chromatin immunoprecipitation experiments. They found that Gata-3 seems to antagonize the binding of Mbd2 before demethylation of the *IL-4* gene. This suggests that one of the key functions of a developmental transactivator might be to compete with silencing forces to reconfigure the activity of a target locus.

There are some indications that Gata-3 might have other, Mbd2-independent, roles in activating *IL-4* expression. So, future investigation might uncover further complexities in transcriptional programming in development.

Arianne Heinrichs

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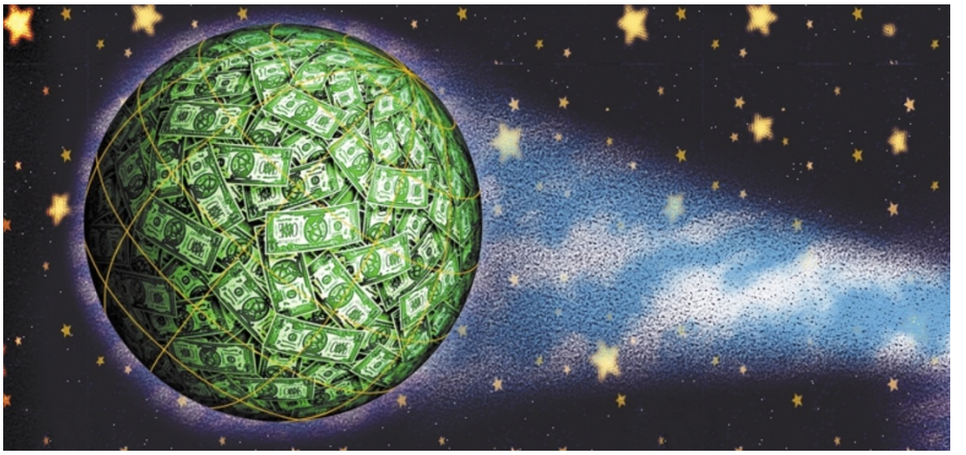
WEB SITE

Steven Reiner's laboratory: http://www.uphs.upenn.edu/abramson/reiner.html



PLANT DEVELOPMENT

Minimizing DET problems

In *Arabidopsis*, the DET1, COP and FUS proteins are thought to be global repressors of photomorphogenesis — changes in growth and development in response to light. Although *DET1* is known to encode a nuclear protein that regulates gene expression, its precise function has remained unclear. Now, however, reporting in *Science*, Joanne Chory and colleagues provide insights into the function of DET1 by isolating suppressors of the *det1* phenotype.

The authors called these suppressors *ted* mutants, and found that the *ted3* mutant is a dominant suppressor of the *det1* phenotype. They mapped and sequenced the *TED3* gene and used database searches to show that *TED3* is homologous to *PEX2* in yeast and mammals. PEX2 is involved in peroxisome assembly and matrix-enzyme import, and peroxisomes are single-membrane-bound organelles that perform many metabolic functions. Using a TED3–green fluorescent protein fusion construct, the authors confirmed the peroxisomal localization of TED3.

Chory and co-workers showed that the phenotype of the homozygous *TED3* knockout is embryonic lethal, and also that transgenic plants containing the antisense *TED3* transcript are dwarfed, pale and sterile. Because they found that *TED3* is ubiquitously expressed throughout development and showed that it is expressed at high levels in seeds, pollen, ovules and cotyledons, the authors propose that it is essential for *Arabidopsis* reproduction and development.

Because ted3 is localized to peroxisomes, the authors investigated whether peroxisomal activities are disrupted in *det1* plants and restored in *det1 ted3* plants. Germination on a sugar-free medium requires active peroxisomes, and they found that *det1* seeds could not fully develop on such a medium unless *ted3* came to the rescue. In addition, glyoxysomes (specialized peroxisomes) can convert indole-3-butyric acid (IBA) to indole-3-acetic acid, an auxin that inhibits root elongation, and they showed that IBA affected root elongation to a lesser extent in *det1* plants than in wild-type or *det1 ted3* plants.

When the authors compared the levels of glyoxysomal enzymes in *det1* and *det1 ted3* plants, they found that the levels were much higher in the latter. They also compared wild-type and *ted3* seedlings, and found that, although RNA levels were similar, protein levels were higher in *ted3* plants. The data therefore indicate that *det1* seedlings have defective peroxisomes that can be rescued by the *ted3* gain-of-function mutation, and that *ted3* might act by stabilizing peroxisomal proteins.

Finally, Chory and colleagues used an *Arabidopsis* oligonucleotide array containing ~8,300 genes to compare gene-expression profiles in wild-type, *ted3* and *det1 ted3* plants. They showed that, in both light- and dark-grown seedlings, a large proportion of the genes that are misregulated in *det1* plants are restored, or partially restored, by *ted3*. In addition, they found that several peroxisome-related genes were underexpressed in *det1* plants.

The authors have therefore found that "increased peroxisomal function can suppress the numerous … defects caused by mutations in *DET1*". Because they also found that *ted3* partially suppresses the effects of *cop1*, they propose that peroxisomes, whose roles still remain largely unknown, have an important function in a photomorphogenetic pathway that is negatively regulated by DET1 and COP. This newly discovered link between peroxisomes and the response to light should open up new avenues in understanding how plants respond to environmental variation.

Rachel Smallridge

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