Nano Drug Brings New Treatment Possibilities to Pulmonary Fibrosis

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A single-injection medicine could be used to target a particular cell type, tissue, or organ to cure disease more successfully and without creating undesirable side effects.

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Researchers at the Masonic Medical Research Institute have made a significant advancement in the treatment of pulmonary fibrosis—a progressive, incurable condition that causes the lungs to stiffen through scarring—by using nanoparticles that are materials with diameter thousands of times smaller than the diameter of a human hair.

> *While these findings do not yet necessarily cure this disease outright, it shows we have the potential to dramatically impact and improve the quality of life for those affected.*
>
> *Jason R. McCarthy, Ph.D., Study Senior Investigator and Associate Professor and Science Operations Director, Masonic Medical Research Institute*

In 2015, Dr. McCarthy started this study alongside 15 other team members, including researchers from the MMRI, Massachusetts General Hospital, and Harvard Medical School. The *American Journal of Physiology-Lung Cellular and Molecular Physiology* published its findings earlier this year.

To effectively administer a drug that inhibits the progression of the disease, the researchers concentrated on developing nanoparticles that can target lung fibroblasts, the cell type responsible for scarring.

Dr. McCarthy added, "*The idea behind the study was not to find a novel therapeutic, per se, but to look at whether delivering effective known drugs to specific cells in the lung can have a more potent therapeutic effect. What we showed is that it is indeed possible to target a drug to diseased cells to interrupt the process of cell death and scarring.*"

Dr. McCarthy and his team are presently examining if this approach could be advantageous to other lung cell types as well, clarifying how they operate, or malfunction, in the process of idiopathic pulmonary fibrosis.

They are now extending their research to look at how this tactic could be used in other organ systems, such as the heart and liver, in addition to the lung.

Journal Reference:

Knipe, R. S., *et al.* (2023) Myofibroblast-Specific Inhibition of the Rho Kinase-MRTF-SRF Pathway Using Nanotechnology for the Prevention of Pulmonary Fibrosis. *American Journal of Physiology-Lung Cellular and Molecular Physiology*. doi:10.1152/ajplung.00086.2022.