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# Cross-linked hyaluronic acid enhances tear film concentrations of chloramphenicol in canine eyes

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### Purpose

To compare tear film concentrations of topical chloramphenicol when formulated with two different excipients/lubricants.

### Methods

Chloramphenicol was compounded as a 0.5% solution using either 1.4% polyvinyl alcohol (PVA; Refresh<sup>®</sup>, Allergan) or 0.75% cross-linked hyaluronic acid (XHA; Oculenis<sup>®</sup>, Sentrax Animal Care). Ten ophthalmologically healthy dogs (5 brachycephalic, 5 non-brachycephalics;  $n = 20$  eyes) received one drop of chloramphenicol-PVA in one randomly selected eye, and one drop of chloramphenicol-XHA in the other eye. Tear fluid was collected with 2- $\mu$ l capillary tubes at times 0min, 1min, 5min, 10min, 15min, 30min, 60min, 120min, 240min, 360min and 480min. Chloramphenicol tear concentrations were measured with UV-Vis spectrophotometry.

### Results

No significant differences were noted in tear chloramphenicol concentrations between brachycephalic and non-brachycephalic dogs with either formulation at any time point ( $P \geq 0.095$ ). In all dogs, mean tear film concentrations were significantly higher with XHA than PVA at all time points ( $P \leq 0.01$ ) except for baseline ( $P = 0.353$ ). Tear film kinetics of chloramphenicol-XHA were somewhat 'biphasic', with drug levels decreasing from 0-120min, then slightly increasing from 120-240min prior to declining again until the end of the experiment (480min). The area under the time-concentration curve ( $AUC_{0-480}$ ) was 4.1 fold higher with XHA than PVA ( $P < 0.001$ ).

### Conclusion

XHA greatly improved tear film concentrations of chloramphenicol when compared to PVA, a less viscous excipient/lubricant. To dictate dosing regimens and determine clinical efficacy, future experiments should assess XHA- chloramphenicol in canine patients with bacterial keratitis and determine clinical breakpoints for chloramphenicol against common bacterial pathogens of canine eyes.

### Conflict of Interest

LS serves on the scientific advisory committee for the company that funded this study (Sentrax Animal Care).

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