

GMO

BIOLOGY

FOUNDATION
SCIENCE

2001-2012

Of Traits and Proteins: The Molecular Basis of Traits



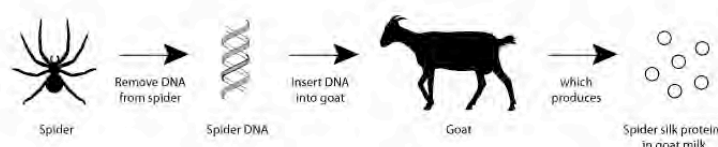
What's the Story? ONE POTATO, TWO POTATO

Potatoes are the most important non-cereal food crop in the world but have drawbacks as a major food source. Lacking several essential amino acids, their nutritive value is low, and the plants are susceptible to damage by insects. These problems have been solved by giving the potato plant new genes: one encoding a protein rich in amino acids, the other encoding a protein toxic to insects.



Should your school use transgenic potatoes to make French fries?

HOW CAN A GENE FROM ONE SPECIES GIVE AN ORGANISM OF ANOTHER SPECIES A NEW TRAIT?



HOW CAN A GENE BE INSERTED INTO A PLANT TO GIVE THE PLANT A NEW TRAIT?

READING →

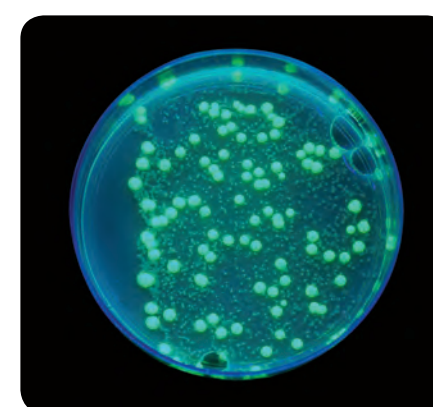
What's in Your Potato?

Unlike bacteria, which are single-cell organisms, plants are made up of many different cells. How can a gene be inserted into a multi-cellular plant to give it a new trait? Inserting a gene into a plant involves the same principle as inserting a gene into bacteria: DNA containing the gene of interest is mixed with plant cells, which take up the DNA. Many plant cells have the remarkable ability to develop from a single cell into a complete plant.

HANDS-ON ACTIVITY →

Puttin' on the Glitz

Traits, or characteristics, of an organism are the result of activities of proteins encoded in the organism's DNA. Students insert the gene for luciferase, an enzyme found in many different organisms including fireflies, into the common intestinal bacteria *E. coli*. This gene results in a new bacterial trait: the ability to glow in the dark.



BACTERIA WITH NEW TRAIT, THE ABILITY TO GLOW IN THE DARK

Questions for YOU to think about:

- 1 Would you eat a genetically modified potato that contained a protein that increased its nutritional value? Was resistant to insects? Why or why not?
- 2 What other applications can you think of for developing genetically modified organisms?
- 3 What concerns might you have about genetically modified organisms?