



## Determination and Identification of Important and Influential Nodes Involved in the Pathology of Amyotrophic Lateral Sclerosis Using Improved TOPSIS Method

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**Abstract:** In many genetic disorders, mutation or loss of function in different genes lead to a same pathological outcome. This finding pointed toward to a fundamental network in which loss of each member can destroy the network functionality [1]. Amyotrophic Lateral Sclerosis (ALS) is a devastating neurodegenerative disorder in which upper and lower motor neuron are affected and patient will die within five years after diagnosis [2]. Up to know several genes identified as causative genes for familial forms of ALS. However, several pathways including RNA metabolism, protein synthesis and intracellular trafficking and others have been implicated in pathology of ALS, the main molecular mechanism is still elusive [3,4]. In the following study, we reconstruct a protein network based on the already known ALS causing gene and their binding partners in order to identify important networks and nodes in ALS disorder. During these operations, factors such as degree of centrality, betweenness and closeness, are considered as node's important indicators [5,6,7]. Finally the important nodes will be determined based on the centrality and TOPSIS method. At the end, our result will be compared with other available network with a direct role in neurodegeneration.

**Keywords:** ALS; TOPSIS method; Centrality; Node's Importance; Complex Network's.

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