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CHANDIGARH › Scientists at Mohali institute discover molecular mechanisms that can help develop therapies for neurogenetic disorders

Scientists at Mohali institute discov… mechanisms that can help develop t… neurogenetic disorders

Neurogenetic disorders are conditions caused by changes in genes and chromosomes, which affect the brain, spinal cord, nerves and muscles

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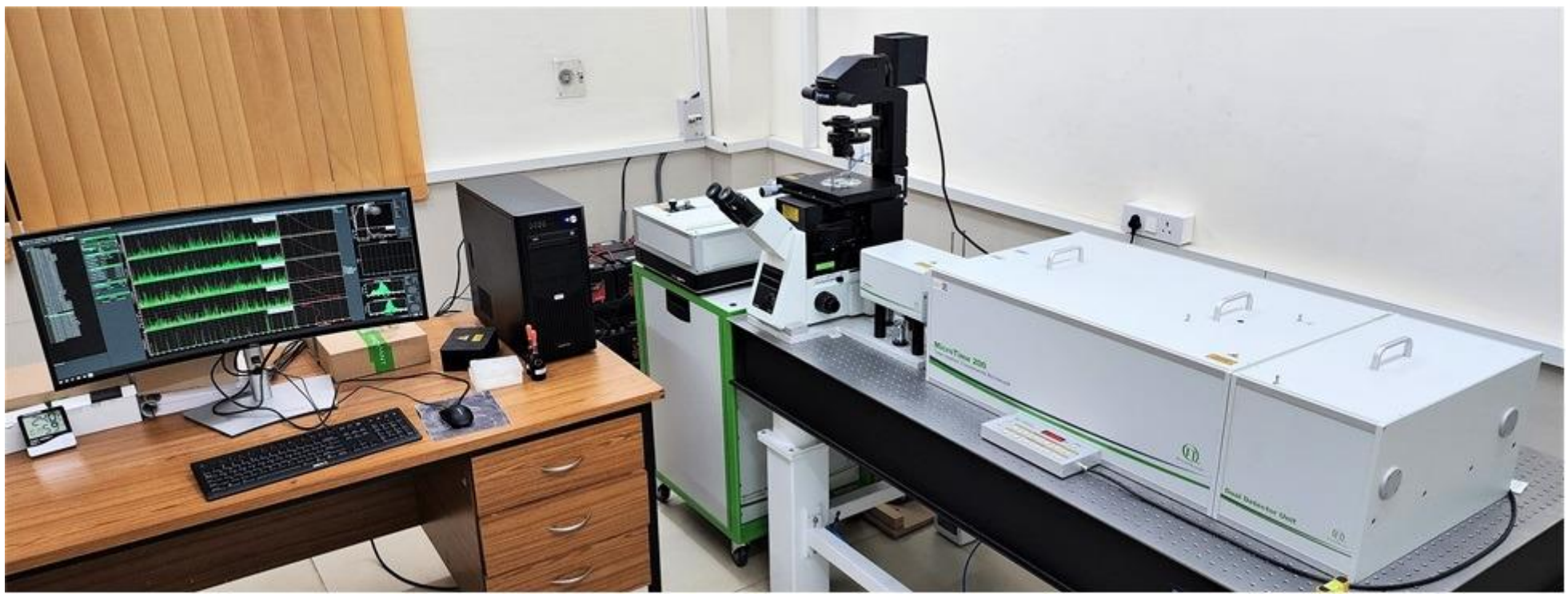
Updated At: Jan 06, 2024 04:24 PM (IST)



“Scientists have unravelled the molecular mechanism of protein phase transitions associated with physiological functions and diseases, which can potentially help the design of therapeutic agents that can prevent pathological phase transitions responsible for fatal neurological diseases,” a statement issued by the Ministry of Science and Technology read. Photos: https://dst.gov.in

Tribune News Service
Vijay Mohan

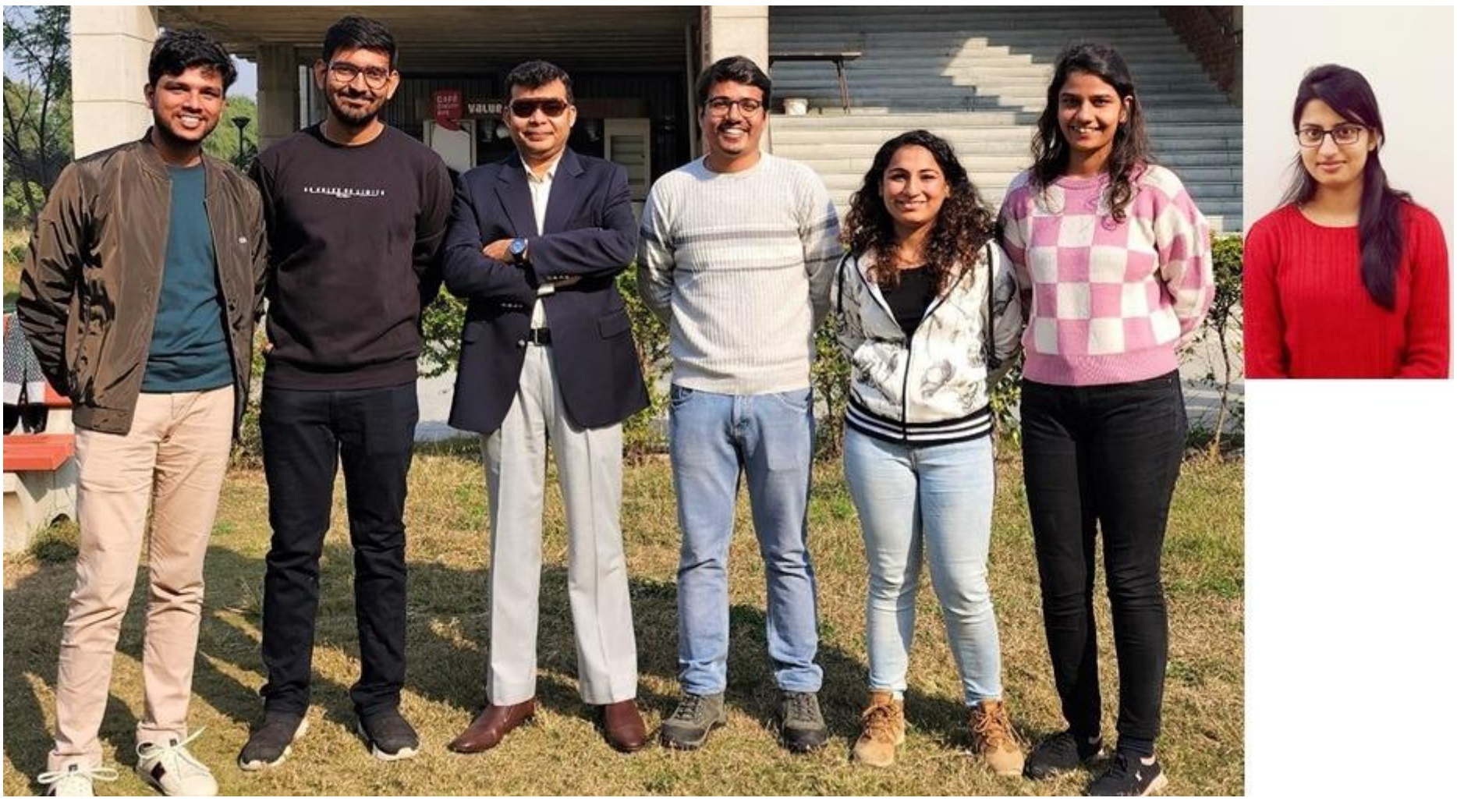
Chandigarh, January 6

Discovery of molecular mechanisms associated with physiological functions and diseases by Indian scientists can lead to the development of therapies for the management of neurogenetic disorders.

Neurogenetic disorders, according to medical literature, are conditions caused by changes in genes and chromosomes, which affect the brain, spinal cord, nerves and muscles. These can create health problems at birth or later in childhood.

“Scientists have unravelled the molecular mechanism of protein phase transitions associated with physiological functions and diseases, which can potentially help the design of therapeutic agents that can prevent pathological phase transitions responsible for fatal neurological diseases,” a statement issued by the Ministry of Science and Technology read.

Scientists at the Indian Institute of Science Education and Research (IISER), Mohali, used a technique called ‘single-droplet single-molecule förster resonance energy transfer’ to study the inner workings of liquid-like condensates that are formed through weak and transient, but stereospecific intermolecular interactions, which led to some crucial discoveries.



According to the researchers, highly regulated intracellular phase separation of protein controls the formation of membrane-less biomolecular condensates that are required for cellular functions. This process, if unregulated, can result in aberrant protein phase transitions into pathological aggregates that are the hallmarks of fatal neurodegenerative diseases like amyotrophic lateral sclerosis and alzheimer’s.

They found that the structural unwinding exposes the multivalency of polypeptide chains that promotes the transient interactions between flexible protein molecules resulting in biomolecular condensate formation.

Additionally, a disease-related mutation introduces enhanced structural plasticity, engendering greater interchain interactions that can promote liquid-to-solid transitions and accelerate pathological aggregation.

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The study published in Nature Communications, provided crucial molecular insights that can help the design of small molecules which can potentially alter the protein phase behaviour, leading to a potent therapeutic strategy

#Mohali

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