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Phenotyping challenges in genetically engineered mice

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Abstract

Genetically engineered mice (GEM) are a staple of modern biomedical research. While genetic engineering technology has become more and more sophisticated, proper pathological analysis of these animals is often lacking. Proper pathological analysis is often replaced by Do-it-Yourself (DIY) pathology, which often resulted in surprising "scientific discoveries".

This study's objective was to highlight published instances of erroneous interpretations of lesions and non-lesions in genetically engineered mice in the hope that more biomedical investigators can be persuaded to involve properly trained and experienced veterinary pathologists in their evaluation of newly created GEM.

The main reasons of erroneous interpretation were found to be either unfamiliarity with mouse anatomy and/or histology or misinterpretation of inflammatory or proliferative in lesions in mice as neoplastic processes.

Proposed solutions to this acute problem are presented as well. First, training institutions should modify their training program to include instruction in mouse and GEM pathology. Second, scientific peer review of manuscripts on GEM should involve an appropriately credentialed veterinary pathologist. Third, funding agencies should recruit veterinary pathologists to their study sections to evaluate proposals on GEM.

Biography

Tamas Nagy obtained his Doctor of Veterinary Medicine degree from Szent Istvan University in Budapest, Hungary in 1994. He completed residency training in veterinary anatomical pathology in 2000 and his PhD in 2008, both at Cornell University in Ithaca, NY. He is currently on the faculty at the University of Georgia and directs the Comparative Pathology Laboratory, a core laboratory that provides preclinical and R&D research pathology services for investigators who use laboratory animals in their research. He has published more than 20 papers in peer-reviewed journals. He frequently teaches workshops on rodent phenotyping and laboratory animal pathology.