Muscular dystrophy, a genetic disease where muscles get progressively weakened and wasted, has so far defied any kind of treatment or cure even as research is taking place across the globe.

Skeletal muscles constitute 40% of our body, and face constant wear and tear due to continuous movement and injury. Yet, we do not notice that because of a self-healing mechanism of muscle regeneration.

Now, scientists of the Council of Scientific and Industrial Research (CSIR)’s Centre for Cellular and Molecular Biology (CCMB) here have traced out a path among mice on how cells function in a muscle when it gets activated, lies dormant and gets activated again leading to regeneration of stem cells during normal growth process.

Healthy cells usually go through this routine. However, muscles afflicted with dystrophy undergo mutation, where the cells instead of lying dormant after an activation phase which helps in regeneration of stem cells, continue to be in the active mode leading to degeneration and death, explained Jyotsna Dhawan and her fellow student-researcher Ajoy Aloysius on Wednesday.

“We are trying to understand the basic concept. This is just a phase in the entire cycle of muscle functioning. We need to test this hypothesis on mice with muscular dystrophy and human trials are a long way off. But this discovered path helps us understand why muscles continue to remain active continuously rather than maintain the active-dormant phases periodically leading to regeneration,” they said.

Their effort has been published in the latest issue of *Science Signaling* journal on July 24. The study which traces the path of ‘Smad3 & Left’ proteins involved in switching genes on and off required to sustain ability of stem cells to self-renew, is also part of the collaboration between Dr. Dhawan’s lab and Ramanuj Das Gupta at the Genome Institute of Singapore.

CCMB Director Rakesh Mishra said it was a key milestone in basic research and would have tremendous impact on medical field. So, if a drug can be developed to make sure cells go into sleep mode to get them ready for regeneration, it could help in specialised treatment.