Letters

Songbirds' Brains: Sexual Dimorphism

We read with great interest the Research News article by Gina Bari Kolata "Sex hormones and brain development" (7 Sept., p. 985). That article highlights brain sexual dimorphism, particularly in the preoptic area of rats. It is important to note that the behavioral significance of this dimorphism still awaits elucidation and that the connectivity of the sexually dimorphic regions remains undescribed.

In contrast to this limited information about rats, the brains of songbirds such as the canary and zebra finch, not mentioned by Kolata, show marked sexual dimorphism of telencephalic vocal control nuclei, and this dimorphism relates nicely to the fact that in these species males sing, but females normally do not. The anatomical differences between the brains of the two sexes are so blatant that it is sufficient to hold a Nissl stained slide against a light and "sex" the brain by noting the size of either of several telencephalic vocal control nuclei (*1*). The connectivity of these vocal control nuclei has been described (*2*).

The sexual dimorphism in the vocal control pathways of songbirds was discovered at a time when the accepted view still was that grossly the brains of male and female vertebrates were much alike, and hormones induced sexual differences in behavior by inducing subtle changes in the microanatomy of neurons and their connections (*3*).

Our observations were followed 1 year later by the published work of Greenough, Carter, and their colleagues at the University of Illinois (*4*), and in 1978 by that of Gorski and his colleagues at the University of California, Los Angeles (*5*), who reported sex-related, light-microscopic differences in the preoptic area of hamsters and rats, respectively. The notion of gross brain sexual dimorphism in vertebrates had come of age!

It has been common enough to focus on studies of rats, hamsters, and such as providing a relevant comparative link to biological matters of human interest. Kolata's review is much in this tradition. Surely there is room for a broader outlook. As a footnote we would like to add that the sexually dimorphic vocal control pathways of canaries and zebra finches are responsible for song, which in these species is a complex learned motor skill (*6*).

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Ionizing Radiation Study

The National Academy of Sciences (NAS) has been requested to examine the scope and quality of federally sponsored research into the effects of ionizing radiation. All federal agencies that sponsor radiation research are participating in the collection of the basic data that will serve as the starting point for the committee's deliberations.

The active participation of those conducting the research programs will be sought by the committee to help to clarify the scope of current research efforts. Each principal investigator will soon receive a questionnaire which has been designed to solicit the relevant information.

Of particular concern to the committee is the encouragement of the scientific community at large to express their views on the national needs for future research on the effects of ionizing radiation. To this end, the Academy has already held one public forum on the subject, but further suggestions are sought. We will be grateful for the views of the readership of *Science* that will help to clarify and specify the problems and goals that a future research agenda should meet. Comments may be addressed to the Committee on Federal Research on the Effects of Ionizing Radiation (FREIR), Room 344, National Academy of Sciences, 2101 Constitution Avenue, Washington, D.C. 20418.

The NAS committee is chaired by Russell Morgan, University Professor Emeritus of Medicine at Johns Hopkins University, and is composed of Elie Abel, Stanford University; John J. Crowley, University of Wisconsin; Patricia W. Durbin, Lawrence Berkeley Laboratory; Robert C. Elston, Louisiana State University; Edward R. Epp, Massachusetts General Hospital; Patrick J. Fitzgerald, Memorial Hospital for Cancer and Allied Diseases; Hans E. Frauenfelder, University of Illinois; Harry K. Genant, University of California at San Francisco; George T. Harrell, Jr., Milton S. Hershey Medical Center; George B. Hutchison, Harvard University; Leon O. Jacobson, University of Chicago; John S. Laughlin, Memorial Sloan-Kettering Cancer Center; Cyrus Levinthal, Columbia University; Charles W. Mays, University of Utah; J. Frank McCormick, University of Tennessee; Robert D. Moseley, Jr., University of New Mexico; Robert D. Phemister, Colorado State University; Edward B. Roberts, Massachusetts Institute of Technology; Charles T. Schmidt, Lawrence Berkeley Laboratory; Raymond Seltser, Johns Hopkins University; John F. Sherman, Association of American Medical Colleges; Carl Shy, University of North Carolina; H. Eldon Sutton, University of Texas at Austin; and Sheldon Wolff, University of California at San Francisco. Extensive use of advisory consultants in critical disciplinary areas is anticipated. The staff director for the study is Daniel L. Weiss of the National Research Council.

The Academy is undertaking the study through a contract with the National Institutes of Health. The results will form the basis for the development of a federal research agenda aimed at meeting future national needs.

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