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Developing highly functional lettuce producing enriched flavonols and xanthophylls

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Biologically active phytochemicals such as isoprenoids, phenols, amino acid derivatives and nod-starch polysaccharides have been actively studied as many epidemiological investigations have revealed that the occurrence of various cancers has correlation with the intake of vegetables. Antioxidants belonging to polyphenols and carotenoids as well as Vitamins C and E are very useful in removing reactive oxygen species. We have cloned beta-carotene hydroxylase which produce xanthophylls from beta-carotene. In order to examine the effects of xanthophylls on the antioxidant activities and resistance to various stresses, the overexpressing construct of beta-carotene hydroxylase was introduced into *Arabidopsis* and lettuce. By using a PCR approach, our group also cloned a gene encoding flavonol synthase which produces quercetin and kaempferol, well-characterized anti-inflammatory compound. This gene is being expressed into *E. coli* and then its product will be used for enzyme assay. Lettuce is being transformed with the flavonol synthase gene in order to produce high levels of flavonols, so that the transformants can be resistant to various stresses. The transformed lettuce will be examined if they have higher amount of flavonols and hence the higher anti-inflammatory activity.

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