IN THE NEWS

Weed all about it
The publication of the sequence of the *Arabidopsis thaliana* genome on 14 December 2000 was appropriately saluted by the world's press. Here are a few snippets of what it had to say.

"More than one hundred scientists from three continents presented yesterday, after nine years of work, the first complete genetic sequence of a plant, a herb that tends to grow on roads and over garden walls.
***El Pais*, Spain**

" … scientists now have the genetic toolbox that will allow them to tinker with an entire kingdom of life upon which all animals, including humans, are completely dependent. 'It's like standing on top of a hill and seeing gold mines everywhere', said Elliot Meyerowitz of the California Institute of Technology in Pasadena."
The Washington Post, US

"The genetic blueprint of a plant has been mapped for the first time, paving the way for new cancer drugs, more nutritious food and a revolution in scientists' understandings of the way living organisms work."
***The Times*, UK**

"The data are now here, and all that's left to do is to classify, analyse and understand. For scientists, the next step will be to determine the function of all these genes — the same challenge faced by their colleagues working on the fruitfly, nematode and yeast."
Le Temps, Switzerland

And the last word should go to this UK paper: " …William Curtis, a British botanist, described a weed called *Arabidopsis thaliana* as having 'no particular virtues or uses'. More than 200 years later, he could not have been proved more wrong."
***The Guardian*, UK**

Jane Alfred

DEVELOPMENTAL BIOLOGY

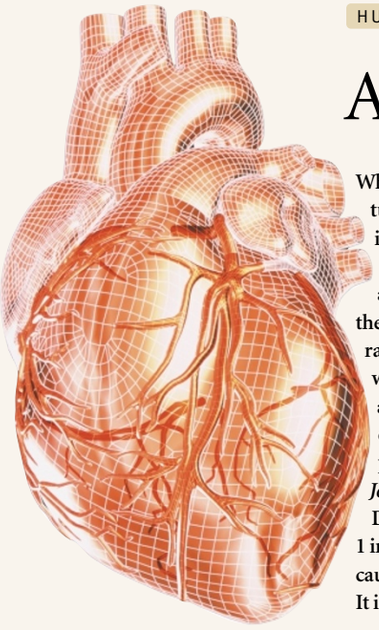
Shaping gradients

One of the basic developmental mechanisms for patterning a field of cells is to apply a concentration gradient of a morphogen across the field. Depending on its position in the gradient, a cell will experience a certain level of the morphogen, and will respond differently from its neighbours. The superimposition of morphogen gradients in different directions provides positional information that will lead to proper patterning of adult structures in three dimensions (belly–back, bottom–top and proximal–distal). Morphogens such as wingless, decapentaplegic (DPP — a member of the large TGF-β family) and hedgehog are among the biggest stars of developmental biology, but there is an ongoing debate about how gradients of these morphogens are formed. Two complementary studies in *Drosophila* wing development have provided important new information about the formation of the DPP morphogen gradient.

The adult wing of *Drosophila* develops from a specific imaginal disc — one of several groups of cells set aside during larval development that give rise to adult structures. The *dpp* gene is expressed in a central stripe in the wing disc and produces a gradient of DPP signalling away from the stripe, in both directions. The two new studies, by Entchev *et al.*, and Teleman and Cohen, have used a version of DPP tagged with GFP and show, for the first time, that DPP protein is indeed present in a concentration gradient — high in the stripe and low at the edges of the disc. Using different genetic tricks, both studies also show that the DPP gradient can form rapidly, and that gradient formation must be regulated during development. At that point, the two studies diverge.

Entchev *et al.* show that the formation of the DPP gradient does not occur by passive diffusion outwards from the central stripe. Instead, a variety of mutants that affect endocytosis and intracellular vesicle transport, including *shi*^{ts1}, show that DPP is internalized by endocytosis, and is then either degraded or recycled and transported out of the cell. A certain amount of DPP is degraded as it passes through each cell, so the concentration of DPP diminishes with distance from the source. The relative levels of DPP degradation and recycling will influence the shape of the DPP gradient and, as Entchev *et al.* point out, this provides a means to alter the shape and size of the resultant adult structure.

Teleman and Cohen investigate directly the relationship between the DPP gradient and the size of the cellular field it has to pattern. If cells are growing rapidly, the DPP gradient will have a bigger area to pattern, but will the gradient be able to form over that entire field, to pattern it correct-



HUMAN GENETICS

Affairs of the heart

When clinically distinct diseases turn out to be caused by defects in the same cellular process, new ideas about pathophysiology and about avenues for therapeutic intervention can rapidly emerge. That is exactly what has happened in a study of a congenital heart defect called dilated cardiomyopathy, recently published in the *New England Journal of Medicine*.

Dilated cardiomyopathy affects 1 in every 2,500 individuals, and causes early-onset heart failure. It is often associated with other phenotypes, such as skeletal-muscle defects, but Kamisago *et al.* focused on a large family with autosomal dominant dilated cardiomyopathy in the absence of other clinical symptoms. Linkage analysis led the authors to the cardiac β-myosin heavy chain gene (*MYH7*) and, indeed, the same missense mutation was found in all affected individuals in this family. A second mutation in *MYH7* was discovered by screening a further 20 families. Following this lead, the authors tested other candidate genes involved in the sarcomere —