Comparison of Nonparallel Immunoassay Curves

by

Mark S. Kaiser and David Siev
Iowa State University and U.S. Department of Agriculture

ABSTRACT

Relative potency is a measure that has been used for many years to summarize the comparison of dose-response curves in parallel line bioassays. When response curves for two preparations are not parallel the traditional definition of relative potency no longer applies. We review the concept of relative potency and show that it can be given meaning for nonparallel curves as the ratio of effective chemical concentration in full strength assay preparations. Estimation of relative potency for nonparallel curves can be accomplished under an assumed theory of response attenuation due to competition of target and competitor antigens in one of the two preparations. We show that estimation of models for both parallel curve and response attenuation situations may be accomplished within the framework of generalized linear models. This estimation depends on the ability to deal with several nonlinear parameters appearing in the link function, and an iterative algorithm depending on direct parameter updates is outlined. The topics discussed are illustrated with the analysis of data from two immunoassays conducted with veterinary vaccines.