

more modern, narrowly defined genera.

Rationalizing fossil classification had dramatic results. When they calculated the diversity trend from the updated record without the Recent, Jablonski and his colleagues found that the Pull of the Recent had been affecting just 5% of taxa. Because the Pull of the Recent operates on so few taxa, it can't be biasing diversity much at all. When the group applied the same approach to the 5-million-year interval just before the end of the dinosaurs, the "Pull of the Danian Stage" (the interval just after) affected more taxa, as might be expected, but still only 13%. "I think we've really cracked the problem," says Jablonski. "All we really did was vet the data. It's very reassuring." Given that the bivalves are representative of most of the

marine fossil record in their ease of preservation, Jablonski believes that the steep rise in diversity the past 65 million years is real.

Paleontologist Michael Foote, a colleague of Jablonski's at Chicago, isn't so sure. "They found that the Pull of the Recent for bivalves is substantially less than had been thought," he says, but "the jury's still out on whether that says the record is OK" at other times and for other animals. Bambach, however, sides with Jablonski, as does paleontologist Douglas Erwin of the Smithsonian Institution's National Museum of Natural History in Washington, D.C. "This puts the Pull of the Recent to bed," he says. And other problems that plague the older record don't seem to apply here. "You have to believe the [past 65 million years of] diversity increase

is probably real," he concludes.

What could have been driving such a jump in diversity remains unclear. Speculations are numerous. Nutrients washed off rising mountain ranges may have fueled an increase in biological productivity that drove diversification. Or the subdivision of the world as continents split, opening new oceans dammed off from the others, could have created new places for different fauna to appear. The growing chill of the past 100 million years would also have increased the number of climate niches between the poles and the tropics for different animals to live in. Whatever the driver or drivers were, most paleontologists now have more confidence that searching for them is worthwhile.

—RICHARD A. KERR

## TOXICOLOGY

# E.U. Shifts Endocrine Disrupter Research Into Overdrive

**CAMBRIDGE, U.K.**—The European Union is embarking on a massive new effort to pinpoint the harmful effects of hormone-mimicking chemicals. Last month, the European Commission launched a collaboration involving 60 labs across the continent to investigate the threat that these substances, primarily pollutants, pose to humans and wildlife. The intent is both to give the E.U. the information it needs to ensure that chemicals are tested adequately for endocrine effects before reaching the market and to flag effects in compounds already out there.

Concern over so-called endocrine disrupters arose in the early 1990s, when studies tentatively linked rising levels of pollutants to declining sperm counts and cancer of the testicles, prostate, and breast in people and to genital malformations in wildlife. However, many of the studies have been controversial. Establishing a cause-and-effect relationship has been a "hot potato, politically and scientifically," says toxicologist Andreas Kortenkamp of the University of London School of Pharmacy, who coordinates the E.U.'s new Cluster of Research on Endocrine Disruption in Europe (CREDO).

The 4-year-long, \$23 million program is meant to complement a substantial amount of research already under way around the world. For instance, many labs are probing the effects of chemicals that mimic or block estrogens, female sex hormones. One thrust of CREDO will be to look hard at compounds that block or behave like androgens such as testosterone, the main male sex hormone. Thus CREDO will "act as a counterbalance" to the stack of findings on estrogen disrupters, says Ulrike Schulte-Oehlmann, an ecotoxicol-

ogist at the University of Frankfurt, Germany. Her 13-lab consortium hopes to zero in on invertebrates, perhaps sea urchins or snails, that might serve as "sentries" in polluted environments and as standard test systems for detecting potential effects in higher species.



**Endocrine canary.** Snails may serve as sentries for ill effects in people.

Another gap in understanding that CREDO will try to fill is the risk posed by bromine-containing flame retardants, used widely in polymers and textiles. These high-production chemicals, some of which bear striking toxicological similarities to known endocrine disrupters such as polychlorinated biphenyls, have been accumulating in aquatic food chains for decades. "This is a warning: We should be concerned about them," says toxicologist Joseph Vos of the National Institute of Public Health and the Environment in Bilthoven, the Netherlands, who is coordinating this part of CREDO.

The E.U. initiative will enter one controversial area: how hormone-mimicking chemicals interact with each other. Gauging the risks of individual chemicals in the milieu encountered in nature is "a nightmare scenario" for risk assessors, says Kortenkamp. Much work needs to be done to

develop proper test methods and assessment strategies that can untangle these risks, he says, particularly at low doses.

Once an endocrine disrupter enters the body, in principle it can target any organ having hormone receptors with which it can interact. "We have to check from top to toe," says Wolfgang Wuttke, a biomedical researcher at the University of Göttingen, Germany. His lab consortium will focus on known estrogenlike rogues, including pesticides, ultra-

violet absorbers in sunscreens, and phytoestrogens used in hormone replacement therapy. The researchers' goal is to reveal to what extent these compounds influence gene expression in nonreproductive organs.

Observers predict that the initiative's megacollaboration credo will bear fruit. "They have the critical mass to advance the field and see what is really important," says Tuomo Karjalainen, a scientific officer at the European Commission in Brussels.

—SONJA LORENZ

Sonja Lorenz has just completed an internship in Science's Cambridge, U.K., office.