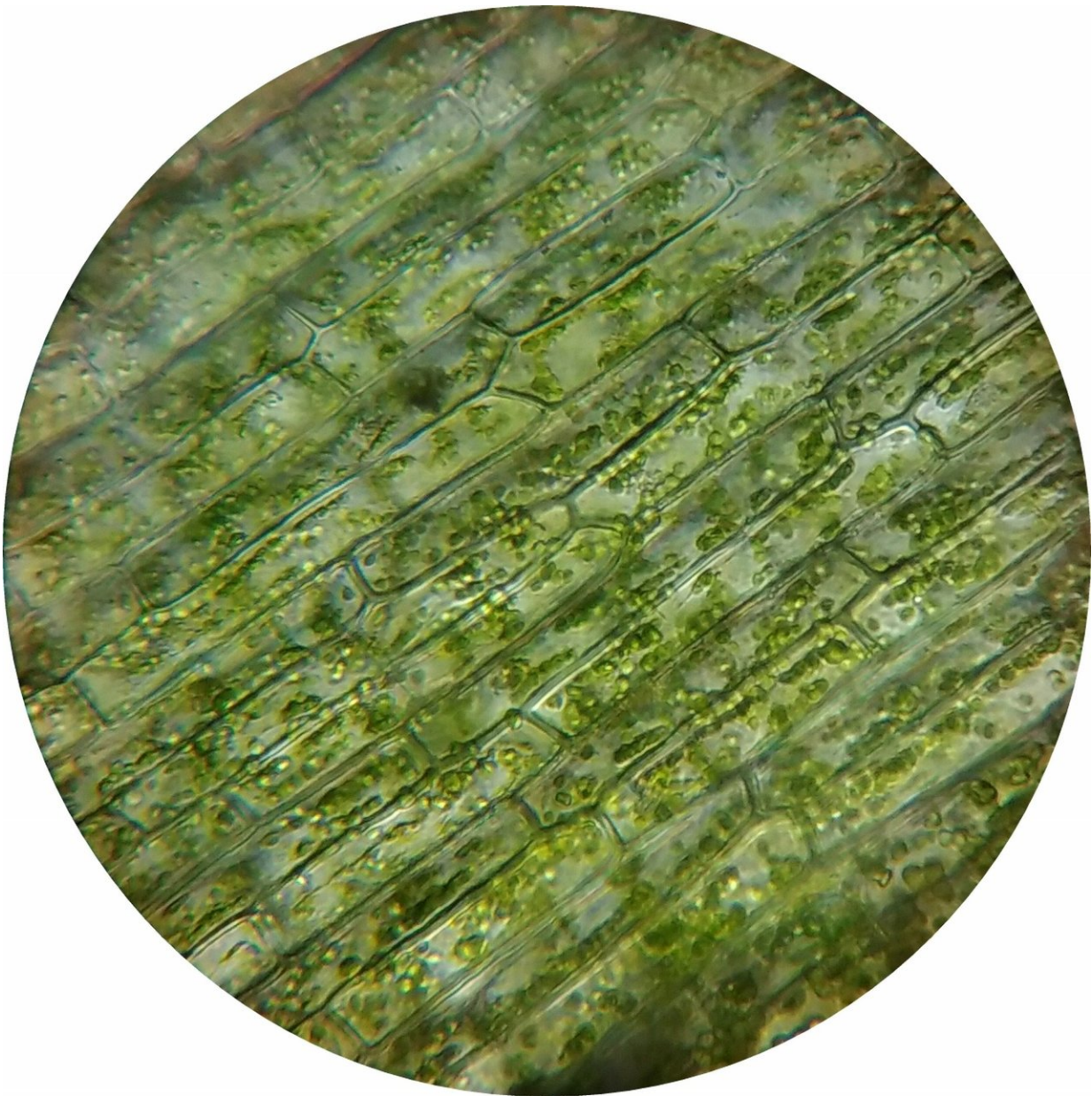


TIC236 protein found to link outer and inner membranes of chloroplast envelope

November 26 2018, by Bob Yirka



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A team of researchers with the Institute of Molecular Biology, Academia Sinica, in Taipei, has discovered a protein called TIC236 that serves as a link between the outer and inner membranes of the chloroplast envelope in plant cells. In their paper published in the journal *Nature*, they describe their study of the means by which proteins are imported into chloroplasts and what they learned. Danny Schnell with Michigan State University has written a [News and Views piece](#) on the work done by the team in the same journal issue.

Chloroplasts are a type of organelle inside plant cells—they are involved in metabolic activities, including assisting with the photosynthetic process. In this new effort, the researchers have isolated one of the proteins involved in transporting other proteins from the cytoplasm, where they are made, into a [chloroplast](#). Chloroplasts have two membranes called TOC and TIC that proteins must pass through in order to do their work.

In their effort, the researchers sought to find the answers to two major questions: How do protein complexes that are known to exist at the boundaries of the membranes help transport other proteins through the membranes? And how did the TOC/TIC system evolve?

In taking a close look at chloroplasts, the researchers discovered that there was a previously unidentified protein located at the TIC—they named it TIC236. They found that TIC236 served as a link between the TOC and TIC. Normally, it is fixed to and interacts with the inner [membrane](#), but part of it also extends into the area between the TIC and the TOC, where it interacts with another [protein](#) that does roughly the same job for the TOC, called TOC75. Thus, the two proteins serve as

intermediaries.

To answer their second question, the researchers suggest that their discovery of TIC236 adds credence to theories that propose that [plants](#) came into existence when a bacterium was consumed by a host cell, leading eventually to the development of chloroplasts. They offer a side-by-side comparison of a plant and bacterium cell, showing the similarities, which now includes TIC236.

More information: Yih-Lin Chen et al. TIC236 links the outer and inner membrane translocons of the chloroplast, *Nature* (2018). [DOI: 10.1038/s41586-018-0713-y](https://doi.org/10.1038/s41586-018-0713-y)

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