RESEARCH BRIEFS

Cells repair spinal cord

A report in *Proc. Natl. Acad. Sci. USA* (**97**, 6126–6131, 2000) suggests that embryonic stem (ES) cells show promise for the treatment of spinal cord damage. In the paper, a team from the Washington University School of Medicine (St. Louis, MO) set out to produce oligodendrocytes derived from mouse ES cells and to determine whether these cells can myelinate axons in vitro and also in vivo, in both injured and uninjured adult spinal cord. The researchers used retinoic acid to induce the ES cells to form oligodendrocytes and labeled the cells with immunohistochemical markers. In culture, axons with mature, highly wrapped myelin profiles could be found, surprisingly, after only nine days—about a month sooner than cultures with nervous system-derived cells. In the uninjured model—myelin-deficient *shiverer* mice that lack the gene for myelin basic protein (MBP)—immunoreactivity for MBP was present in the space outlining the axons. In the injured model—rats with chemically demyelinated spinal cords—mouse-specific antibodies were found in the areas that had been demyelinated. "Similar types of remyelination should be achievable in humans," suggests lead author John W. McDonald. *JG*

Arabidopsis database

In a new public–private partnership, a large database of genetic polymorphisms in *Arabidopsis thaliana*, the standard model system for basic plant research, has become available to researchers worldwide (www.arabidopsis.org/cereon). The database of more than 39,000 polymorphisms was developed by Cereon Genomics (Cambridge, MA), but the company has decided to make the data public through The *Arabidopsis* Information Resource (TAIR), a collaborative project funded by the National Science Foundation (Washington, DC). Chris Somerville, director of plant biology at the Carnegie Institution of Washington, explains that "no other organism has such a rich collection of polymorphisms accessible to the academic and nonprofit sector." Cereon retains the rights to any commercial applications of the information in the database. A 10-year program (www.arabidopsis.org/workshop1.html) is also underway to assign functions to all *Arabidopsis* genes to develop a "virtual plant," which could significantly accelerate research on economically important species. *AD*

Research briefs written by Aaron J. Bouchie, Alan Dove, and Julie Grisham.

Swallowtails unaffected by *Bt* toxin


Photo by Arthur Zangerl

In the first of a series of field trials designed to assess the effects of pollen from *Bacillus thuringiensis* toxin (*Bt*) transgenic crops on nontarget insects, researchers have found that black swallowtail butterfly larvae are unlikely to be harmed by the pollen. These findings contrast with those from a laboratory study on monarch butterflies published last year that caused widespread public concern about the environmental effects of *Bt* pollen (*Nat. Biotechnol.* **17**, 627, 1999). In the new study, which will appear in an upcoming issue of *Proc. Natl. Acad. Sci. USA*, scientists at the University of Illinois (Urbana, IL) reared black swallowtail larvae on plants adjacent to fields of *Bt*-transgenic or nontransgenic corn. Although corn pollen accumulated on the leaves eaten by the larvae, there was no difference in butterfly health or mortality between the experimental and control groups. An important variable that the team quantified was the amount of corn pollen accumulating on nearby plants. "There are certainly theoretical studies of corn pollen densities," says senior author May Berenbaum, "but I'm uncertain ... as to how applicable they would be to any particular field of corn. That's why we measured pollen deposition ourselves." The new data should form a basis for better laboratory studies on transgenic pollen toxicity. *AD*

Biocatalytic success

At the May meeting of the American Society of Microbiology in Los Angeles, CA, biotechnology company Enchira Biotechnology (formerly Energy BioSystems; The Woodlands, TX) presented information on a bacterial biocatalyst containing a chimeric gene evolved to display greatly enhanced properties for controlling the biocatalytic reaction in the biodesulfurization of diesel fuel. Enchira says both the rate and extent of biodesulfurization are improved. Using the company's proprietary gene-shuffling technology—termed random chimeragenesis on a transient template (RACHITT)—researchers created an enhanced version of the *dszC* gene, which encodes dibenzothiophene monooxygenase, from related genes in *Rhodococcus erythropolis* IGTS8 and *Nocardia asteroides* A3H-1. RACHITT combines genes or gene fragments to produce chimeras that encode proteins with desired characteristics. Characteristics are then identified in growth selections and high-throughput screens for enzyme activity. According Philip Pienkos, a company research director, this is the first commercially relevant project using RACHITT. The company is now seeking licensing partners and working on other applications of RACHITT. Developing better biodesulfurization techniques is important because in the US, recent proposals from the Clinton Administration would require refiners to cut up to 97% of sulfur in diesel fuel. *JG*

From skin to bone

Researchers at the University of Michigan School of Dentistry (Ann Arbor, MI) have engineered human gingival and rat dermal fibroblasts that form bone capable of supporting hematopoietic tissue in vivo. In research described in a recent issue of *Hum. Gene Ther.* (**11**, 1201–1210, 2000), an adenovirus vector engineered to express bone morphogenetic protein-7 (BMP-7) was used to transduce both types of fibroblasts ex vivo. In the first of two experiments, transduced gingival fibroblasts, transplanted subcutaneously into 30 immunocompromised mice, stimulated ectopic bone and chimeric osteoblast formation in 100% of the transplants. In the second study, large portions of missing bone grew back in 100% of live rats transplanted with transduced dermal fibroblasts. The transplanted cells did not migrate from the surgical site, nor was there any sign of inflammation or dysplasia in the peritransplant region. Bruce Rutherford, a senior author on the paper, hopes this work will help ease the pain of patients whose bone grafts currently come from other bones in their body. "Because donor cells can be obtained painlessly and grown in vitro," he says, "this technique is less invasive, simpler, faster, and exhibits far less morbidity than current practices." The team is now investigating how gingival and dermal cells give rise to tissues and organs distinct from their tissue of origin. *AJB*