RESEARCH ABSTRACT

ANIMAL WELFARE

Title: Determining the Topical and Oral Pharmacokinetics of Flunixin Meglumine in Pre-wean Piglets and Developing Tools for Drug Study in Pre-Wean Piglets – **NPB #17-082**

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Scientific Abstract: Needle-free pain mitigation in pre-wean piglets is an area of need. In order to lay the foundation for future efficacy studies of flunixin meglumine (FM), scientific data of serum levels and the bioavailability of topical administration of FM are necessary. The objectives of this study were as follows: 1) Find the spot on a piglet where topical application of drug will most likely lead to transdermal absorption of drugs and systemic circulation and quantify that area. 2) Adapt a procedure to place indwelling, dual lumen intravenous (IV) jugular catheters in pre-wean piglets. 3) Measure and compare the pharmacokinetics of intramuscular (IM), oral (O) and topical (T) administration of FM in pre-wean piglets. 4) Precisely determine bioavailability of the topical route of administration. For each of the objectives, pre-wean piglets, 5-10 days of age, weighing 5-10 pounds were randomly allocated to groups, dependent upon the objective. Piglets for the first objective were humanely euthanized and skin samples collected from 32 anatomical location. Samples were prepared in formalin and submitted for histological evaluation. There were significant differences between sample sites for each skin characteristic evaluated. For objective 2, percutaneous jugular vein catheterization was attempted using dual lumen catheters in order to expand and refine pre-wean piglet catheterization techniques for pharmacokinetic studies. Catheterization was successful in 3 of 10 piglets and has potential as a useful technique for pharmacokinetics research. Piglets in objective 3 were assigned IM, O, or T route of administration of FM. Serum samples were collected from piglets post-administration of FM and submitted for analysis. Maximum plasma concentration (C_{max}) was 5,272 (ng/ml), 4,098 (ng/ml), and 31 (ng/ml) for IM, O, and T, respectively. Piglets in objective 4 were administered FM using both T and IV routes in a 2-way crossover design with a washout period of 9 days between routes. Preliminary calculations suggest the bioavailability for the topical route of administration is approximately 6.3%.