

Tobacco makes medicine

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Tobacco isn't famous for its health benefits. But now scientists have succeeded in using genetically modified tobacco plants to produce medicines for several autoimmune and inflammatory diseases, including diabetes. The research is published in the open access journal *BMC Biotechnology*.

A large team of scientists from several European research organizations have participated in the study as part of the Pharma-Planta project (<http://www.pharma-planta.org/>). Led by Professor Mario Pezzotti at the University of Verona, they set out to create transgenic [tobacco plants](#) that would produce biologically-active interleukin-10 (IL-10), a potent anti-inflammatory [cytokine](#). They tried two different versions of IL-10 (one from a virus, one from the mouse) and generated plants in which this protein was targeted to three different compartments within the cell, to see which would work most effectively.

The researchers found that tobacco plants were able to process both forms of IL-10 correctly, producing the active cytokine at high enough levels that it might be possible to use tobacco leaves without lengthy extraction and purification processes. The next step will be to feed the plants to mice with autoimmune diseases to find out how effective they are.

The authors are keen to use the plants to see whether repeated small doses could help prevent [type 1 diabetes](#) mellitus (T1DM), in combination with other auto-antigens associated with the disease. The team has a particular auto-antigen in its sights - the 65-kDa [isoform](#) of

the enzyme [glutamic acid decarboxylase](#) (GAD65) - which they have also produced in transgenic tobacco plants.

According to Pezzotti, "[Transgenic plants](#) are attractive systems for the production of therapeutic proteins because they offer the possibility of large scale production at low cost, and they have low maintenance requirements. The fact that they can be eaten, which delivers the drug where it is needed, thus avoiding lengthy purification procedures, is another plus compared with traditional drug synthesis."

More information: Viral and murine interleukin-10 are correctly processed and retain their biological activity when produced in tobacco, Luisa Bortesi, Marzia Rossato, Flora Schuster, Nicole Raven, Johannes Stadlmann, Linda Avesani, Alberto Falorni, Flavia Bazzoni, Ralph Bock, Stefan Schillberg and Mario Pezzotti; BMC Biotechnology (in press), www.biomedcentral.com/bmcbiotechnol/

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