

## Environmental Enrichment for Laboratory Rodents: Animal Welfare and the Methods of Science

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Because of the difficulty of establishing objective measures of laboratory rodents' psychological well-being, developing environmental enrichment programs that are actually beneficial to rodents destined to participate in laboratory research is particularly challenging. Many studies of effects of environmental complexity, social housing, and increases in cage size suggest that professional judgments as to the impact of diverse types of environmental enrichment on rodent welfare are not a reliable basis for evaluating the outcomes of enrichment programs for laboratory rodents. Successful enrichment programs will vary from one rodent species to another, between sexes, as well as between age classes. There is a need for objective, measurable goals for proposed environmental enrichment programs for rodents, as well as for empirical investigations of the beneficial and detrimental consequences of proposed environmental manipulations.

Improving the welfare of rodents destined to participate in laboratory research by enrichment poses challenges that often do not arise when enriching the maintenance environments of nonhuman animals kept for other purposes. If, for example, members of an endangered species are held in captivity with the intention of eventually releasing their progeny into natural habitat, at least in principle, it is easy to determine whether an environmental enrichment program has been successful. If some change in the captive environment increases the probability that a released individual survives and reproduces in natural circumstances, then enrichment has been successful. The probability of survival and re-

