

IIT-H researchers identify molecule to treat ALS

Drug 'AIM4' will help arrest the disorder of the nervous system

M SOMASEKHAR

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A drug molecule that promises to help in the treatment of Amyotrophic Lateral Sclerosis (ALS), a rare disease of the nervous system, has been identified by researchers at the Indian Institute of Technology Hyderabad (IIT-H).

With no known drugs to treat ALS, which is a debilitating neurodegenerative disease, the molecule code named 'AIM4' raises expectations. Treatment options are limited to two drugs available for management of the condition. Globally, the condition is also known as 'Lou Gehrig's disease.'

In India, the incidence is less than a lakh. The disease severely affects voluntary movement of muscles and can lead to paralysis and death. It occurs due to



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changes in specific genes, which may be triggered by factors such as smoking, exposure to toxins, metals and pesticides.

Research is ongoing throughout the world to find more effective drugs that can arrest this disorder, and not merely manage the symptoms. Such research must first identify the causes for the onset of ALS, said the IITH team, led by Basant Kumar Patel, Sandeep Singh and Rajakumara Eerappa, faculty, from the Department of Biotechnology, and Ganesan Prabushankar, Department of

Chemistry, and their seven research scholars. They have published their findings in the *International Journal of Biological Macromolecules*.

Basant Kumar Patel said, "One of the causes of ALS is the alterations in the genes that code for a critical protein called TDP-43. The gene alteration modifies the protein, which results in its liquid-liquid phase separation. This phase separation, in turn, causes the proteins to be deposited on nerve cells, resulting in neurodegeneration."

In 2016, Patel and Prabush-

ankar found a small molecule called 'AIM4,' which seemed to be better than the other related molecules studied all around the world in its ability to inhibit abnormal aggregation of TDP-43 in vitro ALS disease model systems.

A promising drug

The research team has also found, through computational studies, that AIM4 has specific binding site on this protein and binding energy calculations have shown that the bond between AIM4 and the mutant protein is energetically favourable, which makes it a promising drug for potential treatment of ALS.

"This work is an important step forward in the area of therapeutics of the neurodegenerative disease ALS as current options for ALS are minimal or even non-existent", says Patel. However, there is need for further work to develop drugs for ALS and perhaps even other neurodegenerative disease, feel the researchers.