on the surface, where they would return to their original length by recruiting more monomer units. — PDS

J. Am. Chem. Soc. **126**, 16672 (2004).

ECOLOGY/EVOLUTION

Eats Roots or Shoots

Recently, plant ecologists have increasingly focused on the role of soil organisms in determining plant community processes. Below-ground herbivores, such as worms, tend to promote plant diversity when they feed on dominant plant species. However, van Ruijven *et al.* show that the combined effects of above- and below-ground herbivores cannot be predicted from their separate effects. Different combinations of invertebrate herbivores (nematodes and

Experimental plot.

wireworms below ground, and grasshoppers above ground) were added to experimental species-rich grassland plant communities. When added separately, the nematodes and wireworms had positive effects on diversity, whereas the grasshoppers had neutral effects. When added together, however, the combined effect on diversity was negative. The different feeding preferences of the two groups of herbivores appeared to alter the competitive interactions among the plant species within the communities, eventually producing the nonadditive effects observed. Differential distributions of above- and below-ground herbivores may well contribute to locally heterogeneous diversity levels. — AMS

Ecol. Lett. **8**, 30 (2005).

BIOTECHNOLOGY

Library Science

Bacteria are everywhere and can eat just about anything, including such unappetizing fare as petroleum sludge. Therefore, they must possess the enzymes (and the genes encoding the enzymes) that catabolize hydrocarbons. In the past, the challenge has been to identify and cultivate the desired species; advances in technology have made it feasible to bypass cultivation and to browse for specific genes (enzyme activities) in metagenome (expression) libraries. Uchiyama *et al.* take the next step in devising a method of sorting the library contents on the basis of substrate specificity and then searching for genes of interest. Their approach succeeds because bacteria rely on gene regulatory networks (and even riboswitches) that, in many cases, are induced or repressed by small molecules—either the substrate itself or chemically related compounds. Starting with a metagenome library made from petroleum-contaminated groundwater, they end up with a P450 enzyme that catalyzes hydroxylation (which makes hydrocarbons more polar and amenable to catabolism) of 4-hydroxybenzoate. — GJC

Nature Biotechnol. **23**, 88 (2005).

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Specificity Through Degradation

Yeast use partially overlapping kinase modules to specify discrete cellular responses. For example, the upstream kinases in the mitogen-activated protein kinase (MAPK) cascade, Ste11 and Ste7, are both activated during mating response signaling and during filamentous growth signaling. The MAPK Kss1 then triggers the filamentous growth transcriptional cascade and the MAPK Fus3 triggers the mating response genes. In the absence of Fus3, pheromone signaling stimulates Kss1 and filamentous growth gene expression, suggesting that Fus3 has a role in suppressing filamentous growth responses during pheromone signaling. Chou *et al.* and Bao *et al.* now report that Fus3 triggers the degradation of a transcription factor required for filamentous growth, Tec1, to maintain signaling specificity through the shared MAPK pathways. The abundance of Tec1 decreased after mating stimulated by pheromone and this destabilization required Fus3 but not Kss1. Tec1 Thr273 was phosphorylated by Fus3. Degradation was mediated by a SCF ubiquitin ligase complex. Thus, selective degradation of a transcriptional regulator represents a mechanism for generating specificity during intracellular signaling. — NG

Cell **119**, 981 (2004).

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