result to the lack of exercise can worsening this situation. Above the mentioned, we hypothesized that the physical activities such as aerobic controlled exercises and age specific sports may be helpful in order to

increase mitochondrial activity. In this regard we suppose that increase in mitochondrial activity will lead to improve the brain development and therefore reduce the symptoms of autistic children.

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