



Tobacco that heals

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Meeting a major unmet medical need, Israel's CollPlant uses tobacco plants to produce collagen that can be safely used by surgeons for tissue repair.



Tobacco plants could be used to produce genetically-engineered human collagen

By John Bernard

In a greenhouse in northern Israel, a company is growing tobacco plants yielding a surprising product that is vastly different from cigarettes. These plants produce genetically-engineered human collagen, a protein vital for tissue repair that is used by surgeons to fill bone voids in cancer patients, fix heart valves and heal severe wounds.

The genetic engineering technology that allows the tobacco plants to generate the collagen was developed by CollPlant (<http://www.collplant.com/>), based in Rehovot in central Israel.

This novel use of the tobacco plant answers a major unmet medical need.

A scientific achievement with commercial potential

"Collagen is used in about a thousand important medical products, but until now manufacturers have had to derive it from pigs, cows or human corpses," says CollPlant CEO Yehiel Tal, noting that the US Food and Drug Administration (FDA) and other international health regulatory agencies

have expressed serious safety concerns with respect to the use of both animal and human corpse tissues.

CollPlant's plant-derived collagen poses no safety risks and can be considered a green technology, eliminating the industrial waste and ecological damage associated with the raising of livestock. In addition, the company is providing tobacco farmers with a healthier and more lucrative use for their crops.

"The leaves of a single tobacco plant can yield about 100 grams of tobacco (for cigarettes) or about a gram of genetically-engineered human collagen," says Prof. Oded Shoseyov, CollPlant's co-founder and the inventor of the technology. "And from a single gram of collagen it is possible to produce, for example, about three injections of highly-valuable wound healing gel for patients suffering from diabetic ulcers."

In developing CollPlant's innovative technology, Shoseyov had to overcome a formidable scientific challenge. "Most proteins in the body are the result of a single gene but there are five different genes responsible for the production of collagen."

Shoseyov's success in transferring all five genes into a transgenic plant that could produce collagen was acknowledged earlier this year when he was awarded the prestigious Hebrew University Kaye Innovation Award for "scientific excellence with commercial potential."

Good news from the FDA

CollPlant is well on the way to leveraging the commercial potential of Shoseyov's invention. The company has begun to market collagen as a raw material to Japanese manufacturers and in August received good news from the FDA about its first product.

"The FDA informed us that they have agreed to classify our Vergenix wound dressing as a medical device, rather than as a drug or biologic product," says Tal. "This is a breakthrough because the medical device regulatory review process is much simpler and quicker than that used for products defined as drugs or biologics."

Vergenix is just the first of several regenerative tissue

products in the CollPlant pipeline that target the multi-billion dollar wound management market. These products include gel formulations for deep-tunneled wounds associated with diabetic ulcers, as well as wound dressings for acute and chronic wounds.

Other CollPlant products will attempt to meet the growing demand for collagen-based orthopedic products. In the US alone, each year there are about 800,000 ligament and tendon repair procedures, 400,000 shoulder operations and more than 500,000 bone graft procedures, all of which require collagen.

CollPlant has received strong support from leading investors since its inception. Investment funds headed by two prominent healthcare industrialists, former Teva Pharmaceuticals CEO Eli Hurvitz and Perrigo founder Mory Arkin, were among the founding investors. Earlier this year the company began to trade publicly on the Tel Aviv Stock Exchange.

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