CBE Life Sciences Education
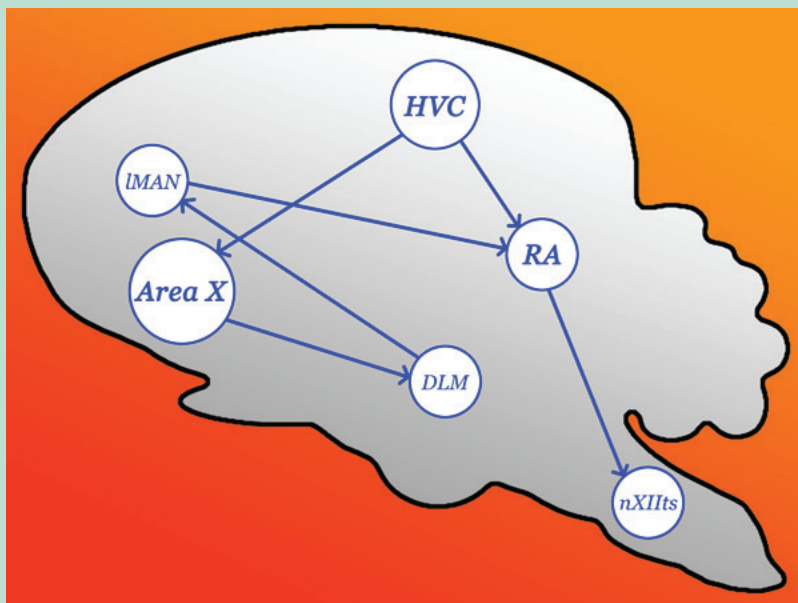
Undergraduate Research as Instruction

Table of Contents

On the Cover

(1) Schematic/Diagram (top): This schematic depicts the song control system found in zebra finches and other songbirds. Circles represent collections of cell bodies, and arrows represent axonal connections among them. Some of these regions, Area X, HVC, and RA, are dramatically larger in males and are sensitive to the trophic effects of gonadal steroids in early development. Area X and HVC are proper names; lMAN is the lateral magnocellular nucleus of anterior nidopallium; DLM is the nucleus dorsolateralis anterior thalami, pars medialis; RA is the robust nucleus of arcopallium; and nXII is the hypoglossal nucleus. (2) Zebra Finches (bottom): This image shows the sexually dimorphic plumage of zebra finches. The male, on the right, sports orange cheek patches, fawn-colored brown feathers down his sides, and black and white stripes on his breast and throat, which give this species its name. The female, on the left, tends toward monochrome gray plumage. Sexual dimorphism in plumage is paralleled by sex differences in song behavior and in the brain circuit underlying this behavior, which is more elaborated in males. Image courtesy of Arthur P. Arnold, PhD, Department of Integrative Biology and Physiology, University of California, Los Angeles. See the article by William Grisham *et al.* on p. 222 on "Using Digital Images of the Zebra Finch Song System as a Tool to Teach Organizational Effects of Steroid Hormones: A Free Downloadable Module."