Collagen manufactured from transgenic tobacco plants

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A scientist at the Hebrew University of Jerusalem's Robert H. Smith Faculty of Agriculture, Food and Environment has succeeded in producing a replica of human collagen from tobacco plants - an achievement with tremendous commercial implications for use in a variety of human medical procedures.

Natural human type I collagen is the most abundant protein in the human body and is the main protein found in all connective tissue. Commercially produced collagen (pro-collagen) is used in surgical implants and many wound healing devices in regenerative medicine. The current market for collagen-based medical devices in orthopedics and wound healing exceeds US $30 billion annually worldwide.

Currently, commercial collagen is produced from farm animals such as cows and pigs as well as from human cadavers. These materials are prone to harbor human pathogens such as viruses or prions (mad-cow disease). Human cadaver is scarce, and for certain indications possesses serious ethical issues.

Producing human recombinant type I pro-collagen requires the coordinated expression of five different genes. Prof. Oded Shoseyov of the Robert H. Smith Institute of Plant Sciences and Genetics in Agriculture has established the only laboratory in the world that has reported successful co-expression all the five essential genes in transgenic tobacco plants for the production of processed pro-collagen. For this work, Shoseyov was one of the recipients of a Kaye Innovation

Award during the Hebrew University Board of Governors meeting in June.

Shoseyov's invention on has been patented, and the scientific findings behind it were published recently in the journal *Biomacromolecules*. A company, CollPlant Ltd., has been established based on patents and technology that were developed in Shoseyov's laboratory. It has raised US$15 million to establish the first commercial molecular farming company in Israel and is already manufacturing collagen-based products that have attracted collaborative commercial interest from companies in the US, Japan Europe and Israel.

Yissum, the technology transfer company of the Hebrew University, is one of the shareholders of CollPlant.. CollPlant is a public company traded in "TASE", and the potential revenue for the Hebrew University from this invention is estimated to reach into the multi-million dollar range.

The Kaye Awards have been given annually since 1994. Isaac Kaye of England, a prominent industrialist in the pharmaceutical industry, established the awards to encourage faculty, staff, and students of the Hebrew University to develop innovative methods and inventions with good commercial potential which will benefit the university and society.

Provided by Hebrew University of Jerusalem