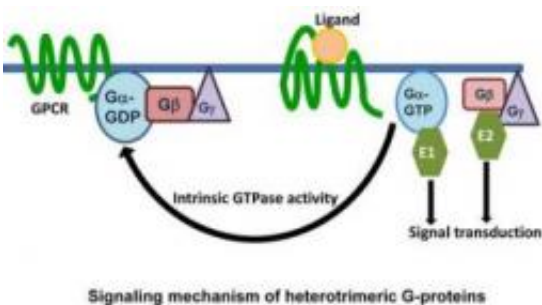


Discovery identifies elaborate G-protein network in plants

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An elaborate heterotrimeric G-protein family from soybean expands the diversity of G-protein networks. Credit: Donald Danforth Plant Science Center

The most elaborate heterotrimeric G-protein network known to date in the plant kingdom has been identified by Dr. Sona Pandey, principal investigator at the Danforth Plant Science Center. The results of this research are published in the recent article, "An elaborate heterotrimeric G-protein family from soybean expands the diversity of G-protein networks," in the *New Phytologist*.

G-proteins are signaling proteins that direct a plant's response to various environmental signals including abiotic and biotic stresses such as drought and [disease resistance](#). Prior to Dr. Pandey's discovery, it was assumed that [plants](#) had only one Ga protein based on previous research using *Arabidopsis* and rice, in contrast to 23 Ga proteins present in humans. Using [soybean](#), Dr. Pandey's group was able to identify four Ga

proteins. In addition, they demonstrated that two of these proteins can react faster than was previously assumed.

Mammals have many G-proteins. These proteins bind GTP (small molecules) and hydrolyze it to GDP. The G-proteins are active only when GTP bound. Binding is a key process because that is when the signaling can occur. Mammals' G-proteins are very quick to hydrolyze bound GTP and thus cycle fast between the GDP bound and GTP bound states. The sole Ga protein of the [model plant Arabidopsis](#) is very slow to hydrolyze bound GTP. In this research Dr. Pandey's group also demonstrated that soybean has two types of G-proteins, two that hydrolyze GTP slowly and two that work more quickly similar to those found in [mammals](#).

"The next step will be to try and engineer plants to express altered amounts of these G-proteins to see how they affect their overall growth and can enable them to better respond to stresses that may be involved in limiting crop yield," Pandey said.

Provided by Donald Danforth Plant Science Center

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