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#### References

1. *Endless Frontier, Limited Resources: U.S. R&D Policy for Competitiveness* (Council on Competitiveness, Washington, DC, 1996).

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#### Psychobiology and Biopsychology

In reference to Eliot Marshall's News & Comment article of 9 August (p. 731), it is difficult to understand why drug-abuse neuroscientists are concerned about being fully integrated into the National Institutes of Health (NIH) peer review system. Those scientists have conducted cutting-edge research on and have made major contributions to our understanding of brain and behavior: They predicted (from behavioral studies) the existence of and then identified several classes of opiate receptors, thereby revolutionizing the concept of neurotransmitters and brain function; they specified and cloned the receptors for every major drug of abuse (and discovered several com-

pletely novel ligands); they advanced the conceptualization of drug dependence as a biologically mediated disease; and they made fundamental discoveries involving the mechanisms of analgesia, tolerance and dependence, pleasure and pain, and reward and punishment, and then used all of this information to develop new treatments for drug abuse, alcoholism, nicotine addiction, and pain. In light of these and other impressive accomplishments, they should be able to compete successfully against and take their place among the best in the world in the life sciences.

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Marshall's article suggests that the distinction between psychobiology and biopsychology is fuzzy and hard to explain, even by NIH staffers. This portrayal of arbitrariness in naming these two neuroscience specialties is not justified. Psychobiology emphasizes biologically dependent variables (for example, brain states) as functions of psychological or behavioral independent variables. Biopsychology emphasizes psychologically

or behaviorally dependent variables as functions of biological independent variables (for example, drug states). The two approaches to brain and behavior are complementary in that it is impossible to establish a causal link or isomorphism between a behavioral state and a brain state without both approaches. It is high time that the two were combined in NIH study sections.

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#### Science Teaching: How to Spend \$5 Million

I second the opinion of Stan Metzenberg (Letters, 9 Aug., p. 721), regarding the absurdity of the National Science Foundation spending \$5 million to encourage faculty at research universities to teach well. Metzenberg's critique, however, which aims at increased support for the "second-tier universities" where "faculty actually teach their own courses," leaves out the fact that it is this nation's liberal arts and sciences colleges which have historically produced a dispro-

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portionately large number of students who have gone on to earn doctorates in the sciences and which continue to provide leadership in the design and implementation of the most effective undergraduate teaching methods. If \$5 million spent to support science teaching at second-tier universities would have a significant impact, imagine how powerful would be the results of those same dollars spent at liberal arts and sciences colleges to support and reaffirm the outstanding job they are already doing. Just one small portion of those dollars provided to increase support for student-faculty collaborative research—typical at our colleges, but rare except at the graduate level in the first- and second-tier universities—would have an impact far beyond its “drop-in-the-bucket” significance for the big research universities.

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### Exposure to Methylene Chloride

James Huff, John Bucher, and J. Carl Barrett state in their letter of 24 May (p. 1083) that new, possibly exculpatory, evidence (Meet-

ing Briefs, 12 Apr., p. 200) should not be taken into account in reassessing the potential cancer risk posed by methylene chloride. This research was thought sufficiently important that the Occupational Safety and Health Administration reopened the record in its methylene chloride rulemaking (1), and the Environmental Protection Agency (EPA) is considering a reassessment of methylene chloride under its revised guidelines for carcinogen risk assessment. This is significant because EPA's Science Advisory Board and other reviewers have considered the rat results discussed by Huff *et al.* to be largely irrelevant to assessing methylene chloride's potential risk to humans (2).

As for the criticisms of research showing that mice are unusually susceptible to this chemical, the results of experiments cited by Huff *et al.* do not show that the increase in lung tumors observed in the mice occurred by a mechanism that would also be operating in humans, as one of the authors (R. R. Maronpot) of a paper by F. W. Kari *et al.* (3) acknowledged at the summer 1993 Toxicology Forum (4).

Huff *et al.* [paraphrasing the results of Kari *et al.* (3)] state that “mice exposed to only 2000 parts per million of methylene chloride . . . showed eventual lung and liver cancers . . .,” implying that this is a low

exposure. In fact, 2000 parts per million is a very high exposure that far exceeds the saturation limits of the P450 pathway.

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### References and Notes

1. *Fed. Regist.* **60**, 54462 (1995).
2. For example, letter from EPA's Science Advisory Board and report to William D. Ruckelshaus, EPA Administrator (18 July 1984).
3. F. W. Kari, F. J. Foley, S. K. Seilkop, R. R. Maronpot, M. W. Anderson, *Carcinogenesis* **14**, 819 (1993).
4. “Methylene chloride mechanistic and bioassay studies,” Toxicology Forum, National Institute of Environmental Health Sciences, Aspen, CO, summer 1993, transcript, p. 350.

### California Civil Rights Initiative

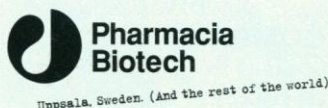
In her letter of 23 August (p. 1031), Lucy Johns repeats the charge that a clause in the California Civil Rights Initiative (CCRI) “drastically dilutes protection against discrimination by gender.” This charge, an effort to defeat the CCRI, is simply untrue. In an open letter to the people of California, 26 of the most distinguished constitutional lawyers in the country, some in favor

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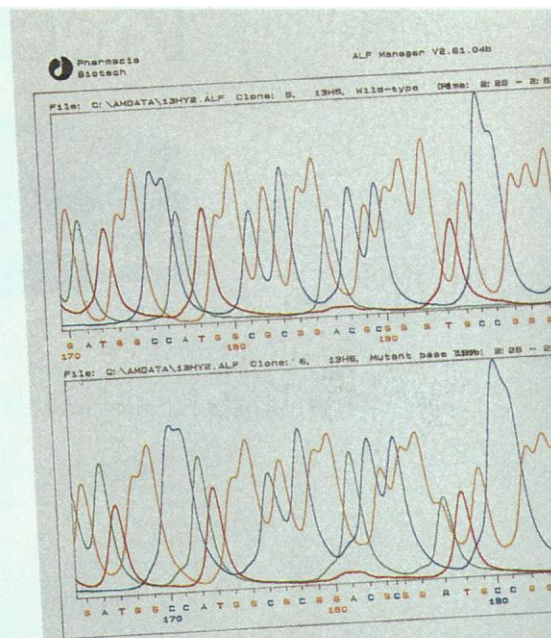
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The p53 gene from 316 breast cancer patients was sequenced using ALF automated sequencing technology. (Bergh J., Norberg T., Sjögren S., Lindgren A., Holmberg L. “Complete Sequencing of the p53 Gene ...” *Nature Medicine* 1995; 10:1029-1034.)

