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Use of an Epidermal Culture for Cutaneous Toxicity Studies

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I. INTRODUCTION

The skin is one of the organs most frequently exposed to gaseous, liquid, and solid environmental substances that can result in a breakdown of homeostatic mechanisms. Contact with chemicals used in hygiene, medication, cosmetic application, as well as chemicals that result from the development of industrial products, is a constant public health concern. Thus, substances that may cause skin irritation are among those that are constantly under surveillance. Animal assay systems usually involve the application of these substances onto the shaven backs of rabbits and other animals, followed by incubation periods that result in lesions of various severity as quantified by subjective pathological examinations. The Draize skin test (1) is used most frequently by industry and is recommended by regulatory agencies in assaying and classifying chemicals potentially irritating to the human skin. The significant variability of this and similar in vivo animal tests in accurately predicting irritancy to human skin has been observed and reported (2). Studies have also shown that results obtained from such animal experiments are often equivocal and sometimes do not reflect responses that occur when humans are similarly exposed (3). It is also particularly difficult to study mechanisms of toxicity in the whole animal, in part, because of the high levels of exposure necessary to elicit a measurable response and also because of the undescribed interactions of various physiological systems. However, regulatory agencies offer little in the way of alternatives for preevaluating products before they can be released for public use (4). What is needed is an in vitro sys-