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КАФЕДРА ІНОЗЕМНИХ МОВ
ЛІНГВІСТИЧНИЙ НАВЧАЛЬНО-МЕТОДИЧНИЙ ЦЕНТР

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КАФЕДРИ ІНОЗЕМНИХ МОВ

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NANOBIONIC PLANTS

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Plants have many valuable functions: They provide food and fuel, release the oxygen that we breathe, and add beauty to our surroundings. Now, a team of MIT researchers wants to make plants even more useful by augmenting them with nanomaterials that could enhance their energy production and give them completely new functions, such as monitoring environmental pollutants.

The researchers report boosting plants' ability to capture light energy by 30 percent by embedding carbon nanotubes in the chloroplast, the plant organelle where photosynthesis takes place. Using another type of carbon nanotube, they also modified plants to detect the gas nitric oxide. Together, these represent the first steps in launching a scientific field the researchers have dubbed "plant nanobionics."

The idea for nanobionic plants grew out of a project to build self-repairing solar cells modeled on plant cells. As a next step, the researchers wanted to try enhancing the photosynthetic function of chloroplasts isolated from plants, for possible use in solar cells. Chloroplasts host all of the machinery needed for photosynthesis, which occurs in two stages. During the first stage, pigments such as chlorophyll absorb light, which excites electrons that flow through the thylakoid membranes of the chloroplast. The plant captures this electrical energy and uses it to power the second stage of photosynthesis — building sugars.

Chloroplasts can still perform these reactions when removed from plants, but after a few hours, they start to break down because light and oxygen damage the photosynthetic proteins. To design needed results are used different techniques including work on incorporating electronic nanomaterials, such as graphene, into plants.

Right now, almost no one is working in this emerging field. It's an opportunity for people from plant biology and the chemical engineering nanotechnology community to work together in an area that has a large potential.