ent parts of plants talk to each other. For example, scientists have long known that some substance travels from leaves to buds, conveying the signal to flower in response to cues such as day length. But no one knows the identity of this messenger. The new results inspire speculation that it is an RNA, says Winslow Briggs, a plant physiologist at the Carnegie Institution of Washington at Stanford. For those studying traffic on the plant information highway, the new RNA-transport molecule could be a good ride.

–EVELYN STRAUSS

HUMAN GENETICS

Iceland OKs Private Health Databank

Ending months of furious and, at times, bitter debate, the Icelandic parliament has given a private company permission to build a database containing the health records of the entire nation. But critics of the legislation, passed 16 December by a sizable majority, immediately pledged to find ways to block its implementation.

The new law grants one company, deCODE Genetics from Reykjavik, the right to establish and commercially exploit a nationwide database created through agreements with hospitals, clinics, and individual physicians to submit their patients' medical records. The company expects this information to greatly speed up its search for disease-causing genes, on which diagnostic tests and therapies could be based. Icelanders belong to a very homogeneous gene pool, making disease genes much easier to spot here than in other populations.

The Icelandic government hopes the database, which will also be available to health officials, will improve the country's health care system. It also sees genetics as a promising way to generate high-tech jobs for the country's small, fish-based economy. "We have quite a few people abroad who have educated themselves in this field. Now, they can come home and work on this," says Siv Fridleifsdottir, vice-chair of the Committee on Health in the Althingi, the Icelandic parliament. But the deCODE bill, introduced last spring and then revised over the summer, has touched off a sulfurous battle within the research community (*Science*, 14 August 1998, p. 890, and 30 October 1998, p. 859). "This has totally destroyed the scientific atmosphere," says

CREDIT: ALTHINGI

Solid majority. Iceland's parliament says yes to deCODE's databank.

Eirikur Steingrimsson, a geneticist at the University of Iceland.

Critics of the bill say it violates basic ethical principles because patients will not be asked for their consent before their records are deposited in the database. They argue that there should be more safeguards to secure privacy, and that one company should not have the commercial rights to a whole nation's gene pool. Over the past few months, dozens of medical, scientific, and patients' organizations testified against the bill in committee hearings. "We look at this as a black day in the medical and scientific community," says psychiatrist Tomas Zoega, chair of the Ethics Committee of the Icelandic Medical Association. "But the battle will keep on going."

deCODE's founder and president, Kari Stefansson, says that many opponents have acted out of professional envy rather than ethical concerns. "A subpopulation of people working in biomedicine in Iceland feels that we have disrupted their lives simply by our size," says Stefansson, a former Harvard University geneticist. "They have great difficulty recruiting people in their labs and competing with us." Now that the bill is passed, he adds, "I expect that there will be a lot of reconciliation." Adds University Hospital gastroenterologist Bjarni Thjodleifsson, who is working with deCODE on a genetic study of inflammatory bowel disease, "This is a revolutionary bill, and people are unduly paranoid about their position. As the dust settles, matters will clear up, and trust can be obtained."

With only two defections from the ruling coalition, the bill passed parliament by a vote of 37 to 20. Still, the debate opened many wounds in the body politic. Critics claim that deCODE had too much influence in drafting the bill. In particular, they point to a last-minute addition that allows deCODE to link the database's medical information to existing genealogical records and to genetic information that the company collects in its own studies—an arrangement that critics say will make it relatively easy to identify individual patients and learn sensitive details about them. "I have never witnessed such a stronghold [on the parliament] by one company that has interests in a law," says Social-Democrat Össur Skarphedinsson, chair of the health panel.

But Stefansson says the company was not trying to hide anything. "This [database link] had been the idea that was discussed from day one," he says. "If the politicians say they didn't know about it, they are being very disingenuous." He also denies that the company has received any special favors. "You can have a stronghold simply by the power of your idea."

Despite their defeat, deCODE's critics haven't given up. One recourse, says Zoega, is to ask the Icelandic and European courts to overturn the law on the grounds that it violates an individual's right to privacy. In addition, the bill allows individuals to notify the surgeon-general if they oppose use of their data, and the medical association may place ads and provide patients with the necessary forms, he adds. Already, 44 general practitioners and 109 hospital specialists have pledged not to send information to the database unless a patient specifically requests them to do so. "We will certainly be dragging our feet," Zoega says about participating in the data collection.

–MARTIN ENSERINK

Martin Enserink is a science writer in Amsterdam.

ASTROPHYSICS

Has a Dark Particle Come to Light?

PARIS—A strange new particle may have left its mark in a mountain in central Italy. Its appearance, which has yet to be confirmed, would not be entirely unexpected, but it would have profound implications. Reclusive and ponderous, in this case with about 60 times the mass of the proton, such WIMPs (for weakly interacting massive particles) could account for some or all of the mysterious dark matter that astronomers believe far outweighs the galaxy's glowing stars and gas clouds.

Hoping to detect particles of dark matter, researchers have set up WIMP detec-

tors in underground laboratories around the world (see *Science*, 21 March 1997, p. 1736). Now, a collaboration working at the Gran Sasso laboratory in Italy's Apennine Mountains has picked up the strongest hint so far of passing WIMPs: a particle count that appears to vary with the seasons, as the Earth's orbit carries it into a galactic wind of WIMPs and then away again. The Gran Sasso result "is in favor of this modulation" with about a 99% level of statistical confidence, said Pierluigi Belli, a University of Rome physicist who is a member of the collaboration, called DAMA (for DArk MAtter).

The claim, which Belli announced here on 16 December at a gathering called—despite the location—the Texas Symposium on Relativistic Astrophysics and Cosmology, faces plenty of skepticism. But if WIMPs are real, they might settle a long-standing problem. The Milky Way and other galaxies spin so quickly that the gravity of their ordinary, luminous matter is not enough to keep them from flying apart. Perhaps 90% of the galaxies' mass has to consist of some unseen matter to add the extra gravitational glue. Theories of how elements were forged in the big bang, however, limit the universe's complement of baryonic matter—the ordinary stuff of which planets, stars, and people are made—to less than is required to make up the deficit.

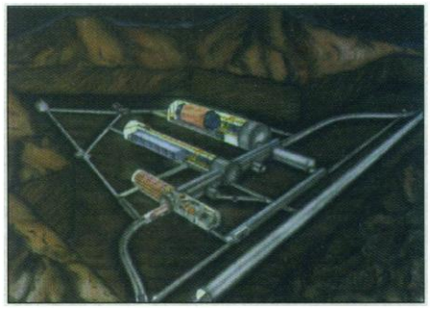
WIMPs have become a favorite candidate for fleshing out galaxies to the required mass, in part because they are natural consequences of some speculative theories of particle physics. In a theory called super-symmetry, which many theorists hope will extend the current picture of particles and forces, each known particle has a still-undiscovered massive partner. A WIMP of about the mass suggested by the DAMA results could be the lightest of these super-symmetric partners, a particle called the neutralino.

Detecting a WIMP is a matter of setting a trap and waiting. DAMA consists of nine 9.7-kilogram crystals of doped sodium iodide—a material that scintillates, or generates a flash of light, when one of its nuclei or electrons recoils after interacting with another particle. Photodetectors gather the light and the results are stored on computers for analysis.

Because of natural radioactivity in the rock and other materials surrounding the detectors, "there is a huge mountain of background signals," said Bernard Sadoulet of the Center for Particle Astrophysics at the University of California, Berkeley. To sort any WIMP signal from this noise, the DAMA researchers looked for a subtle seasonal variation in the scintillation counts. When the galaxy formed from a collapsing cloud of gas, the cloud's stately rotation was amplified, like that of a ballerina drawing in her limbs, so that the visible matter of the galaxy now spins rapidly, carrying the sun around the galactic center at some 220 kilometers per second. But the WIMPs would not have collapsed because they can't radiate photons to shed energy. Like the primordial gas cloud, they should hardly rotate at all. As a result, the sun should encounter the WIMPs as a kind of wind, said Sadoulet. Because Earth's orbital motion adds to the sun's velocity in the summer and subtracts in the winter, the WIMP signal should show a slight annual modulation.

In 1997, the DAMA group presented weak hints of a modulation. And now, based on 180 days of data collected from November 1996 to July 1997, they are more confident in claiming that they have seen "an effect satisfying all the distinctive requirements for a WIMP-induced process," as Rita Bernabei of the University of Rome, the DAMA group leader, puts it.

An unambiguous WIMP detection would delight theorists. But in sharp exchanges after Belli's talk, experimenters took aim at everything from the DAMA group's statistical analysis techniques to the fact that data presented so far cover mainly the rising part of the modulation. "You have not shown us that the signal is going up and down," said Sadoulet, "which would be much more convincing to the community."



Heart of a mountain. The Gran Sasso underground laboratory, which adjoins a highway tunnel.

"Yes, of course," Belli shot back. "This is a work in progress." Bernabei says that the collaboration is analyzing additional data "to verify the reproducibility of the effect—with proper features—over several cycles." Other evidence for the reality of WIMPs could also come from efforts to create supersymmetric particles in an accelerator at CERN, the European laboratory for particle physics in Geneva, and from other dark matter detectors such as those at Sadoulet's laboratory. Said Antonio Masiero, a theorist from the International School of Advanced Studies in Trieste, Italy, "Other WIMP experiments are close, so it is starting to be exciting."

–JAMES GLANZ

NEUROBIOLOGY

Filling in the Blanks of The $GABA_B$ Receptor

Valium and its copycat drugs soothe jangled nerves by augmenting the actions of the brain's own sedative, a neurotransmitter known as γ-aminobutyric acid (GABA). They do this by binding to one of the cell-surface molecules through which GABA exerts its effects, the $GABA_A$ receptor. But neurons have other GABA receptors that could also serve as drug targets for treating disorders ranging from epilepsy to pain. Now, four research teams have discovered a feature of this second class of $GABA_B$ receptors that could open the way to more effective and subtle manipulations of the brain's GABA system.

The groups—one reporting its results in this issue of *Science*—have found that the $GABA_B$ receptor is not a single molecule but instead consists of two different proteins, neither of which is effective on its own. This marriage of two disparate proteins to produce a functional receptor offers greater opportunities for drug design, as researchers can now target each protein separately as well as the receptor as a whole. And it has researchers speculating that the same kind of marriage, called a heterodimer, might also turn up in other members of the receptor class to which $GABA_B$ belongs. These are known as G protein-coupled receptors for the kind of protein that relays their signal into the cell, and they number some 1000 in all.

"This is pretty wild," says neurobiologist Roger Nicoll of the University of California, San Francisco. "No one had ever shown that these [G protein-coupled] receptors can form heterodimers." Kenneth Jones at Synaptic Pharmaceutical Corp. in Paramus, New Jersey, whose group reported its findings in *Nature*, says the research "has major implications" both for understanding the workings of this large class of molecules, which also includes receptors for the neurotransmitter serotonin and for opiates, and for developing novel drugs to block or stimulate them.

The discovery solves a mystery that arose early in 1997 when molecular biologist Bernhard Bettler at the drug giant Novartis in Basel, Switzerland, and his colleagues cloned the first gene for a $GABA_B$ component, a protein called GBR1. When inserted into cells, however, GBR1 could not perform a key function of natural $GABA_B$ receptors: opening membrane channels that allow potassium ions to flow out of the cell. Now, Bettler's team and three others have found out why.

Aware that something seemed to be missing from the receptor cloned by the

CREDIT: LABORATORIO NAZIONALE DEL GRAN SASSO