MedicalXpress

Can tomatoes carry the cure for Alzheimer's?

July 8 2008

The humble tomato could be a suitable carrier for an oral vaccine against Alzheimer's disease, according to HyunSoon Kim from the Korea Research Institute of Bioscience and Biotechnology (KRIBB) in Korea and colleagues from Digital Biotech Inc. and the Department of Biological Science at Wonkwang University.

Although their research, just published online in Springer's journal *Biotechnology Letters*, is still in the early stages, it is a promising first step towards finding an edible vaccine against the neurodegenerative disease.

Alzheimer's disease is the most common cause of dementia and it progresses over a long period of time. It is thought to be caused by the accumulation of human beta-amyloid, a toxic insoluble fibrous protein in the brain, which leads to the death of neurons. Reducing the accumulation of beta-amyloid may inhibit the degeneration of the nervous system and therefore prevent or delay the onset of Alzheimer's disease. One approach is to stimulate the immune system to reduce beta-amyloid in the brain.

Kim and colleagues' aim was to develop a plant-derived vaccine against Alzheimer's disease, since beta-amyloid is toxic to animal cells. Tomatoes are an attractive candidate as a vaccine carrier because they can be eaten without heat treatment, which reduces the risk of destroying the immune stimulation potential of the foreign protein. The researchers inserted the beta-amyloid gene into the tomato genome and measured the immune responses to the tomato-derived toxic protein in a group of 15-month-old mice.

They immunized the mice orally with the transgenic tomato plants once a week for three weeks, and also gave the mice a booster seven weeks after the first tomato feed. Blood analyses showed a strong immune response after the booster, with the production of antibodies to the human foreign protein.

The authors conclude: "Although we did not reveal a reduction of existing plaques in the brain of mice challenged with tomato-derived beta-amyloid…this study represents a unique approach in which transgenic plants expressing beta-amyloid protein are used to produce a vaccine." The team is currently looking at strategies to increase the potency of the tomato-based vaccine, because fresh tomatoes contain only 0.7% protein and levels of foreign protein are even lower.

Source: Springer