



Stem Cells and Neurological Disorders

CONSTANCE HOLDEN'S ARTICLE "VERSATILE cells against intractable diseases" (News Focus, 26 July, p. 500) is fascinating, but also somewhat misleading. I believe that it is important to point out that most stem cells transplanted into humans to treat neurological disorders do not develop into differentiated cells with neuronal profiles. About 90 to 98% of the initial grafts disappear over time, and those that do remain seem to migrate from the initial zone of implantation and assume glial rather than neuronal morphology. Nonetheless, it is interesting to note that in many cases, functional recovery can still be obtained and sustained over long periods of time in the absence of new neuronal circuits being formed between the host and transplanted tissue.

Holden also seems to suggest that the only way to obtain functional repair is through inherent neurogenesis or by the transplantation and development of "precursor" cells into neurons. The "plasticity" of the nervous system is not "newfound" at all. Even the great neuroanatomist, Santiago Ramon y Cajal, writing at the beginning of the 20th century, was aware of the inherent capacity of the nervous system to show limited repair by axonal and dendritic collateral sprouting (1). Whether damaged nerve cells can actually develop new branches as a form of regeneration has been more controversial; nonetheless, there has been an existing literature for more than 30 years on this topic.

Because there is so much financial interest in developing stem cell therapies, one has to be very careful about overinterpreting claims about their safety and efficacy. Another recent *Science* article ("Stem cells not so stealthy after all," G. Vogel, News of the Week, 12 July, p. 175) points out that, as they differentiate, stem cells may be rejected by patients. Under such circumstances, it seems unwise to promote stem cell therapies too vigorously. Much more needs to be known about what the cells are and what they actually do in the damaged or diseased brain.

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Reference

1. S. Ramon y Cajal, *Trab. Lab. Invest. Biol.* VIII, 2 (1910) [as translated by F. Reinoso-Suárez, in *Neuroplasticity: A New Therapeutic Tool in the CNS Pathology*, R. L. Masland, A. Portera-Sanchez, G. Toffano, Eds. (Liviana Press, Padua, Italy, 1987), pp. 31–37].

Taxonomic Bias and Vulnerable Species

THE TAXONOMIC BIAS IN CONSERVATION research noted by J. A. Clark and R. M. May ("Taxonomic bias in conservation research," Letters, 12 July, p. 191) (1) is not unexpected, but their letter neglects an important aspect of this disparity—its inverse relation with extinction risk across taxonomic groups. Although a disproportionate amount of research focuses on vertebrates in general, and birds and mammals in particular, our analyses of the conservation status of U.S. organisms find birds and mammals to have the lowest extinction risk levels among 14 taxonomic groups ($n = 20,897$ species) examined (2). Only 14% and 16% of U.S. birds and mammals, respectively, are classified as extinct, imperiled, or vulnerable, whereas 69% of unionid mussels, 51% of crayfishes, 43% of stoneflies, 37% of freshwater



51% of crayfish species are classified as extinct, imperiled, or vulnerable.

fishes, and 33% of flowering plants are included in those risk categories (3, 4). These figures are consistent with emerging data at a global level (5). Although a global amphibian assessment is currently under way, birds and mammals, not surprisingly, are the only two major groups so far comprehensively assessed worldwide. We agree with Clark and May that there may be useful reasons for focusing research on charismatic organisms, such as garnering public support and funds for conservation, but our data suggest that such an approach underrepresents the vast majority of species and those organisms at greatest risk of extinction and thus in greatest need of conservation attention.

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References and Notes

1. J. A. Clark, R. M. May, *Conserv. Practice* 3, 28 (2002).
2. B. A. Stein *et al.*, *Precious Heritage: The Status of Biodiversity in the United States* (Oxford Univ. Press, New York, 2000).
3. Risk assessments are based on conservation status ranks in use by NatureServe and its natural heritage program members. Definitions, assessment criteria, and current status ranks for each species are available at www.natureserve.org/explorer.
4. See pp. 100–104 of Stein *et al.* (2).
5. C. Hilton-Taylor, *2000 IUCN Red List of Threatened Species* (IUCN, Gland, Switzerland, and Cambridge, UK, 2000).

Response

WE WARMLY WELCOME STEIN *ET AL.*'S comments, which we think reinforce our message and also add an important further dimension. Our primary hope in documenting taxonomic bias in the conservation literature was to begin a dialogue in which this bias is both acknowledged and addressed. In fact, there are opportunities as well as liabilities inherent in such bias—witness, for example, World Wildlife Fund's success in using the panda on its logo as a means of inspiring interest and donations for broad biodiversity protection. Nevertheless, as Stein *et al.* note, the goal of preservation of all biodiversity cannot be realized as long as we continue to bias our research toward birds and mammals.

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Cancer Epigenetics and Methylation

AN IMPORTANT QUESTION IN THE FIELD OF cancer epigenetics involves the causes of CpG island hypermethylation in tumor suppressor genes leading to transcriptional silencing. L. Di Croce *et al.* recently shed