

No more sneezing, allergen free house plants

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Pelargoniums (Geraniums and Storkbills) have been cultivated in Europe since the 17th century and are now one of the most popular garden and house plants around the world. Credit: Luis A. Cañas

New research published in BioMed Central's open access journal *BMC Plant Biology* shows how targeting two bacterial genes into an ornamental plant (*Pelargonium*), can produce long-lived and pollen-free plants.

Pelargoniums ('Geraniums' and 'Storkbills') have been cultivated in Europe since the 17th century and are now one of the most popular garden and house plants around the world. They have been selectively bred to produce a wide range of leaf shapes, flowers and scents, and have commercial traits such as early and continuous flowering, pest and

[disease resistance](#) and consistent quality.

In a collaborative project, researchers from the Instituto de Biología Molecular y Celular de Plantas (IBMCP) and BIOMIVA S.L. (Spain) modified [Agrobacterium tumefaciens](#) (the bacteria responsible for causing crown gall disease) to carry altered genes. One gene, encoding an enzyme *Isopentenyl phosphotransferase* (ipt) was designed to increase the amount of cytokinin (a [plant hormone](#)), and consequently prevent aging (senescence), and the second was engineered to selectively destroy pollen-producing anthers.

The modified DNA was injected into *Pelargonium zonale* cells by the bacteria, where it was subsequently integrated into the plant's genome. Individual plants were then grown from these transgenic cells. *P. zonale* plants carrying the modified genes were more compact with increased number of branches and leaves than normal. These plants also had small leaves and flowers, with more vibrant colours, and the extra cytokinin in the leaves meant that these plants lived longer than usual.

Dr Luis Cañas, one of the researchers from IBMCP explained, "The ipt enzyme catalyzes the rate-limiting step for cytokinin biosynthesis in plants and consequently extra ipt, provided transgenically, produces more cytokinin and prevents the plant cells from aging. In addition, the use of an anther-specific promoter from pea driving the expression of a [bacterial gene](#) (ribonuclease), prevents the development of male progenitor cells into anthers and pollen, resulting in pollen-free flowers."

The generation of long-life plants is good news for the gardener who wants a display of flowers for as long as possible and the lack of pollen not only is great for hay fever sufferers but also prevents accidental release of the transgenes into the environment. However the extra cytokinin does not protect against owners forgetting to water their plants.

More information: Production of engineered long-life and male sterile Pelargonium plants Begoña García-Sogo, Benito Pineda, Edelin M Roque, Teresa Antón, Alejandro Atarés, Marisé Borja, José P Beltrán, Vicente Moreno and Luis A Cañas BMC Plant Biology (Section: Genetics and crop biotechnology) (in press)

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