

Fish gelatin: Ultra-high-tech biomedical uses ahead?

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Natural gelatin, extracted from the shiny skin of a seagoing fish called Alaskan pollock, may someday be put to intriguing new biomedical uses. US Department of Agriculture (USDA) chemist Bor-Sen Chiou is developing strong yet pliable sheets, known as films or membranes, that might be made from a blend of gelatin from the fish skins and a bioplastic called polylactic acid or PLA that's produced from fermented corn sugar.

The fish- and corn-derived films might be suitable for use commercially in tissue-engineering laboratories that would produce semi-synthetic tissue for repair of injured bone or cartilage, for example. That might speed patients' recovery times, given that damaged bone and cartilage are often slow to form tissue needed for self-repair.

Chiou is testing the experimental films in his laboratory at the Agricultural Research Service (ARS) Western Regional Research Center in Albany, Calif. ARS is the USDA's chief intramural scientific research agency.

At the Albany center, Chiou and colleagues use an ultra-high-tech process known as "electrospinning" to literally spin together the fish gelatin and the polylactic acid to form slender, submicroscopic fibers. When amassed, these nanofibers form sheets of a milky white film or membrane.

In tomorrow's tissue-engineering labs, the films could be "seeded" with

cultures of human cells. The nanofibers would provide the infinitesimally small scaffolding or support matrices upon which the cells could replicate. Later, the tissue resulting from the replicating [cells](#) could be used as transplants.

The fish-and-PLA membranes are not expected to pose problems such as allergic reactions. Some surgically implanted medical devices already in use today are made of PLA, or contain components made of PLA.

Chiou and his colleagues—chemist Roberto Avena-Bustillos and technicians Haani Jafri and Tina Williams—may be the first to use a blend of fish gelatin and corn-derived plastic to make next-generation nanofibers. They are collaborating in the research with food technologists Peter J. Bechtel and Cynthia K. Bower of the ARS Subarctic Agricultural Research Unit in Kodiak, Alaska, in seeking new uses for fish skins and other leftovers from Alaska's fish-processing plants.

Provided by United States Department of Agriculture

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