Robbins, Phillips, and Sahakian (*11*) have demonstrated that chlordiazepoxide (Librium) actually increases tail-pinch-induced eating at doses that have no effect on eating during control trials with no pinch. This result suggests that the eating is produced by an appetitive component of the tail pinch, which is unmasked from the inhibitory, aversive component by the effect of the drug. The same interpretation has been applied to the effects of tranquilizers on eating induced by electrical stimulation of the lateral hypothalamus (*5*).

We agree in the most part with Katz's comments, but we cannot agree with the proposal that arousal (or incentive) and aversion are "inextricably related and jointly necessary for the learning," since, if their effects cannot be separated, parsimony requires that they be reduced to a single activating or motivating process. Reward and aversion may be the sensations associated with an approach or withdrawal response, but an association must be formed between these emotional sensations and the activating process. The learning of inappropriate associations may explain studies showing that squirrel monkeys and cats will work for electric shock (*12*), and hungry rats and squirrel monkeys will work to postpone food presentation (*13*).

All that is necessary then for learning is activation, which can be defined as stimulus change; whether an animal learns to approach or avoid will depend on the situation. Although they are not identical, tail pinch and brain stimulation both activate the animal, as does deprivation. Perhaps the nonspecific component of deprivation is all that is necessary to motivate learning; the particular sensations of hunger or thirst are merely cues in the presence of which learning occurs.

PAUL J. FRAY
GEORGE F. KOOB*
SUSAN D. IVERSEN
Psychological Laboratory, University of Cambridge, Cambridge CB2 3EB, England.

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* Present address: Salk Institute, P.O. Box 1809, San Diego, Calif. 92112.

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H-Y Antigen Gene Loci

Detection of the H-Y antigen in the heterogametic sex of vertebrates is probably one of the most important discoveries to have been made in recent years concerning differentiation of gonadal tissues; however some exceptions have been noted which raise many questions about the strict localization of the genes responsible for expression of this antigen to only the short arm of the Y chromosome (p). The exceptions include Sxr mice, some *Myopus schisticolor* XY embryos, and human XX males and true hermaphrodites (*1*, *2*). Additionally, Koo *et al.* reported a case of a human female who was H-Y$^+$ and whose karyotype was 46,X,der(X),t(X;Y) (*3*). This derivative chromosome was reportedly composed of the short arm (p), centromere, and the proximal long arm (q) of an X that was translocated to a Yq.

Arguments to explain these exceptions have been made for pericentric inversions of the Y, two loci on the Y, or an unseen translocation of some Y material elsewhere; the basis for these ideas seems to be the belief that the H-Y antigen must be confined to the "male chromosome," at least in mammals. Wachtel (*2*) admits that the dosage effect of supernumerary Y's ". . . is not easily reconciled with the existence of a Y-situated regulator . . . ." The ideas of multiple gene copies and loci that are distributed throughout a genome are not new ones, but are not adequately treated as a viable explanation for the unexpected cases of H-Y antigen expression or lack of it.

Studying mammalian chromosome evolution reveals that the X has remained more stable, while the Y shows great variability between species and the human races (*4*–*8*). This fact, together with the similarity of X and Y prometaphase banding patterns, random inactivation of X material (Lyon's hypothesis), and the homology that must exist between the X and the Y, suggests that the Y may be an evolutionary breakdown product of an originally sexually bipotential X. This would also be consistent with evolutionary divergence of the amphibian and the H-Y$^-$ homogametic *Xenopus laevis* male.

Consequently, the X would host an H-Y operon that is normally repressed by the X-situated regulator. The Y may have lost its regulator, with probable mutation of the operator so that it is insensitive to repression. The X would normally not express H-Y antigen except in the case of a mutated operator or regulator. This would account for the citations above and the reduced amount of H-Y antiserum binding in human XX males and true hermaphrodites (*1*, *2*). The gene dosage effect of Y's is now also explained.

In conclusion, while I must agree that the H-Y antigen genes are located on the Yp, other evidence requires that additional loci be considered. H-Y antigen studies of persons with partially deleted or ring X chromosomes may prove just as informative if not more so than confinement to presumed unusual Y's.

FLOYD H. THOMPSON
University of Illinois at the Medical Center, Chicago 60612, and *Illinois Institute for Developmental Disabilities, Chicago 60608*

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