

## **Determining optimal antimicrobial regimens for otters using susceptibility and *in vivo* pharmacokinetic profiles**

Southern sea otter morbidity and mortality is often associated with localized or systemic bacterial infections. We have identified several opportunistic bacterial pathogens associated with disease in California otters. However, susceptibility of these bacteria to commonly used antibiotics has not been reported, nor has the *in vivo* disposition of these antibiotics been reported in sea otters. Also, it is unclear whether bacteria we are isolating from California sea otters are developing antibiotic resistance. The absence of reliable susceptibility information and accurate pharmacokinetic data makes optimal drug dosage determination difficult. Pharmacokinetic studies of the most commonly used antibiotics would provide valuable *in vivo* baseline health information for sea otter veterinarians.

**Hypothesis 1:** Based on antimicrobial susceptibility tests, opportunistic bacterial pathogens of sea otters may be resistant to commonly used antibiotics in sea otters at clinically relevant dosages.

**Objective 1:** Utilize a microbroth dilution assay to determine the antibacterial susceptibility of sea otter bacterial pathogens to 23 different antibiotics, including those commonly used in sea otters.

**Hypothesis 2:** Pharmacokinetic parameters for selected intramuscularly-administered (IM) antibiotics can be derived that will allow determination of accurate dosage protocols using pharmacokinetic-pharmacodynamic (PK-PD) relationships.

**Objective 2:** Utilize reverse-phase high performance liquid chromatography (HPLC) to determine pharmacokinetic parameters for two commonly utilized antibiotics, enrofloxacin and procaine penicillin G, from sea otter plasma.