WEB WATCH

What's in it for me?
Thanks to the efforts of the Human Genome Project, the draft human genome is out there for every molecular biologist to use, but we're not all gene jockeys. The NCBI's draft human genome sequence: an introduction gets inside the head of a molecular biologist who has never had to navigate his/her own DNA before, and poses the questions that s/he might ask. For one question — 'is there only one copy of *ALD* (the adrenoleukodystrophy gene) in the genome?' — a detailed tour of the draft genome is provided, with a subway map that explains how the draft human genome data intersect with the NCBI's other resources. Each question takes you to the type of search that you need to perform, complete with a 'help' window explaining what it's just done and where you can go from there. So, whether you're interested in intron–exon structure, single nucleotide polymorphisms, homologous sequences or protein domains and their structures, the tour tells you which train to catch and where you need to change lines.

One stop along this tour has been significantly refurbished. By now, all readers of Nature Reviews journals will be familiar with the NCBI's LocusLink database as all our articles carry extensive links to it. Each LocusLink entry now provides links to the Gene Ontology database (providing information on molecular function, biological process and cellular component), Proteome's databases of protein function (you have to register, but access is free to not-for-profit organizations), the Mouse Genome Database and Flybase. The wealth of functional data provided by these links make this the Grand Central Station of the NCBI's tour.

Cath Brooksbank

CELL DIVISION

Don't shoot now

In hostage situations, the armed police show up but they might not be needed — provided that the negotiator does a good job. Likewise, the cell sometimes needs to prepare for a disaster that might never happen. In the 30 January issue of *Proceedings of the National Academy of Sciences*, Vanesa Gottifredi and colleagues describe such a case: when DNA synthesis is blocked, p53 is on call but is prevented from going in with guns blazing.

In response to agents that might lead to DNA damage, such as γ-irradiation, p53 becomes phosphorylated. This stabilizes it by preventing its interaction with the ubiquitin ligase MDM2, allowing it to orchestrate a transcription programme that induces cell-cycle arrest. It's always been assumed that a stable p53 equals an active p53, but Gottifredi *et al.* now show that this isn't true. Treatment with agents that block DNA replication, such as hydroxyurea or aphidicolin, stabilize p53 but many of its target genes, including *p21*^{WAF1} and *MDM2*, are not transcribed and, once the cell-cycle block is released, the cells continue to divide in the presence of high levels of p53. This is not due to a general shutdown of RNA synthesis because a p53 target gene, *PIG3* is transcribed, as are other genes such as c-*fos* and cyclin E. Furthermore, p53 remains in the nucleus, so cellular localization doesn't hold the key to its inactivity. But perhaps most surrprising is the finding that when DNA synthesis is blocked, p53 fails to transcibe *p21*^{WAF1} and *MDM2* even when the cells are blasted with γ-irradiation.

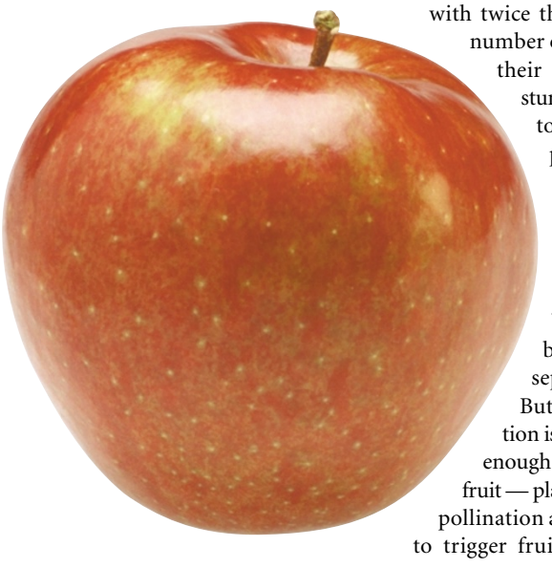
What might be reining p53 in? The patterns of phosphorylation and acetylation of p53 after blocking DNA sythesis or γ-irradiation seem largely the same. Furthermore, ATM, the kinase that leads to p53's stabilization in response to γ-irradiation, is functional and loss of ATM doesn't prevent the accumulation of p53 when DNA synthesis is blocked. So an unidentified kinase or an alternative, kinase-independent mechanism must be responsible for p53's stable but inactive state.

Why do cells need to keep p53 in

PLANT DEVELOPMENT

De-pipping the Pippin

Seedless fruit may be a pointless waste of resources for a plant, but the economic rewards of growing such crops are considerable. Whereas seedless grapes, bananas and oranges are common groceries, other fruits are less easy to produce. Now, reporting in *Proceedings of the National Academy of Sciences*, Jia-Long Yao and colleagues have identified mutations in a single gene that result in seedless apples.



Conventional plant breeding has produced a small number of seedless apple varieties such as Wellington Bloomless, Spencer Seedless and Rae Ime, but these varieties produce undersized fruit of poor quality. The apples are not seedless because they cannot make seeded fruit — in fact, if hand pollinated, they produce fruit with twice the conventional number of seeds. Rather, their flowers are so stunted that they fail to attract insect pollinators.

The blooms of Rae Ime have neither petals nor anthers, these organs being replaced by additional sepals and styles. But lack of pollination is not, on its own, enough to make seedless fruit — plants require both pollination and fertilization to trigger fruit development. Nevertheless, these stunted flowers reminded Yao and colleagues of a classic *Arabidopsis thaliana* mutation called *pistillata*, in which flowers also lack both petals and anthers.

The *PISTILLATA* gene belongs to the so-called MADS-box family. By a scheme of overlapping expression, these genes direct the development of the four organs that make up a flower: carpels, petals, anthers and styles. Honma and Goto recently reported in *Nature* that, in the flower, the MADS-box gene products form multi-protein transcription factor complexes, the compositions of which determine their DNA-binding specificities. Inclusion of the PISTILLATA protein in a complex changes its transcriptional targets, converting organs that would otherwise become carpels and styles into petals and anthers, respectively.

Taking the hint from *Arabidopsis*, Yao and colleagues first identified the apple homologue of *PISTILLATA* in Granny Smith apples; they share 64% identity at the amino-acid level. In Rae Ime, Wellington Bloomless and Spencer Seedless varieties, however, the authors found transposon insertions that disrupt the gene and prevent it from being transcribed.

This study is the first hint that *PISTILLATA* is involved in parthenocarpy — the official name for fruit production without fertilization.