plus one would not equal two, but market research seems to suggest that merging could in fact raise our profile," says Neil McDonald, a structural biologist at ICRF's headquarters in London. Indeed, predicts Steve Jackson, deputy director of the Wellcome-CRC Institute of Cancer and Developmental Biology at the University of Cambridge, Cancer Research UK should have more clout among both politicians and scientists. Coupled with a solid research program, that would amount to far more than a marriage of convenience.

–JOHN PICKRELL

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ASTHMA RESEARCH

Missing Gene Takes Mice's Breath Away

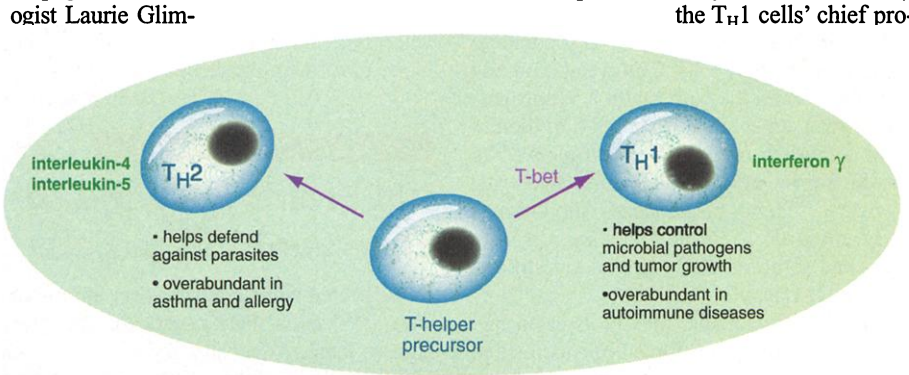
A strain of mice with a tendency to wheeze may help scientists get closer to the root of asthma in humans. Asthma constricts airways in patients' lungs and leaves them short of breath, sometimes fatally; it afflicts tens of millions of people worldwide and seems to be on the rise in many areas. Scientists are still struggling to decipher the cellular signals at the root of the attacks. Now, in reports on pages 336 and 338, immunologist Laurie Glimcher and her colleagues describe a mouse strain that mimics the human condition and might provide a better model system for studying the disease.

Researchers have created asthmatic mice before, but through a process involving injections of allergens and irritants. That scenario doesn't match the situation of many patients with chronic asthma, whose attacks are not triggered by known allergens. The new mice resemble those human asthmatics in several key ways, such as having characteristic chronic lung inflammation and thickened airway walls. What's more, the gene responsible for the mice's affliction appears to be misregulated in human asthmatics as well. "It's an exciting model," says immunologist William Paul of the National Institute for Allergy and Infectious Diseases in Bethesda, Maryland.

The engineered mice lack a gene called T-bet, which codes for a transcription factor, a protein that controls the expression of other genes. In previous experiments, Glimcher and her colleagues had shown that T-bet affects the development of immune system cells, encouraging the development of so-called T_H1 cells. These cells help organize attacks on unfamiliar cells such as invading microbes. They also make proteins that discourage overproduction of a sister cell type called T_H2 cells, whose main job is to help the body defend against parasites.

In most people, a complex set of feedback loops keeps the two cell types in balance. But many scientists suspect that in asthma patients something skews the balance, allowing T_H2 cells to predominate. The proteins those cells produce can lead to some of the changes seen in asthma patients' airways, including high numbers of trigger-happy immune cells that spark inflammation.

To find out more about T-bet's role in the immune system, the team created mice lacking the gene. As expected, the mice produced fewer T_H1 cells. Immature immune cells taken from the animals' lymph nodes produced very little interferon γ, the T_H1 cells' chief protein product, compared to their wild-type littermates. The cells also produced higher levels of interleukin-4 and interleukin-5, two products of T_H2 cells—and prime suspects in fueling asthma.



Proper balance. The T-bet gene prompts immature immune cells to become T_H1-type cells, keeping the number of T_H2 cells in check.

The animals' lungs resembled those of chronic asthma patients, with unusually thick layers of collagen and extensive networks of the musclelike cells that constrict airways. And even before exposure to an irritant, the animals' lungs showed signs of inflammation: They had significantly more immune system cells called eosinophils and lymphocytes than their littermates with functioning T-bet. Mice lacking T-bet were also extremely sensitive to the irritant methacholine; their airways narrowed and it took more effort to breathe. Although it is difficult to really hear a mouse wheeze, Glimcher says, "these mice have asthma."

T-bet might play a role in human asthma as well. The researchers found that asthma patients had significantly lower levels of T-bet expression in their lungs than people without asthma. Although the genetic causes of asthma are complex, the T-bet gene is in a region of the genome that has been implicated in asthma susceptibility.

The mice will be especially useful for fingering the proteins that interact with T-bet to encourage the development of T_H1 cells, says asthma specialist Jack Elias of Yale University School of Medicine. Such proteins might help scientists track down the still-mysterious cause of asthma. Although any treatments are years away, Glimcher says there may be ways to tweak the T-bet system in human lungs to discourage asthma attacks. Any such hints should help asthma patients breathe a little easier.

–GRETCHEN VOGEL

STEM CELL RESEARCH

Stem Cells May Shore Up Transplanted Hearts

Can a broken heart be mended? Perhaps, says a new report, which shows that after a heart transplant, cells migrate to the donated organ, possibly helping it recover. These migrants show signs of being stem cells, those multitalented cells that have the capacity to develop into a multitude of tissues.

Some parts of the body, such as the skin, regenerate readily when damaged. But "we all thought that once you lose a chunk of heart, it's gone," says cardiologist Roberto Bolli of the University of Louisville in Kentucky. One of the first indications that the heart can bounce back came in July 2001, when researchers reported that heart muscle cells can divide after a heart attack. Transplanted hearts are often similarly damaged: Many heart cells die during the hours the organ is out of the body.

Cardiovascular researchers Federico Quaini and Piero Anversa of New York Medical College in Valhalla and colleagues at the University of Udine, Italy, wanted to find out whether the transplant recipient's body pitches in to help heal the new organ. The team examined eight hearts transplanted from female donors into male patients. Up to 10% of cells in the transplanted hearts contained the male Y chromosome—a clear sign that cells from the recipient had taken up residence in the new heart, the group reports in the 3 January issue of *The New England Journal of Medicine*.

Cardiologist Philip Binkley of Ohio State University, Columbus, calls the study an "ingenious and novel demonstration that the heart can recruit new cells that may be a