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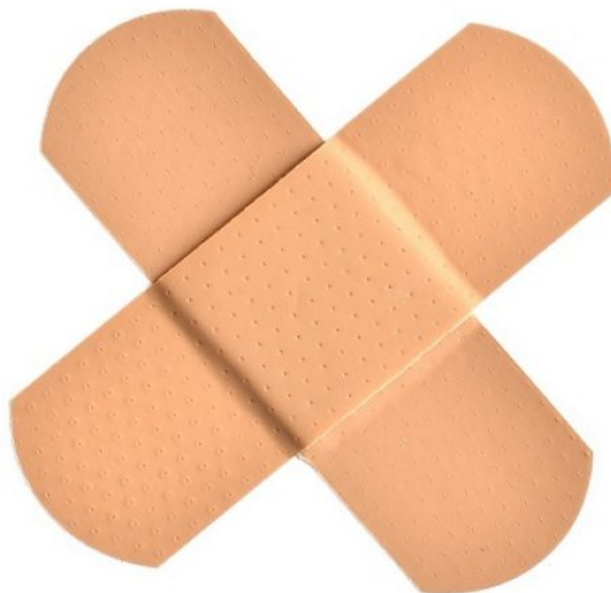
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In the Lab

By Asian Scientist Newsroom

Wound Healing On A Different Scale

A research group in Singapore has developed a method to use waste fish scales as a source of collagen for wound healing.



AsianScientist (Mar. 16, 2018) – Scientists from Nanyang Technological University, Singapore (NTU Singapore) have derived collagen from fish scales for use in various biomedical applications such as wound healing. They published their findings in *Acta Biomaterialia*.

According to the 2016 State of World Fisheries and Aquaculture report published by the United Nations' Food and Agriculture Organisation, aquaculture production is expected to reach 102 million tonnes by 2025. As a result, a considerable amount of aquaculture waste, such as fish scales, is produced yearly.

In this study, researchers led by Assistant Professor Cleo Choong and Associate Professor Andrew Tan, in collaboration with Associate Professor Véronique Angeli from the National University of Singapore, have obtained collagen from fish scales for wound healing applications.

Collagen itself is not only a promoter of wound healing, but it also can be used as a carrier of drugs that can enhance wound healing, such as growth factors. However, in its natural, unmodified form, collagen becomes soluble only in acidic conditions, which damage the drugs.

Using chemical modification, the NTU scientists were able to create water-soluble collagen from the fish scales, opening up the possibility that this collagen could incorporate drugs and be successfully used to fabricate wound dressings with superior healing potential. They showed that collagen improved the formation of blood and lymphatic vessels in the wounds of mice, thereby accelerating healing.

About 200 milligrams of collagen can be derived from 10 grams of fish scales—the amount that can be obtained from one or two fish. There is little cost in getting the fish scales since they are usually discarded, as compared to sources such as cowhide which have a wide range of other uses. Excluding labor costs, the materials used to extract 100 mg of collagen from fish scales in the lab is just over S\$4 (US\$3).

The research team partnered a local Singaporean fish farm that supplied the team with fish scales from sea bass, snakehead and tilapia. It is in talks with a few local fisheries to explore ways of converting aquaculture waste material into useful materials, as well as to scale-up the collagen extraction process for effective waste-to-resource management.

“Currently, collagen is widely used for various biomedical applications. However, most of the commercially available collagen-based products are from mammalian animal sources such as pigs, cows and sheep,” Choong explained, adding that as a result, cultural and religious concerns limit the widespread use of such products.

Mammalian animal sources of collagen are also subject to more stringent regulatory approval as there is a higher risk of disease transmission to humans. The use of collagen derived from fish scales reduces this risk.

“Collagen is commonly used for wound dressing material due to its favourable biological properties. Applying collagen dressings to a wound to stimulate tissue growth can provide relief for a wide variety of injuries. Collagen dressings come in all shapes and sizes—gels, pastes, powders and pads. It can potentially treat wounds of all dimensions,” said Tan.

The article can be found at: [Wang et al. \(2017\) Fish Scale-derived Collagen Patch Promotes Growth of Blood and Lymphatic Vessels *In Vivo*..](#)

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Source: [Nanyang Technological University, Singapore](#); Photo: Pixabay.

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