Update on Exposure to Anticoagulant Rodenticides in Fishers

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Field Collaborators (Various Projects)

California

SNAMP: Rick Sweitzer and Reginald Barrett

USFS: Craig Thompson and Kathryn Purcell

Hoopa: Mark Higley and Sean Matthews

CA Translocation: Deana Clifford, Aaron Facka, Roger Powell, Richard Callas, Scott Yaeger, Laura Finley

Washington

WA Translocation: Jeff Lewis and Patti Happe

East Coast

Pennsylvania: Jeff Larkin (>40-50 fishers)

Minnesota: John Erb (>40 fishers)

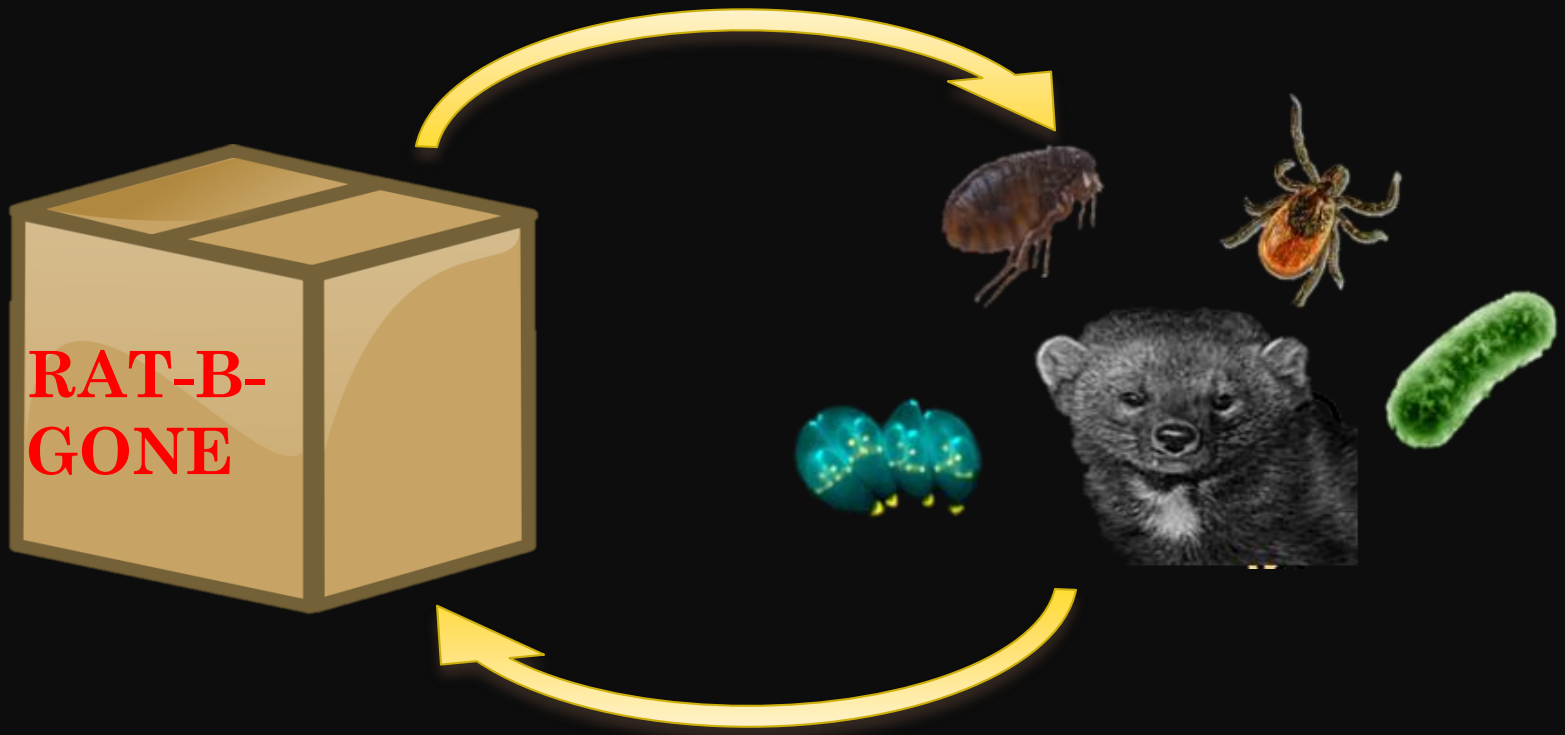
Field crews on all projects!!

Why Investigate Exposure to Toxicants (ARs) in Fishers?

- Presence or absence?
- Synergistic effects (sub-lethal) with infectious pathogens, ecto/endoparasites, predation events?

Building the Foundation of Disease Ecology in California Fishers

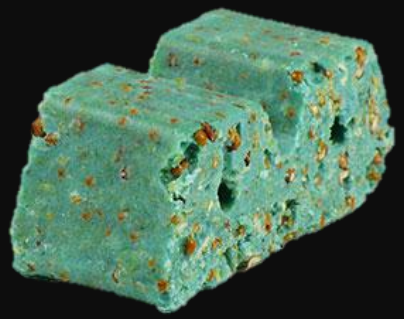
Essential to understand the role of not only infectious, but non-infectious disease processes in the ecology of the fisher

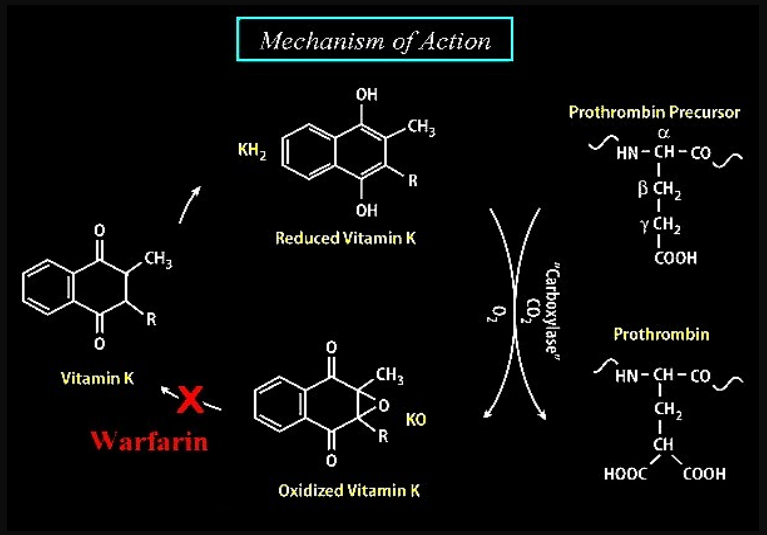


What are Anticoagulant Rodenticides?

- Chemical pesticide
  - Various forms: pellets or bait blocks

- Vitamin-K antagonist
  - Disrupt normal blood-clotting
  - Capillary bleeding





First and Second Generations ARs

- First Generation (warfarin, diphacinone, chlorophacinone, coumachlor)
  - Less acutely toxic
  - Metabolized and excreted more rapidly
  - Toxicosis in rodents typically after multiple feedings

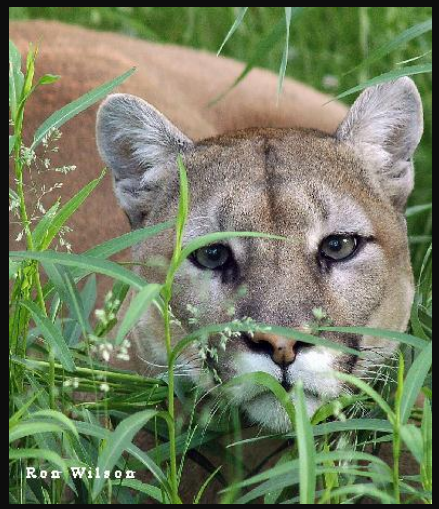
- Second Generation (brodifacoum, bromadiolone, difethialone)
  - More acutely toxic
  - Longer retention in tissue of primary consumers
  - Single feeding could lead to toxicosis

What are the effects of ingestion in non-target carnivores?

- **Severe Cases**
  - Death (toxicosis) from hemorrhaging (coagulopathy)
  - Essentially, bleeding into body cavities
  - Seen in various wildlife (avian and mammals)

Bobcats

Mountain Lions



Polecats and mink

What are the effects of ingestion in non-target carnivores?

- **Moderate, Mild, Subclinical Cases**
  - Behavior changes
    - Depression
    - Loss of appetite
    - Excessively thirsty
    - No clinical signs at all

Red Foxes

American Badgers

Raccoons

Striped Skunks

How do we test to determine exposure, morbidity (sick) and mortality?

Definitive confirmation of morbidity and mortality

- Presence/exposure of an AR with confirmed concurrent coagulopathy

Exposure testing

- Tissues
  - Liver
  - Whole blood
  - Serum

AR Levels Seen in CA Fishers

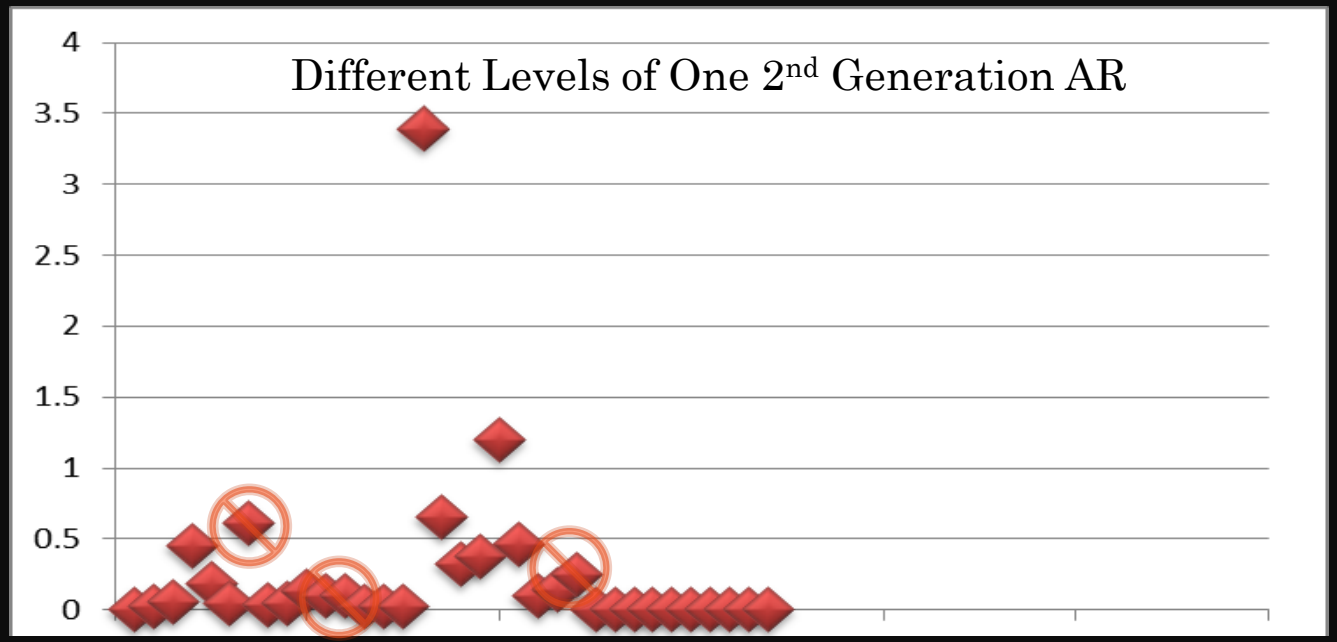
- Levels ranged widely; Example: Trace to 3.40ppm for one 2nd gen AR

Can we correlate levels seen in AR mortalities to possible threshold for sickness?

- No, would be premature at this time.

Why?

- Many factors involved:
  - metabolism, synergistic effects (pathogens or >1AR, etc..)



Spatial Clustering

- *Preliminary data*
  - No spatial clustering
    - With any AR
    - Individual types of AR
    - Generation (1st or 2nd) class
    - Number of AR present per fisher

Is This Occurring Only in California Fishers

- No, fishers outside of CA within the distinct population segment are being exposed.

Where?
- Washington Reintroduction (Olympic National Park)

National Parks?
- Yes, 3 of 3 fishers tested from Yosemite NP tested positive.

Is This a "Fisher-only" Issue?

- No, many montane wildlife species are potentially at risk.

Other montane carnivore projects in CA
Martens and Sierra Nevada Red Foxes

What do we know right now?

- Fishers are exposed to ARs; 2nd gens. being more prevalent.
- ARs are a mortality factor for fishers
- Currently, exposure levels are not good indicators of sickness
- Spatial data suggest no clustering of exposures.

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