

FOUNDATION: 1999 Grant Reports Retrospective Analysis of Foot Lesion Development in Rats Housed on Wire-bottom Versus Solid-bottom Caging, and Between Rats from Different Sprague-Dawley Suppliers

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The use of wire-bottom versus solid-bottom caging for rodents is an important contemporary issue in the field of laboratory animal science. Solid-bottom caging supporters note that this housing method provides a warm, draft-free environment with wood chip, corncob or paper bedding available for nesting behavior. Many toxicologists prefer wire-bottom caging to decrease coprophagy and to reduce caging and handling expenses. In chronic studies and carcinogenicity bioassays, however, rats housed on wire may develop foot lesions such as ulcers, calluses and other deformities. The 1996 Guide for the Care and Use of Laboratory Animals states that while rodents are often housed on wire flooring, evidence suggests that solid-bottom caging is preferred. Based on three dated references, the Guide concludes that "Solid-bottom caging with bedding is therefore recommended for rodents". While these studies yielded some useful information, they all utilized small numbers of animals, and primarily studied peripheral nerve abnormalities and microscopic nerve lesions.

Our facility performed a 2-year rat chronic toxicity/oral carcinogenicity study with the final terminations in November of 1996. That study was an internal research and development-funded project designed to evaluate what effect differences in feed type, housing, supplier, and gavage treatment might have on growth, survival, and spontaneous disease. Sprague Dawley rats from two different suppliers (Harlan Sprague Dawley, Inc., and Charles River Laboratories, Inc.) were utilized, and the rats were housed in either wire-bottom or solid-bottom cages. Multiple parameters were captured electronically during the course of that study, including clinical observations, body weights, and clinical and anatomic pathology data. For this report, data from selected groups was extracted and analyzed retrospectively to determine differences in numbers of animals with foot lesions, the time to onset of foot lesions, and differences in body weight over time.

We found that significant foot abnormalities were more common in heavy male and female rats, when compared to lighter animals, and abnormalities were more common in rats housed in wire cages. Relative to body weight comparisons, the Charles River rats were heavier on average than the Harlan Sprague Dawley rats at each time point examined. However, despite differences in weight, cage type and supplier, significant lesions were not found until the rats had been housed for over one year. Thus, it appears that wire caging can be used for rats in study designs of up to one-year duration without adversely affecting health and humane care. For studies of greater than one year duration that require wire caging, further study into the use of cage inserts or resting boards may be indicated. This information may be of particular interest to Institutional Animal Care and Use Committees (IACUCs) when setting policies for studies of varying durations.

NOTE: Since these summaries can not capture the detail of the projects, we look forward to reading the full publications in the literature. We thank the authors and staffs for their efforts to expand the body of knowledge in our field.