THE MYSTERIOUS CASE OF VANISHING DRUG CONCENTRATIONS IN KOALAS

CHLAMYDIOSIS

CRYPTOCOCCOSIS

“No pharmacokinetic studies have been done for any drug used in koalas”

ENROFLOXACIN (Baytril®)
MELOXICAM (Metacam®)
CHLORAMPHENICOL
The researchers:

JOANNA GRIFFITH

BENJAMIN KIMBLE

LISA BLACK with ‘Evo’ & Christy Brown

ENROFLOXACIN

Mean elimination half life

$\lambda t \frac{1}{2} h$

CAT 6.7

HORSE 5.9

KOALA 2.9

MELOXICAM

$\lambda t \frac{1}{2} h$

DOG 24

PEOPLE 15-20

KOALA 1.5

SUMMARY

1. poor oral absorption into blood
2. Rapid elimination

WHY?
POOR ORAL ABSORPTION

- Excessive ingesta in GIT
- Breakdown by gut bacteria
- Extensive ‘first pass’ metabolism
- Enteroocyte cellular ‘efflux’ pumps

EFFICIENT HEPATIC METABOLISM

- To metabolise toxic secondary plant metabolites (phenolics, turpenes)
- Eucalypts induce meloxicam metabolism

CHLORAMPHENICOL ( $\lambda t_{1/2}$ h)

- Metabolised by glucuronidation

<table>
<thead>
<tr>
<th></th>
<th>CAT</th>
<th>HORSE</th>
<th>KOALA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5.1</td>
<td>1</td>
<td>&gt; 16</td>
</tr>
</tbody>
</table>

ENTEROHEPATIC CIRCULATION

FUTURE DIRECTIONS

- Investigate pharmacokinetic indices of these, and other drugs
- In-vitro models for koala absorption & metabolism
- More efficacious dosage regimes

Thanks to the KIDReG team
Thanks to other university colleagues

Dr Kong Li  Pharmacology, School of Medical Sciences
Faculty of Pharmacy
Dr George Li
Professor Andrew McLachlan
Professor Michael Murray &
Dr Susan Ghassabian

Dr Jeffrey Shi  School of Chemical & Biomolecular Engineering

Thanks to Koala Facilities

Koala Preservation Society  Port Macquarie NSW
Billabong Koala & Wildlife Park  Port Macquarie NSW
Australia Zoo  Beerwah QLD

Support from

Support from

HERMON SLADE FOUNDATION

The FACULTY OF VETERINARY SCIENCE
THE UNIVERSITY OF SYDNEY –
THOMPSON FELLOWSHIP 2010

THANK YOU