Protein found in Zebrafish can regenerate aged discs in human vertebrae

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In news– Pune scientists have found that a protein in zebrafish which helps in disc maintenance and promotes regeneration in aged discs between vertebrae can have potential therapeutic implications for degenerated human discs.

About the protein-

- The proteinplays a **positive role in disc maintenance and promotes regeneration in aged discs between vertebrae** can have potential therapeutic implications to promote regeneration in degenerated human discs.
- **In humans, discs degenerate naturally, leading to many related health concerns,** including low back, neck, and appendage pain.
- **Currently, only symptomatic treatments for disc degeneration are available, i**ncluding pain relievers or anti-inflammatories. In severe cases, disc replacement or disc fusion surgery is performed.
- Thus, there is an urgent need to develop a treatment either to suppress disc degeneration or to promote disc regeneration in humans.
- Medical examinations have given insights into the stages of degenerating human discs, but limited information is available about the cellular and molecular processes playing a role in the maintenance of the discs.
- Most importantly, **no medical procedures or treatments have been known to suppress disc degeneration or induce disc regeneration.**
- **A study by Agharkar Research Institute (ARI), Pune**, an

autonomous institute of the Department of Science and Technology, **discovered that a protein called Cellular communication network factor 2a (Ccn2a) secreted from intervertebral disc cells induces disc regeneration in aged degenerated discs** by promoting cell proliferation and cell survival by modulating the pathway called the FGFR1-SHH (Fibroblast growth factor receptor-Sonic Hedgehog) pathway.

- **The study which used Zebrafish as a model organism is the first in vivo study showing that it is possible to induce disc regeneration** in a degenerated disc by activating an endogenous signaling cascade.
- The scientists also found that the Ccn2a-FGFR1-SHH signaling cascade takes a positive role in disc maintenance and augmenting disc regeneration.
- The study used genetic and biochemical approaches and is likely to help design a novel strategy to suppress disc degeneration or induce disc regeneration in degenerated human discs.