Comparative Pathology of Animal Models of Cerebral Malaria

LTC Eric Lombardini
Chief, Divisions of Comparative Pathology and Veterinary Medical Research, Department of Veterinary Medicine
Armed Forces Research Institute of Medical Sciences
Bangkok, Thailand

Abstract
The literature is full of arguments as to the worth and relevancy of these various models. Regardless of the debate, the need for accurate, effective and comparable animal models for cerebral malaria research is crucial, and remains a critical boundary to the discovery of new antimalarial compounds and vaccines. The 50th anniversary of the discovery of Plasmodium coatneyi has just been observed since the parasite was first reported in 1961 in an anopheline mosquito from Malaya. Subsequently in the following years, the parasite was experimentally inoculated into a cynomolgous macaque and described, although it had initially being misdiagnosed as Plasmodium knowlesi due to the morphological features observed microscopically in a blood smear. The plasmodium was subsequently found in the blood of a cynomolgous macaque (Macacainus) in the Philippines and has since been used as a model for cerebral malaria in a variety of non-human primate species with varying degrees of success. A significant amount of the foundational work on the parasite and the pathophysiology of infection in macaques has been and continues to be conducted throughout the world in hopes of perfecting the animal model of human disease. The discussion as to the validity of the various models hinges on the comparative pathology of each species in comparison with the human parasite and includes histopathological features, ultrastructural features and molecular markers. Several research groups worldwide are currently examining different features of the rhesus macaque-Plasmodium coatneyi cerebral malaria model, and the debate as to the validity of the rodent models continues. The lecture will concentrate on the discussion of the clinical signs, histopathological and ultrastructural features of the non-human primate model in comparison with the pathology of cerebral malaria in humans.

Selected Publications