

## NEVERSHED: A Novel Gene for Extending the Lifetime of Flowers and Fruits

### INVENTION:

Researchers at Salk have identified NEVERSHED (NEV), a gene responsible for controlling abscission via mutation of ARF-GAP domains. In *Arabidopsis*, modulation of NEV results in inhibiting abscission of flowers and, to a lesser extent, of leaves. NEV has the potential of controlling abscission of commercially relevant crops. For example, it may be used to regulate abscission in cotton and prevent the shedding of cotton bolls until ready for harvest. Similarly, NEV may be used to inhibit abscission in corn, rice, wheat, and soybeans or to control shedding of fruits and vegetables like peaches or tomatoes. The process of abscission in plants affects many important physiological events in the various stages of plant growth. Thus, the ability to control abscission would be beneficial for many aspects of plant biology and crop science.

### APPLICATIONS:

- Food crops
- Floral crops
- Cotton

### ADVANTAGES:

- Increase crop yield
- Prevention of pre-harvest fruit drop
- Extends life of cut flowers and potted plants
- Allows fine-tuning of the timing of separation

**STAGE OF DEVELOPMENT:** Discovery in *Arabidopsis*

### BACKGROUND:

A distinctive feature of plants is their remarkable ability to release entire organs such as leaves, flowers, fruit and seeds by modifying cellular adhesion. Organ separation/abscission occurs by secretion of certain enzymes that locally alter cell walls and dissolve the pectin rich middle lamella between cells in an abscission zone. Genetic modification of particular genes in a plant can also result in modulation of organ separation. Plants can be designed to maintain structures (e.g., fruit, grains, vegetables, flowers etc.) for a longer period of time on the plant or, conversely, to selectively shed such structures earlier or at a pre-selected time. The ability to genetically manipulate abscission zone differentiation in agronomically important plants will provide valuable opportunities to improve crop yield and to simplify harvesting as well as applications in the floral industry.

**INVENTORS:** Drs. Joseph Ecker, Sarah Liljegren and Marty Yanofsky

**PATENT STATUS:** U.S. Patent 7,169,964

**PUBLICATIONS:** Liljegren, et al. 2009. Regulation of membrane trafficking and organ separation by the NEVERSHED ARF-GAP protein. *Development*, 136:1909-1918.

**CONTACT:** Melissa Rodgers; [mrodgers@salk.edu](mailto:mrodgers@salk.edu); (858) 453-4100 x1481

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