PLANT PROTECTION

Dr. Brian Ellis

Dr. Brian Ellis is the Associate Director of the Biotechnology Laboratory. Believe it or not, his research focuses on how plants deal with stress. Like us, plants have to put up with things that are bothersome or harmful. However, unlike us, they are unable to just move away from the problem. How do they cope?

* Plants have done a rather excellent job of dealing with their living conditions. After all, they don't have the luxury of wearing sweaters when the weather gets too cold, applying lotion if the sun is too strong, or protecting themselves with armor if things get a little rough. This amazing ability to adapt to such a diverse range of climates and environments is a central theme to many areas of plant biotechnology. What are the genes and chemicals that provide this protection in the plant kingdom?

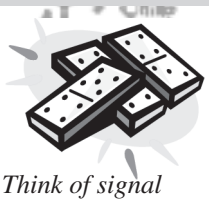
KEY WORDS

lignin: an important component of plant cell walls, required for structural support. Essentially, this is the chemical that allows plants to stand upright.

signal transduction: the study of molecules responsible for a cell's ability to react to external and/or internal changes.

Lignin is the second most common compound in plants. Since plants make up the largest % of living tissue on earth, lignin is the second most common biocompound on earth!

* One of the chemicals that plants produce to give them such versatility and strength is lignin. However, lignin is what the paper manufacturers want out of wood - this is the stuff that is difficult to biodegrade and the stuff that turns things brown. Consequently, there is huge economic incentive to manipulate trees into making less lignin or making a more pulpable form of lignin.



Think of signal transduction as a row of dominos lined up. Push the first one, and you will cause a cascade effect. Something similar happens with molecules in a cell.

* Plants also need to react to their surroundings. For example, when the sunlight is too strong, plants quickly induce the formation of compounds that provide protection from the ultraviolet rays. How do the UV rays activate this mechanism? Do genes get turned on? Do chemicals and proteins get activated? A large part of Dr. Ellis' research is focused on the signals involved in this process.

Lignin is also interesting from an evolutionary point of view. Scientists feel that the formation of rigid structures was the adaptation that allowed plants to leave aquatic environments for land environments.

Dr. Ellis' expertise in his field has also made him a leading spokesperson on genetically engineered foods. He has

cochaired the Royal Society of Canada's Expert Panel on the Future of Food Biotechnology, a group of scientists and ethicists that examined and informed the Federal government on the impact and implications of this field. He explains, "It's a technology that has great capacity to do good, increasing yields and reducing the need for chemicals in farming, for example. But the power of the corporations in this area is enormous, and public awareness and debate will help ensure these developments aren't exploited purely for profit."