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Capillary hydraulic conductivity (Lp) and infection in August Rana pipiens

Rana pipiens is a fundamental capillary physiology and Lp research model. While others have considered inflammatory mediators and Lp, few have focused on the frog's natural state and Lp. The purpose of this double blind study was to test antibiotic and anthelmintic drugs in summer Rana and assess Lp response to a change in shear stress. We hypothesized that treating naturally occurring Rana infections would decrease first occlusion capillary Lp. Frogs (n=24) were randomized into 3 equal groups. The control group received the laboratory standard of care: Gentamicin ($1.3\text{mg}\cdot\text{L}^{-1}$). Treatment 1 frogs (T1) received Gentamicin/Levamisole HCl ($12\text{mg}\cdot\text{L}^{-1}$) combination. Treatment 2 frogs (T2) received Levamisole/Enrofloxacin ($300\text{mg}\cdot\text{L}^{-1}$) (medications given topically as bath). Frogs were in medication-free, fresh water at least 8 days before experiments were initiated. Frogs were pithed cerebrally and true capillaries with no rolling or sticking white blood cells (WBC) were cannulated ($10\text{mg}\cdot\text{ml}^{-1}$ pipette BSA, 15°C) and stimulated with an abrupt change in shear stress. The modified Landis technique was used to assess Lp ($30\text{cmH}_2\text{O}$). Mean ($\pm\text{SE}$) Lp for T1 ($3.3\pm 0.4\times 10^{-7}$) was lower than control ($10.4\pm 2.6\times 10^{-7}$) or T2 ($11.7\pm 4.4\times 10^{-7}\text{cm}\cdot\text{s}^{-1}\cdot\text{cmH}_2\text{O}^{-1}$) ($P=0.04$). WBC and parasite numbers did not differ significantly among the groups. However, average number of living parasites in T1 (2.2 ± 1.5) identified at necropsy were lower than control (7.7 ± 2.0), but similar to T2 (2.8 ± 1.3 parasites) ($P=0.05$). These data suggest the Gentamicin/Levamisole drug combination lowers capillary Lp by opposing infectious agents in August Rana, thus increasing experimental success rate.