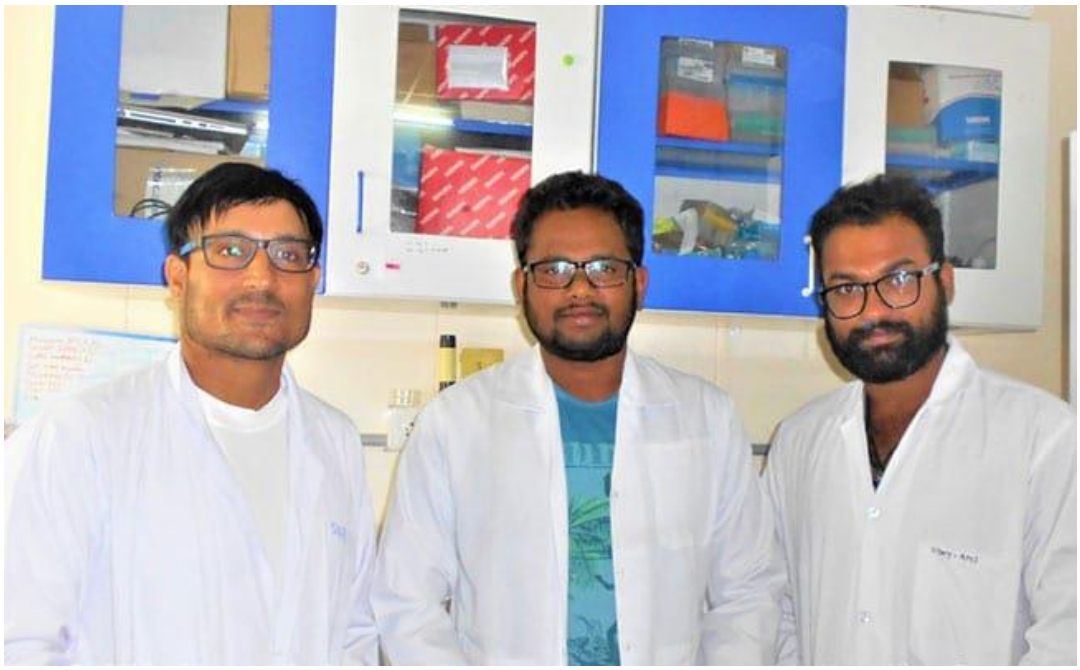
IIT Hyderabad Researchers Develop Collagen From Waste Eel Skin

Indian Institute of Technology (IIT) Hyderabad Researchers have derived collagen from waste eel skin.

NEW DELHI: Indian Institute of Technology (IIT) Hyderabad Researchers have derived collagen from waste eel skin and shown that tissue scaffolds built using such collagen allow growth and proliferation of stem cells. The practical applications of this research can lead to utilizing eel fish skin-derived collagen as a promising alternative to animal derived collagen, which are expensive and are associated with pathological diseases.

The Researchers believe that sustainable utilization of marine discarded eel skin derived-collagen for the biomedical application would boost Indian 'blue' bioeconomic growth and help in the development of an alternate industry that converts waste into useful products.

The Research, funded by Department of Science and Technology-Science and Engineering Research Board (DST-SERB), Government of India through the National Postdoctoral Fellowship Scheme (N-PDF) was led by Dr. Mano Govindharaj, Young Scientist Fellow and Dr. Subha Narayan Rath, Associate Professor, Department of Biomedical Engineering, IIT Hyderabad and included Research Scholar Mr. Uday Kiran Roopavath. The team's research has been published recently in the reputed peer-reviewed Journal of Cleaner Production.



(From Left to Right: Dr.Subha Narayan Rath, Associate Professor, Department of Biomedical Engineering, IIT Hyderabad, Dr. Mano Govindharaj, Young Scientist, Department of Biomedical Engineering, IIT Hyderabad, and Mr. Uday Kiran Roopavath, PhD Research Scholar, IIT Hyderabad)

Explaining this research and its significance, Dr. Mano Govindharaj, Young Scientist Fellow, Regenerative Medicine and Stem Cell Laboratory, IIT Hyderabad, said, "Our team's finding is

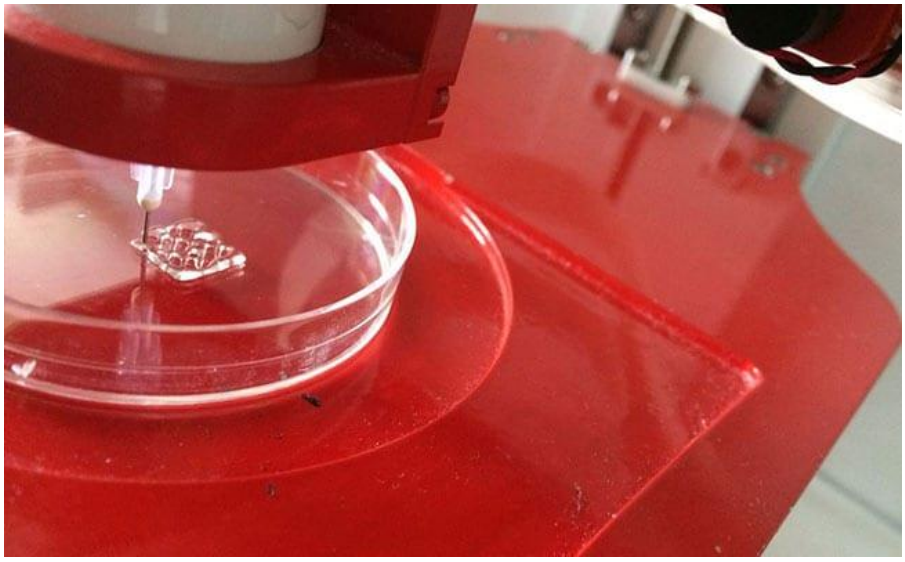
a valuable asset in the area of 'blue' biotechnology. The color 'blue' in biotechnology is assigned to the development of technology on the basis of aquaculture, coastal and marine biology. Our research group at IIT Hyderabad uses a common marine waste product for producing collagen, a biomaterial that is extensively used in tissue engineering."

Low immunogenicity, porous structure, good permeability, biocompatibility and biodegradability make collagen scaffolds useful in tissue engineering applications.

Collagen is usually extracted from bovine skin and tendons, porcine skin and rat tail. Such sources are associated with several problems such as the spread of diseases such as the mad-cow disease and religious constraints of using certain animals. Extraction of collagen from non-mammalian sources is therefore attractive.

Speaking about the advantages gained from this research, Dr. Subha Narayan Rath said, "We have explored the valorization of commoditized discarded marine Eel skin to develop value added collagen-based blue biomaterials. The advantages of this extraction process are twofold. Not only does it serve to provide a sustainable and safe source for collagen but also helps in waste management. Eel skin and fish skin wastes are commonly discarded in coastal areas, or even disposed of in the sea, which leads to a cascade of events due to breakdown of organic matter and reduction of oxygen levels in sea water."

The research team derived collagen from eel skin by treating it with acetic acid, common salt and pepsin. The researchers then combined the collagen with alginate hydrogel and used a 3D printing process to obtain scaffolds.



3D printing of eel skin collagen scaffold by IIT Hyderabad researchers

When the scaffolds were tested for stem cell growth and proliferation, the researchers found that the 3D printed collagen scaffolds allowed extensive growth of stem cells, thus making eel-skin derived collagen a promising material for tissue engineering applications.

Source: NDTV
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