Whole-Body Autoradiography for Development of New Products – Evaluation of Results

William J. Waddell, M.D.
Department of Pharmacology and Toxicology
School of Medicine
University of Louisville
Louisville, Kentucky, USA

Summary

The details of the technique of whole-body autoradiography are reviewed. An explanation is presented of why an increased concentration of total drug at a site always indicates an interaction, of some kind, with a biological substituent. Common causes of increased concentrations which are not specific interactions, such as lipid solubility, protein binding, pH gradients, etc., are discussed. Because of the expense and labor involved in preparing whole-body autoradiographs, a geometric time scale is used for sacrificing the mice. A geometric progression of three, based on one hour, is the most efficient time scale to use for all studies of first-order elimination kinetics. Examples are given for some potential problems which would effect the interpretation of the whole-body autoradiographic studies. These include detachment of the isotopic label from the compound, influence of route of injection of poorly water-soluble compounds and translocation of radioactivity in wet sections. The usefulness of the technique in determining localization in particular cell types and correlating this localization with specific enzyme activities and metabolism of drugs in specific cells are presented. The different methods for quantification of the radioactivity in the tissues of the body are discussed; it is possible to quantitate radioactivity in areas as small as bronchial epithelium and salivary gland duct epithelium.