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## Transgenic Expression of Bean $\alpha$ -Amylase Inhibitor in Peas Results in Altered Structure and Immunogenicity

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### Abstract:

The development of modern gene technologies allows for the expression of recombinant proteins in non-native hosts. Diversity in translational and post-translational modification pathways between species could potentially lead to discrete changes in the molecular architecture of the expressed protein and subsequent cellular function and antigenicity. Here, we show that transgenic expression of a plant protein ( $\alpha$ -amylase inhibitor-1 from the common bean (*Phaseolus vulgaris* L. cv. Tendergreen)) in a non-native host (transgenic pea (*Pisum sativum* L.)) led to the synthesis of a structurally modified form of this inhibitor. Employing models of inflammation, we demonstrated in mice that consumption of the modified  $\alpha$ AI and not the native form predisposed to antigen-specific CD4<sup>+</sup> Th<sub>2</sub>-type inflammation. Furthermore, consumption of the modified  $\alpha$ AI concurrently with other heterogeneous proteins promoted immunological cross priming, which then elicited specific

immunoreactivity of these proteins. Thus, transgenic expression of non-native proteins in plants may lead to the synthesis of structural variants possessing altered immunogenicity.

Keywords:  $\alpha$ -Amylase inhibitor; transgenic plant; animal model; Th2 inflammation; mass spectrophotometry