Investigations into Photodynamic Therapy for Equine Sarcoids

Kelly White, Oregon State University-College of Veterinary Medicine, and faculty mentor
Dr. Scott Gustafson, DVM, MS, DACVS, Veterinary Clinical Sciences

Abstract

The potential for using photodynamic therapy (PDT) with the photosensitive drug delta-aminolevulinic acid (ALA) to treat equine sarcoids is currently being tested in vivo in a clinical trial. Surgery, cryotherapy, radiation therapy, and immunotherapy have been used in the treatment of sarcoids. However, none of these have been uniformly successful due to a high rate of recurrence despite aggressive treatment. PDT has been emerging as a successful treatment modality in humans with many forms of locally invasive neoplasia. PDT involves selective accumulation of a light-activated photosensitive agent or porphyrin, such as ALA, in tumors. Illumination of the target tissue with light activates the drug in the tumor tissues that have accumulated the agent, thereby enabling selective treatment of tumor. Porphyrins release singlet oxygen radicals when excited by photons. These free radicals damage cell membranes to elicit apoptosis, or programmed cell death. We plan to treat four equids with injectable ALA solution (1mg/ml) directly into the sarcoid, and four equids topically with a 20% ALA lipoderm ointment. All eight patients will then be exposed either to direct sunlight or locally with a diode laser emitting a 635 nm red light. As of July 19, 2001, four equids (three horses and one donkey) have been treated with PDT and ALA. The three horses were treated by injection with a solution of ALA directly into the sarcoid which was then exposed to the red light of the laser with subsequent injections of ALA solution every 20-30 minutes for two hours. The donkey was treated by injecting ALA solution again directly into the sarcoid which was then exposed to direct sunlight. Digital photographs and measurements will be taken on day 1-3 post treatment, as well as a biopsy on day 3 to determine whether apoptosis is occurring.