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Pharmacokinetics of enrofloxacin in *Exopalaemon carinicauda* after oral and intramuscular administration

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Many epizootic diseases are prevalent because of the high density aquaculture. Enrofloxacin is used to treat various systemic bacterial infections in aquatic animal. However, studies concerning the pharmacokinetics of enrofloxacin in *Exopalaemon carinicauda* which is important specie for polyculture in China are limited. Therefore, the pharmacokinetic profiles of enrofloxacin in *E. carinicauda* were investigated following a single oral and intramuscular administration (10 mg/kg body weight) at 20°C water temperature in this study. After drug administration the plasma and tissue samples (muscle, liver, and gill) were analyzed using an HPLC method. The results showed that the plasma concentration-time data for enrofloxacin were described commendably by a two-compartment open model with elimination half-life ($t_{1/2\beta}$) of 20.38 and 17.76 hour after oral and intramuscular administration respectively. The $t_{1/2\beta}$ values are reasonable and suitable for one time a day dosing regimen to achieve good efficacy and reduce the risk of drug residues. The drug concentrations in all the tissues were peaked at 1 hour after oral administration and 0.5 hour after intramuscular administration and the highest drug concentration was in hepato pancreas followed by gills and muscle. As enrofloxacin is a typical concentration-dependent drug, the C_{max}/MIC and AUC/MIC values were selected as indices to ensure its therapeutic efficacy in aquaculture. The plasma C_{max}/MIC values were 15.95 and 19.86 and the plasma AUC/MIC values were 797.51 and 993.07 for enrofloxacin on aquatic animal pathogens such as *Vibrio* and *Aeromonas* after oral and intramuscular administration respectively. These ratios indicate it can obtain good therapeutic efficacy using the current dosage and mode of administration of enrofloxacin. This study would be helpful for the clinical regimen design of enrofloxacin in *E. carinicauda* and provide reliable basis for use of enrofloxacin in aquaculture that could improve the quality of aquaculture products.

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Genetic selection and nutritional effects on physiological, genomic, and intestinal microbial responses and interactions

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Complete replacement of fishmeal in feeds has proven difficult for a number of aquaculture species. In carnivorous fish plant proteins often cause reduced growth and negatively affect gut health. Also, replacement of fish oil generally leads to a severe reduction for long-chain omega-3 fatty acids in tissues. Little is known about strain differences regarding effects of plant based diets in fish and the potential for selection for improved gut health, EPA and DHA synthesis and deposition, disease resistance and performance. Our laboratory has been selecting fish for the ability to efficiently grow and utilize in all plant protein diet that includes relatively high levels of soybean meal and soy protein concentrate. After several generations of selection we find that our selected fish not only grow faster than non-selected fish on the plant-based feed but do not develop intestinal enteritis as do non-selected fish. Furthermore, we have determined that variation exists within trout stocks for the ability to biosynthesize and deposit EPA and DHA in muscle in fish reared on feed in which fish oil has been replaced with flax oil. We are now utilizing these fish as a model to determine the underlying biology behind these traits we have chosen to examine the physiological and genetic components by evaluating data obtained from histological, transcriptomic, genomic, proteomic and microbial host interactions. In this presentation we will show responses and discuss the effect of diet and selection on animal physiology, metabolism, and gut microbiota and host responses.

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