docrinology circles to describe the growing population of obese people at risk for diabetes and heart disease.

But O'Rahilly points out that no one can yet pin down 11β HSD-1 as the cause of the millions of cases of diabetes and heart disease. "You have to find out whether the level of metabolic disturbance in people correlates with the activity of this enzyme," O'Rahilly says.

Meanwhile, two recent clinical observations support the team's results: In April, Joel Berger's group at Merck Research Laboratories in Rahway, New Jersey, showed that a class of antidiabetic drugs now on the market suppresses 11β HSD-1 levels in fat cells. And Eva Rask of Umeå University Hospital in Sweden and Brian Walker of the University of Edinburgh, U.K., report that obese men express higher levels of 11β HSD-1 activity in fat tissue than do lean males, which begins to address O'Rahilly's concerns.

Flier and O'Rahilly both say they are aware of drug companies that have in hand, or are scrambling to come up with, potent inhibitors of the enzyme. Such compounds might be used to treat obesity by altering stress hormone levels in belly fat. "We have wanted to know for some time what properties of fat inside the abdomen make it different from fat outside the abdomen," says O'Rahilly. "If this enzyme explains it, that would be interesting indeed." **–TRISHA GURA**

Trisha Gura is a science writer in Cleveland, Ohio.

ATMOSPHERIC PHYSICS

Finding the Holes in The Magnetosphere

Just outside the protective cocoon of our atmosphere, a battle rages in space. A gas of electrically charged particles—the solar wind—traveling at hundreds of kilometers per second streams at us from the sun. All we have to guard us is Earth's magnetic field, but this shield is not impregnable. Every so often, particles and energy burst through, by means of a process called magnetic reconnection, causing displays such as the aurora borealis as well as magnetic storms that disrupt satellites, power lines, and communications. Researchers have puzzled for decades over how and where reconnection happens. Now physicists from the British Antarctic Survey (BAS) in Cambridge have developed a way to pick between two competing views of where reconnection occurs.

The work "seems to provide strong evidence for one [model] rather than the other," says space plasma physicist Stan Cowley of the University of Leicester, U.K. Finding a recipe for picking between the two models is an "important step," agrees physicist Ray Greenwald of Johns Hopkins University's Applied Physics Laboratory in Laurel, Maryland.

The solar wind is no steady breeze. Violent events in and around the sun, such as flares and coronal mass ejections, can whip up the wind to gale force. And because it is made up of charged particles, the solar wind carries the sun's magnetic field with it. As it nears Earth, our magnetosphere diverts the solar wind around our planet like river water around a bridge pier. But sometimes the two magnetic fields don't just rub together: They hook up, creating an entry point for the particles and energy to pour into the magnetosphere.

Looking up. The British Antarctic Survey's SHARE radar scans the skies over Halley research station in Antarctica.

Researchers still don't understand reconnection events well enough to predict when and where they will happen. Theoretical models have divided them into two principal camps. Supporters of the "subsolar" theory hold that the action takes place at the point closest to the sun, the "nose" where the magnetosphere bears the full brunt of the solar wind. The rival "antiparallel" camp, meanwhile, believes that any point where the sun's and Earth's fields are in direct opposition—typically well away from the "nose"—is fair game for reconnection. "It is debated at every meeting," says Greenwald.

A team from BAS decided to settle the matter. A key difference between the two theories is that, under particular seasonal and solar wind conditions, the antiparallel model predicts that two reconnection points will always be created, whereas the subsolar theory produces only one. Finding reconnection events, which may be just a few thousand kilometers wide and last only a few minutes, is hard for the handful of spacecraft currently surveying the vast magnetosphere. But Richard Horne and his BAS team realized they had just the tool for the job: ground-based radar.

Horne and his colleagues have spent years monitoring Earth's ionosphere, the plasma layer that forms the uppermost tier of the atmosphere. Because reconnection events cause disturbances in the ionosphere, the BAS researchers realized that the radar data they had collected might contain "footprints" of past reconnections. The team searched back through years of data from radar stations close to the poles, the best places to monitor the ionosphere. Data collected from Goose Bay in Newfoundland and Stokkseyri in Iceland on a December day in 1997 showed two distinct ionospheric disturbances signaling reconnection events. Neither took place close to the spot nearest the sun favored by the subsolar model. The results, to appear this month in the *Journal of Geophysical Research* (Volume 106, p. 28995), show "clear evidence in favor of the antiparallel theory," Horne says.

Researchers caution that one example doesn't clinch the case. Reconnection events may appear "all over the place," Cowley says, perhaps with one model dominating the other. Greenwald agrees that more observations are needed. The BAS team has since identified three more double events and has submitted a second paper to the *Journal of Geophysical Research*. In time, these results should help solve what Cowley calls "the fiendishly difficult problem" of understanding in full how magnetic reconnection works. **–ANDREW WATSON**

Andrew Watson is a writer in Norwich, U.K.

PALEONTOLOGY

Paring Down the Big Five Mass Extinctions

BOSTON—The five largest extinctions of the past half-billion years seemed immutable milestones on the path to modern life. Ever since researchers fingered a huge impact to explain the most recent of them, the one that ended the age of the dinosaurs 65 million years ago, the rest have also borne the tinge of doom. But now a pair of paleontologists say that two of the Big Five just don't measure up. Instead, Richard Bambach and Andrew Knoll of Harvard University argue, the losers should be demoted to "mass depletions": plunges in diversity caused by still-mysterious failures to produce enough new species.

Doubts about the legitimacy of the Big Five—those that came late in the Ordovician and Devonian periods and at the ends of the Permian, Triassic, and Cretaceous—began with the same sort of data first used to identify them. As they reported last month at the annual meeting of the Geological Society of America (GSA) here, Bambach and Knoll

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