that afflicts as many as 20 million people worldwide. Deidre Carter of the University of Sydney notes that the grant is especially welcome "at a time when morale in Australian universities and the research community is very low."

Briones plans to use some of his grant money for travel. "I want to go to high-quality meetings where I can meet people smarter than me," he says. **–RICHARD STONE**

GENOMICS

Wellcome Trust Backs Genome Computation

What began as a one-man crusade now has the weight of the world's largest medical research charity behind it. Last week the U.K.-based Wellcome Trust announced that it would spend $13 million over 5 years to fund hardware and software designed to analyze newly sequenced human DNA. Its support of a project called Ensembl (www.ensembl.org) reflects a growing appreciation of the importance of computers to interpret the human genome.

Tireless crusader. New funds for Ensembl will provide Tim Hubbard with more help.

Ensembl was started in early 1999 by Tim Hubbard, a bioinformaticist at the Sanger Centre near Cambridge, U.K. He began developing computer programs to sort through the vast amounts of data generated by sequencing efforts, which simply determine the order of bases—A, G, T, and C—along each chromosome. However, the sequence has little value or meaning until scientists locate the genes these bases encode and figure out their functions. By midyear, Hubbard had teamed up with Sanger's Michele Clamp, Ewan Birney of the European Bioinformatics Institute (EBI), also in Cambridge, and a few other colleagues to set up automated preliminary analysis of the rapidly emerging rough draft of the human genome.

"The Ensembl budget was cobbled together," Birney recalls. "We were working off bits and bobs of other budgets." By making their rudimentary analysis available to everyone, they also hoped to prevent the genome from being patented by private concerns.

The Wellcome money will put the project on much firmer footing. It allows the 10-person Ensembl staff to triple over 5 years and greatly increases its computing capacity, adding "the equivalent of hundreds, perhaps thousands, of personal computers," notes EBI's Graham Cameron. This investment "will speed up the annotation of the human genome," predicts David Haussler, a bioinformaticist at the University of California, Santa Cruz. "It puts them in a better position to tackle the large bioinformatics problems that are looming."

The new funds will be split between the Sanger Center and EBI, which is an outpost of the European Molecular Biology Laboratory in Heidelberg, Germany. The money arrives at a critical time for EBI, one of the world's three archives of genomics data, whose budget has been hit by changes in the European Union's policies for supporting scientific infrastructure (*Science*, 25 February, p. 1401). It's also "a vote of confidence [in the field] and a commitment by the Wellcome Trust," notes David Lipman, director of the National Center for Biotechnology Information in Bethesda, Maryland.

The award reflects a growing interest in bioinformatics by funding agencies. Haussler, for example, is one of 12 computational biologists who have just been appointed as investigators for the Howard Hughes Medical Institute. The U.S. National Human Genome Research Institute plans to create a network of centers of excellence, several of which will focus on computational biology. The award to Ensembl also kicks off the Wellcome Trust's $150 million initiative in functional genomics, which follows the recent completion of the rough draft of the human genome. "We didn't feel we could wait," says Celia Caulcott, a Wellcome Trust program manager. **–ELIZABETH PENNISI**

EVOLUTION

Parasites Make Scaredy-Rats Foolhardy

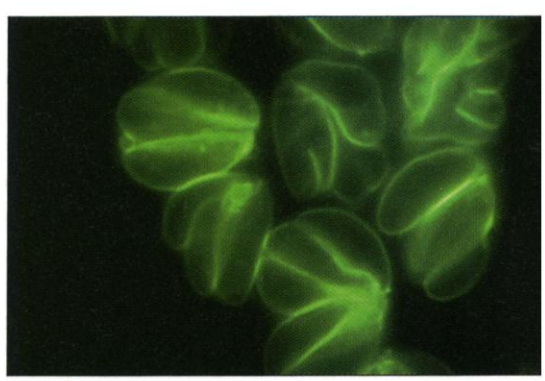
Long before *The X-Files*, Robert Heinlein wrote about parasitic aliens that alter human minds. In his 1955 novel, *The Puppet Masters*, slug-shaped creatures arrive on Earth and clamp themselves to people's spines, forcing their hosts to help spread their kind across the planet. Although the rabidly anticommunist Heinlein may have been less interested in biology than in finding an allegory for the Red Menace, *The Puppet Masters* proved scientifically prophetic: Some parasites, it turns out, alter the behavior of their hosts for their own benefit.

In the 7 August issue of the *Proceedings of the Royal Society of London B*, researchers at Oxford University offer a striking demonstration of this ability by the protozoan *Toxoplasma gondii*. Rats, the intermediate hosts of *Toxoplasma*, appear to lose their fear of cats when the parasite infects them. And cats, not coincidentally, are *Toxoplasma*'s final host. By precisely altering rat brains, the parasite potentially increases its chances of completing its life cycle. "They certainly have demonstrated that the parasite is changing behavior in a rather specific way," comments Hilary Hurd, a parasitologist at Keele University in the United Kingdom. "It's fascinating that this happens."

What makes the story all the more fascinating is that *Toxoplasma* is extremely common in humans. Perhaps half of all people on Earth carry its cysts in their brains without visible effects. (It is dangerous only when it invades a host with a weak immune system, such as AIDS patients or fetuses, where it can cause brain damage or even death.) Recent research has hinted that even in this latent form, however, *Toxoplasma* may create subtle changes in personality.

The relatively innocuous *Toxoplasma* is an unlikely candidate for a mind bender. Dwelling in a cat's bowels, it produces egg-like oocysts that leave its host's body along with the feces. The oocysts can survive in soil for decades, waiting for a rat or some other warm-blooded mammal or bird to pick them up. Once inside an intermediate host, the parasite invades cells and replicates. *Toxoplasma* elicits a strong immune response, which prompts the parasite to form tough-coated cysts in which it finds refuge until its host happens to be eaten by a cat. The mildness of *Toxoplasma*'s effects on its intermediate host make good evolutionary sense: It's not in the parasite's interest to be lethal, as cats find dead animals distasteful.

Yet a parasite's gentleness need not mean that it's passive. Since the 1960s, parasitologists have documented various ways in which parasites may alter their intermediate hosts to improve their chances of infecting a final host. The lancet fluke *Dicrocoelium dendriticum*, for example, forces its ant host to clamp itself to the tip of grass blades, where a grazing mammal might eat



Mind bender. *Toxoplasma* causes rats to lose their aversion to cat scent.

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