Synthetic collagen from maize has human properties

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Synthetic collagen has a wide range of applications in reconstructive and cosmetic surgery and in the food industry. For proper function in animals a certain number of prolines within the protein need to be hydroxylated. BioMed Central's open access journal *BMC Biotechnology* reports that for the first time the α1 chain of type 1 collagen has been produced in maize with similar levels of proline hydroxylation to human collagen.

Most collagen used is derived from animals but there are risks associated with this collagen containing infectious agents or being rejected by the body. To avoid this problem several laboratory–based systems have been developed using plants to produce collagen. Plant-derived recombinant proteins should have lower contamination and fewer infectious agents, but these systems are unable to make modifications to the protein essential for proper function in human cells.

Working in collaboration with industrial partners researchers added a gene, which codes for the α1 chain of human CI (hCI α1), to maize along with genes which make human prolyl 4-hydroxylase. This second protein was able to hydroxylate approximately the same percentage of prolines in the recombinant collagen α1 chain, produced in maize, as seen for human collagen made in human cells.

Dr Kan Wang from Iowa State University said, "Producing human collagen in maize seeds is an inexpensive alternative to using animal-derived collagen. The seeds are easy to grow, process, and store. Our

transgenic plant system is also able to produce a protein with human-like modifications making it a better choice for a wide range of applications."

More information: Hydroxylation of recombinant human collagen type I alpha 1 in transgenic maize co-expressed with a recombinant human prolyl 4-hydroxylase, Xing Xu, Qinglei Gan, Richard C Clough, Kamesh M Pappu, John A Howard, Julio A Baez and Kan Wang, *BMC Biotechnology* (in press)

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