Study provides insight into how corn makes hormones

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It's a corn plant only a geneticist could love, but an MU researcher has found a way to help scientists love it.

Instead of the characteristic fan-like tassel that waves majestically atop the stalk, this corn plant sends up a cartoonishly skinny stick. Its ears -- if it makes them at all -- resemble small, chubby, lime-green caterpillars, not exactly something you want to dig your teeth into. To top it off, the corn plant stands only about three feet tall, at full maturity, and has few leaves.

"A farmer would say this corn plant looks terrible," said Paula McSteen, associate professor of biological sciences at MU and lead investigator of the study. "For me, the idea is that if the plant looks that terrible, the missing gene must control a really important process."

By using a positional cloning technique and molecular markers, McSteen and her colleagues were able to pinpoint the absent gene, which they named vanishing tassel2 or vt2. The gene encodes an enzyme, called tryptophan aminotransferase, important for making auxin, an important growth hormone in plants.

"We know that auxin is critical for determining where cell division and expansion are going to happen to make new organs," said McSteen. "Where auxin is made tells the plant where organs, such as ears, tassels, and leaves, are going to grow."

The researchers confirmed that the corn plants lacking the vt2 gene do produce low levels of the hormone.

The study is part of a larger effort by McSteen to understand the role auxin plays in organogenesis -- the formation of specific organs in plants -- and to shed light on the largely unknown molecular mechanism that fuels auxin's production in plants. In previous work, McSteen discovered another gene, sparse inflorescence1 or spi1, also involved in making auxin in corn.

Previous genetic research in the model plant Arabidopsis suggested that genes similar to both spi1 and vt2 act independently of each other to produce the hormone. However, corn plants missing both genes do not have less auxin than plants missing only the newly discovered vt2 gene.

"The lack of an additive effect suggests the spi1 and vt2 genes work together, instead of independently, to make auxin in corn," McSteen said. "This is the first evidence these genes are in the same biosynthesis pathway."

Results from the study shed new light on how auxin is synthesized in plants, which despite over a century of research, remains largely unknown.

More information: The study, titled "vanishing tassel2 encodes a grass-specific tryptophan aminotransferase required for vegetative and reproductive development in maize," appeared online on February 18 in the journal *Plant Cell*.

Provided by University of Missouri-Columbia

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