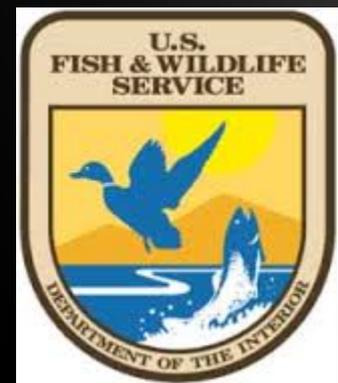




Is Draxxin a good substitute for Erythromycin?

Katherine Haman, Mary Peters, Sonia Mumford

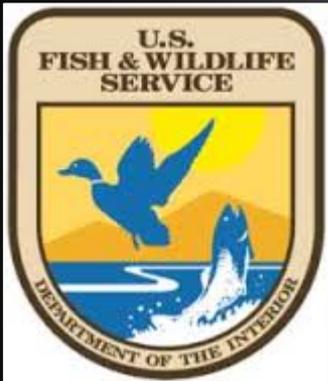


Draxxin – a Team Effort



**Northwest
Indian
Fisheries
Commission**

Betsy Hall, Craig Olsen, Bruce Stewart, Marcia House



Sonia Mumford, Mary Peters, Sharon Lutz, Chris Patterson, Joy Evered, Susan Gutenberger, Guppy Blair, Kim True, Laura Sprague, Andy Goodwin, Brad Thompson, Jim Bowker, Dave Erdahl

Doug Munson (IDFG), Craig Banner (ODFW), Linda Rhodes (NOAA), Diane Elliott (USGS), Jed Varney (Pacific Seafoods), Hugh Mitchell (AquaTactics), Pat Gaunt (Mississippi State)

Cowlitz Salmon Hatchery, Little White Salmon Hatchery
Carson, Klickitat, Warm Springs, Leavenworth, Nez Perce hatcheries

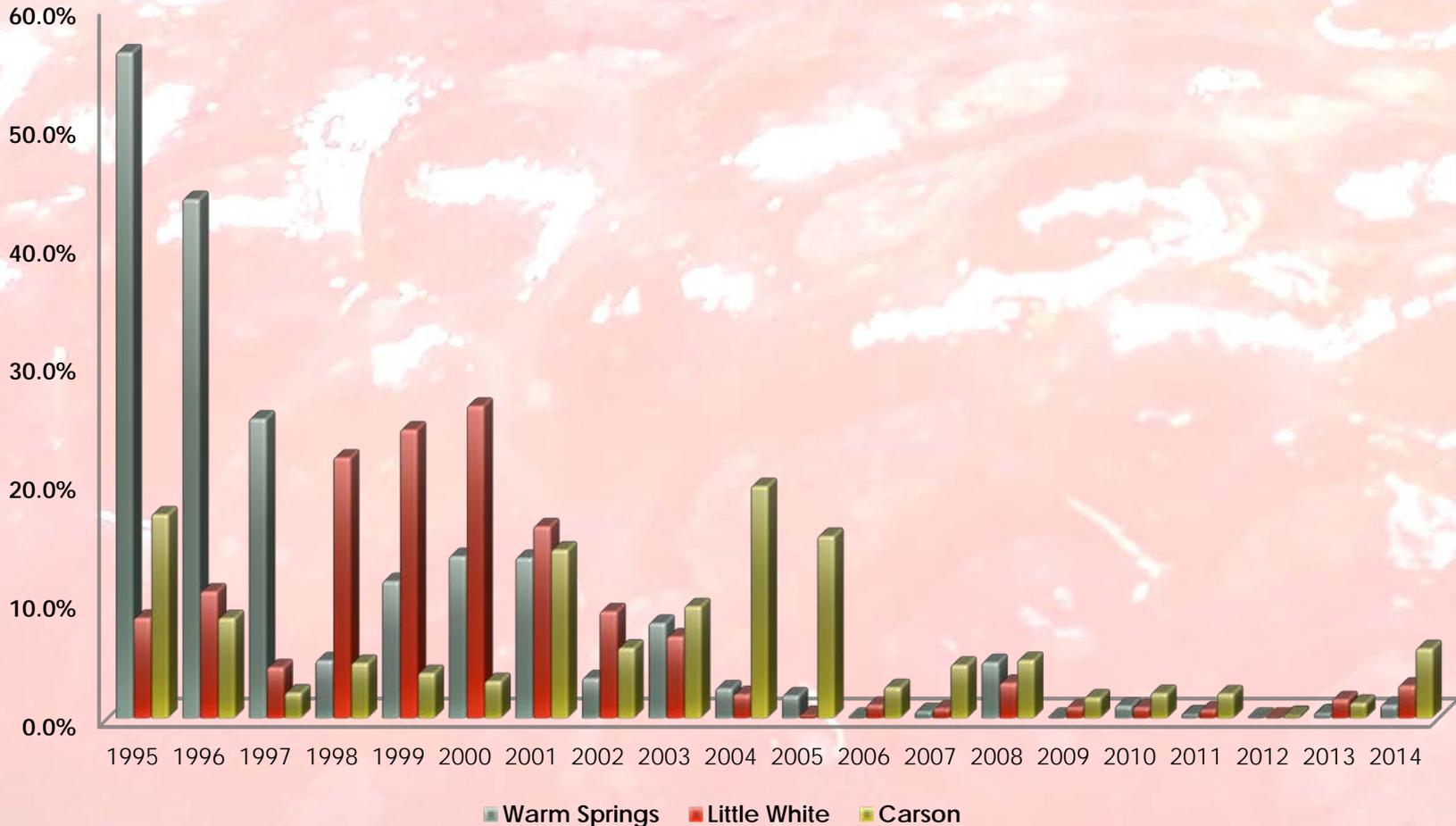
Vertical transmission of *R. salmoninarum*



20 years of managing *R. salmoninarum*

Notes from three spring Chinook hatcheries:

Percentage of spawned females, OD => 0.2



Bacterial Kidney Disease (*Renibacterium salmoninarum*)



A Brief History:

- Erythromycin (injectable) is no longer available (**new update, possibly available with new manufacturer this summer under INAD**)
- Draxxin (tulathromycin) *in vitro* MIC is 0.5 ug/mL (NWIFC, NOAA; 2014)
- No pre-spawn mortality in adult SCS at 5 mg/kg, IP or Dorsal sinus (USFWS, 2014)
- Rough bioassay indicated tulathromycin uptake in kidneys (NOAA, 2014)
- Was this at a level and duration to be effective?

Pilot Pharmacokinetic Study, 2015



Draxxin pK study design – replicated at LWS & CSH

- 5mg/kg IP injections in adult, female SCS at LWS and CSH
 - Study duplicated due to differing ave. water temp at LWS (46-48F) and CSH (54-58)
 - LWS also injected a small group with 10 mg/kg
- Sacrifice 3 fish at various time points over a 56 day period
 - 6 fish at each time point, 102 fish total
- Measure drug concentration in ovary, kidney, and muscle
 - NY Dept. of Ag, FDA-approved method HPLC-MS/MS

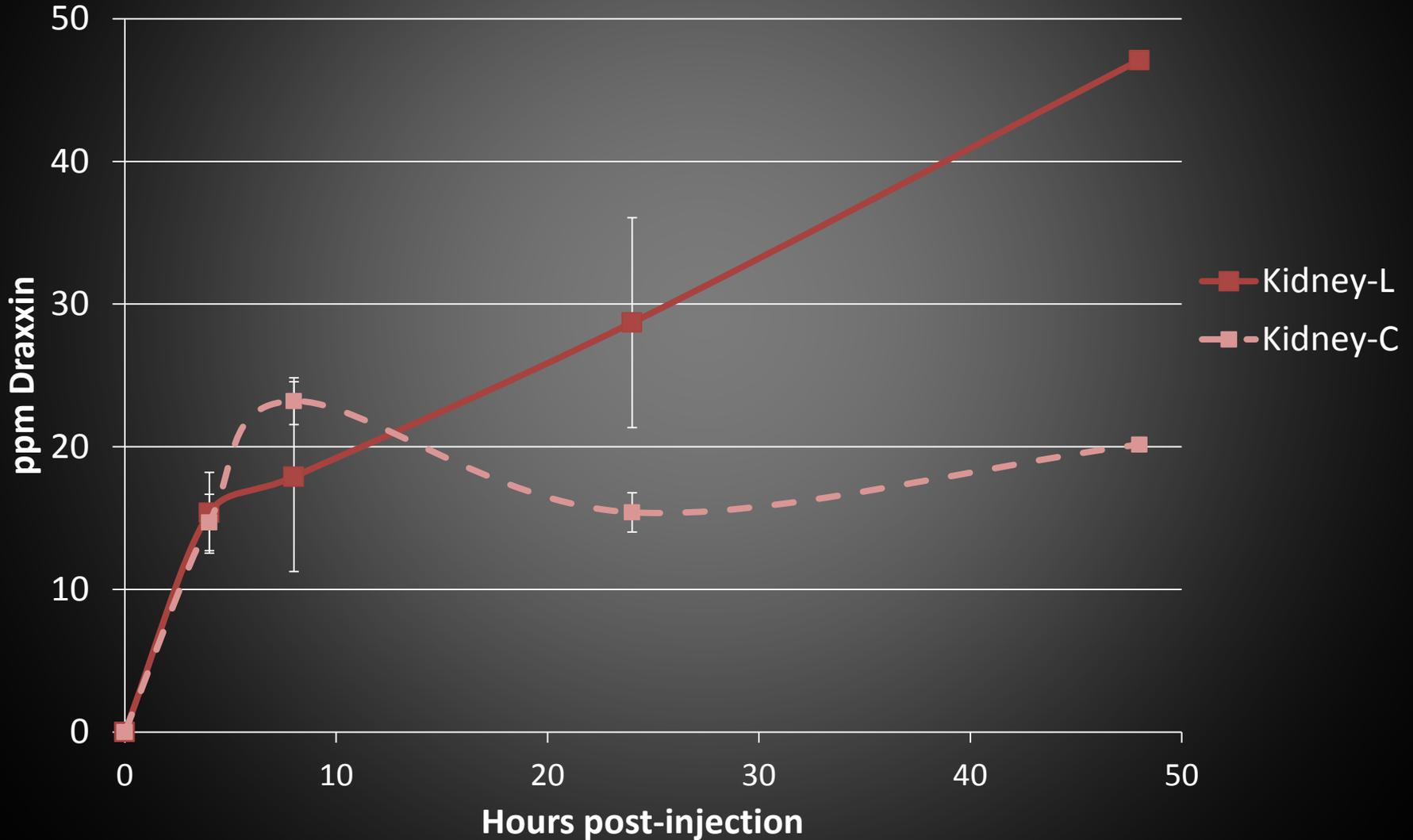
Objective: Does tulathromycin concentration exceed the *in vitro* MIC, and if so, for how long?

Draxxin pK study design – replicated at LWS & CSH

Time	Injected Fish Sampled	Uninjected Control	Tissues Collected For LC-MassSpec	Tissues Collected for Histo
0 (Monday)	3	1	Muscle, Kidney, Ovary	Heart, Liver, Kidney, Intestine
4 (Monday)	3		Muscle, Kidney, Ovary	
8 (Monday)	3		Muscle, Kidney, Ovary	
Day1 (Tues)	3	1	Muscle, Kidney, Ovary	Heart, Liver Kidney, Intestine
Day 2 (Weds)	3		Muscle, Kidney, Ovary	
Day 3 (Thursday)	3			
Day 4 (Friday)	3	1		
Day 7 (Monday)	3	1	Muscle, Kidney, Ovary	Heart, Liver Kidney, Intestine
Day 9 (Weds)	3		Muscle, Kidney, Ovary	
Day 11 (Friday)	3		Muscle, Kidney, Ovary	
Day 14 (Monday)	3	1	Muscle, Kidney, Ovary	
Day 21 (Monday)	3	1	Muscle, Kidney, Ovary	
Day 28 (Monday)	3	1	Muscle, Kidney, Ovary	Heart, Liver Kidney, Intestine
Day 35 (Monday)	3	1	Muscle, Kidney, Ovary	

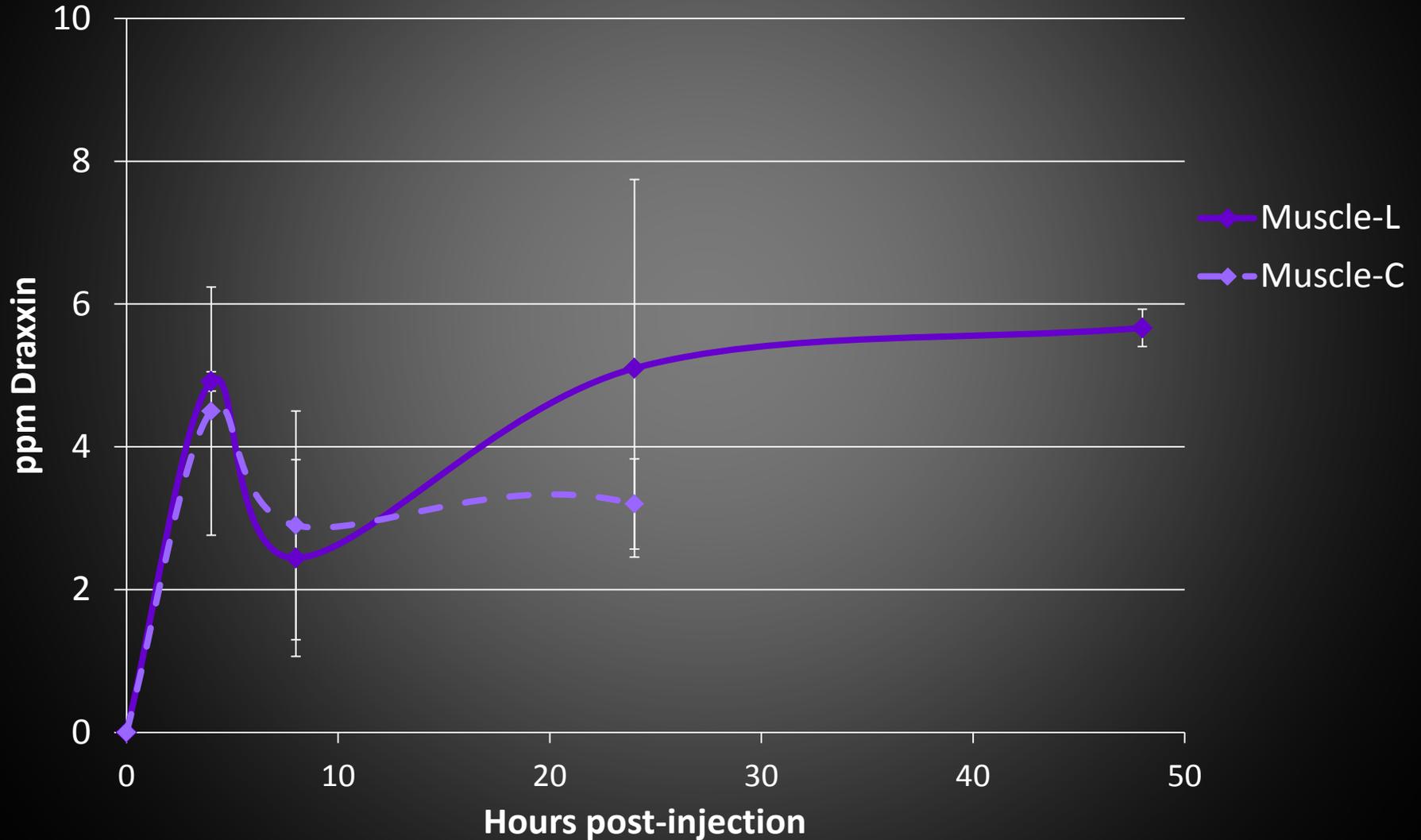
Preliminary results, residues through 48 hours

Draxxin tissue residues (ppm) LWS and Cowlitz SCS



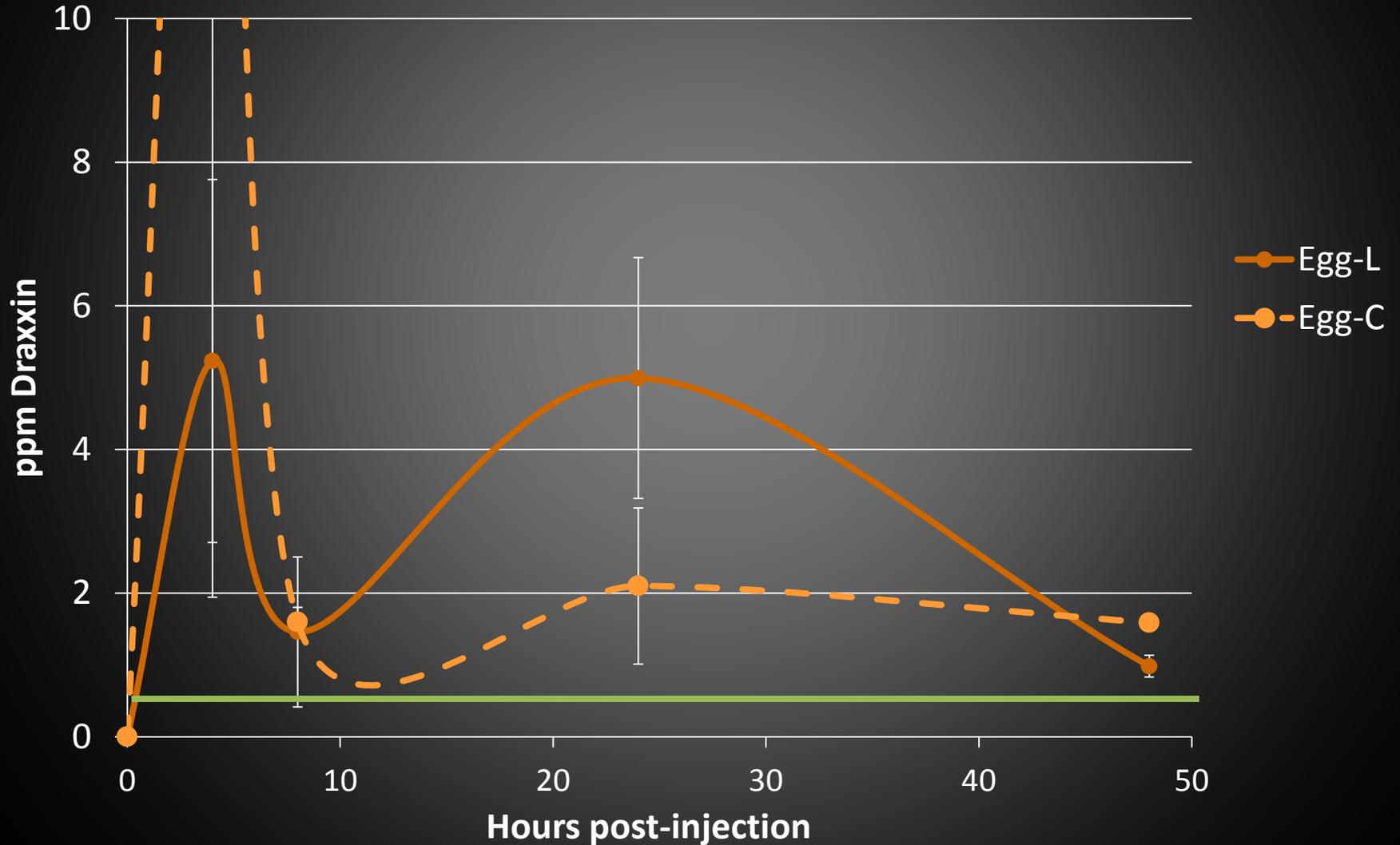
Preliminary results, residues through 48 hours

Draxxin tissue residues (ppm) LWS and Cowlitz SCS



Preliminary results, residues through 48 hours

Draxxin tissue residues (ppm) LWS and Cowlitz SCS



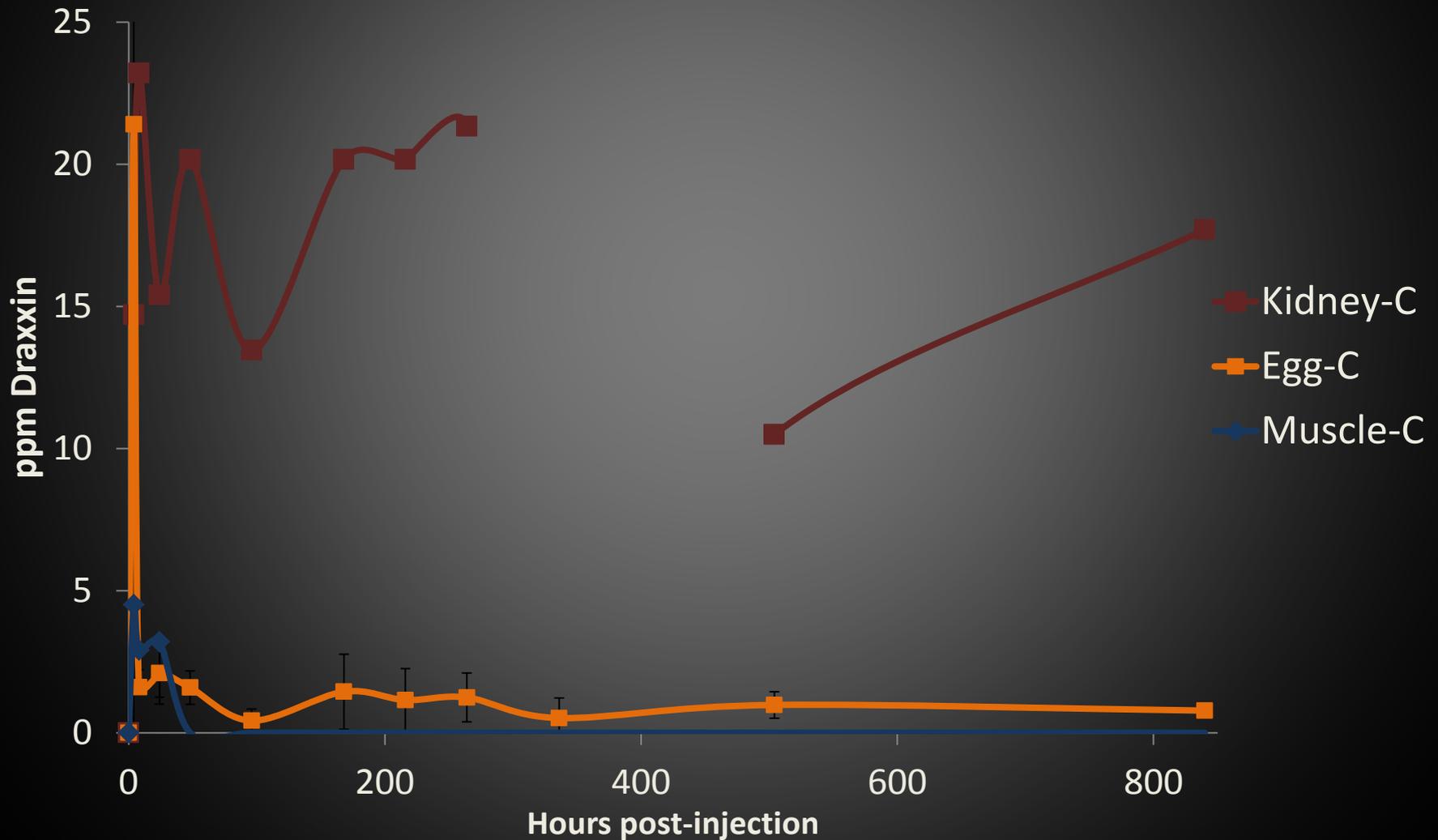
Preliminary results: above the MIC in eggs & kidney



How long does Draxxin remain above the MIC?

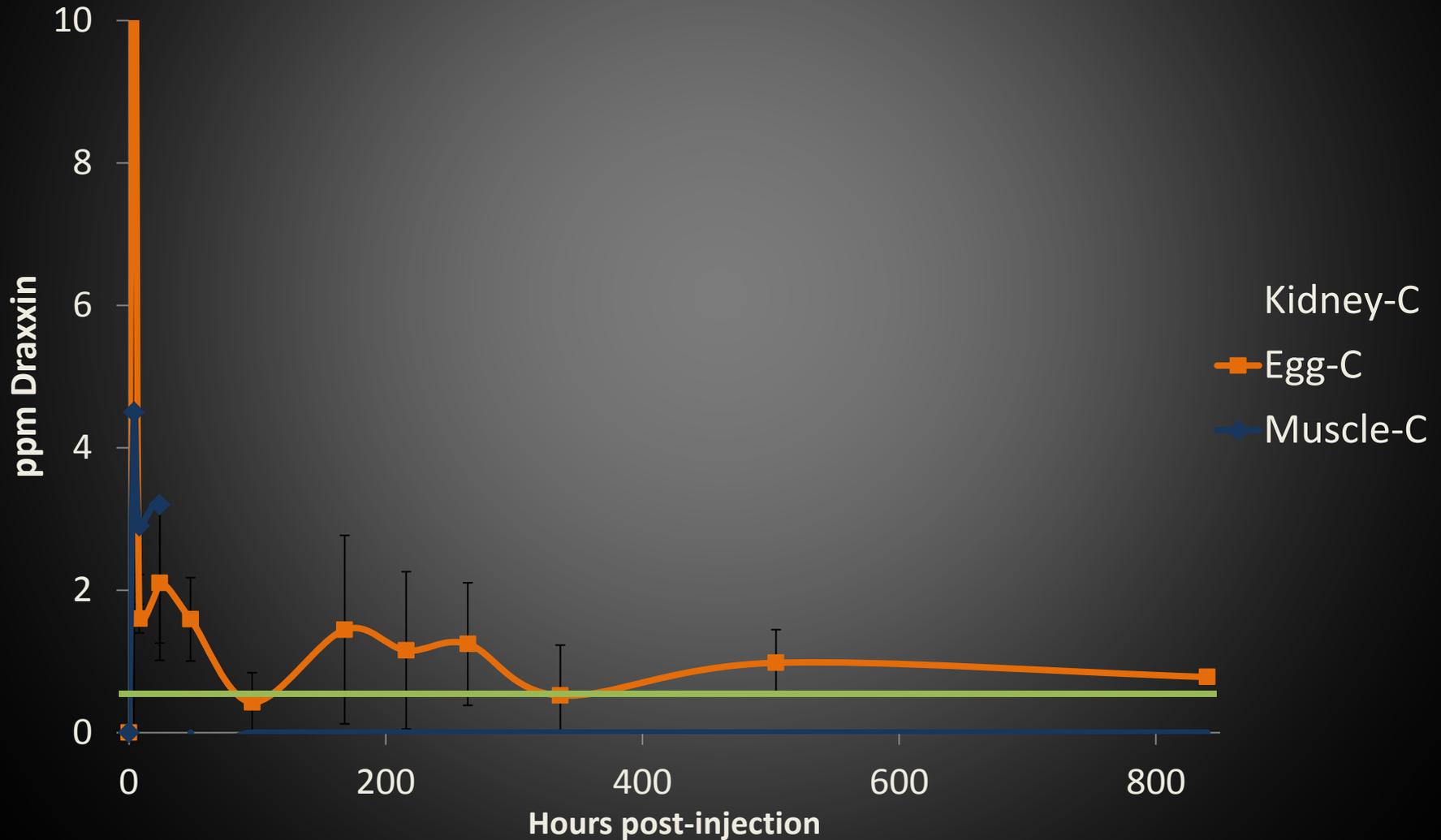
Preliminary results, residues through 35 days

Draxxin tissue residues (ppm) Cowlitz SCS



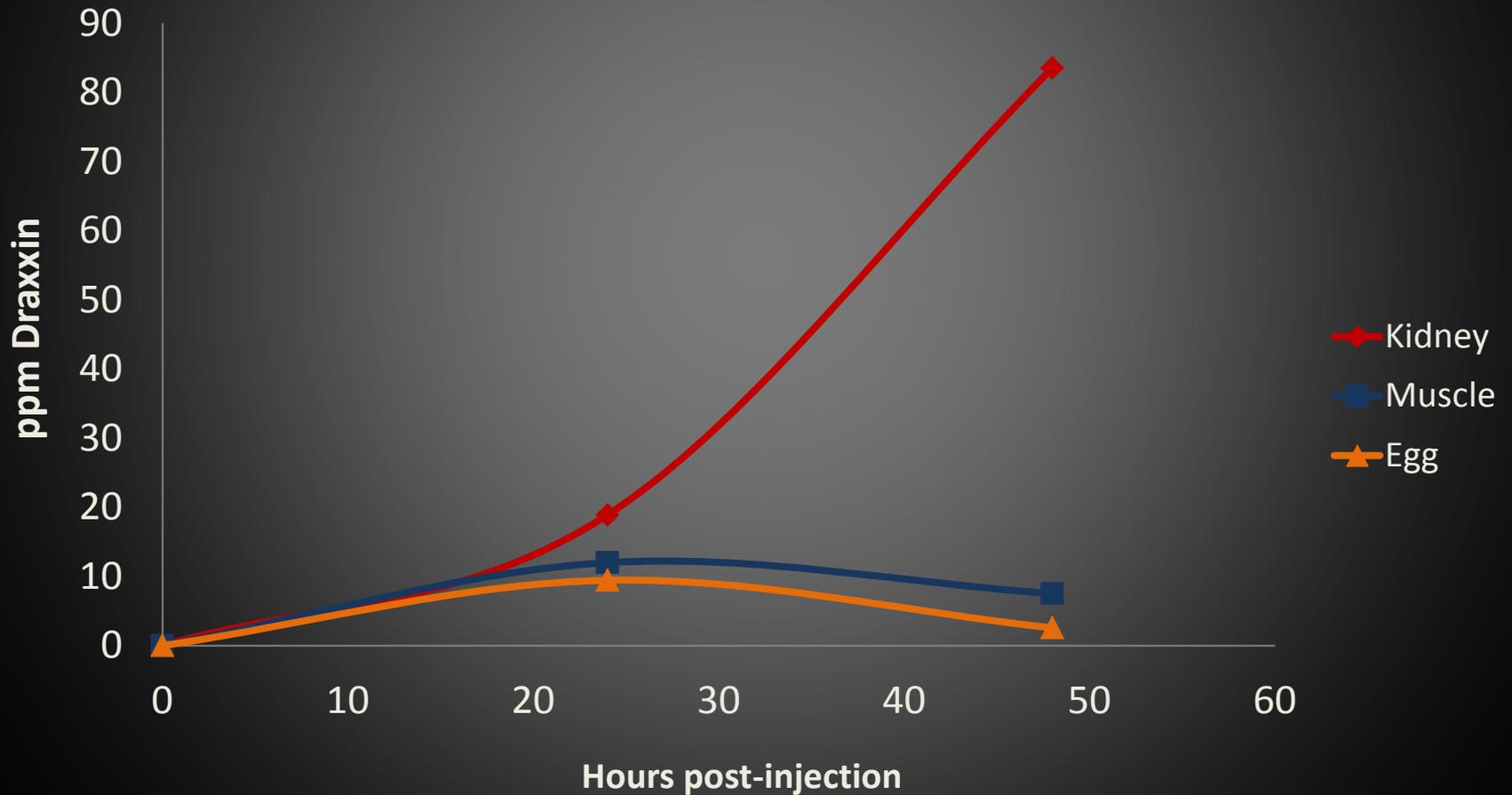
Preliminary results, residues through 35 days

Draxxin tissue residues (ppm) Cowlitz SCS



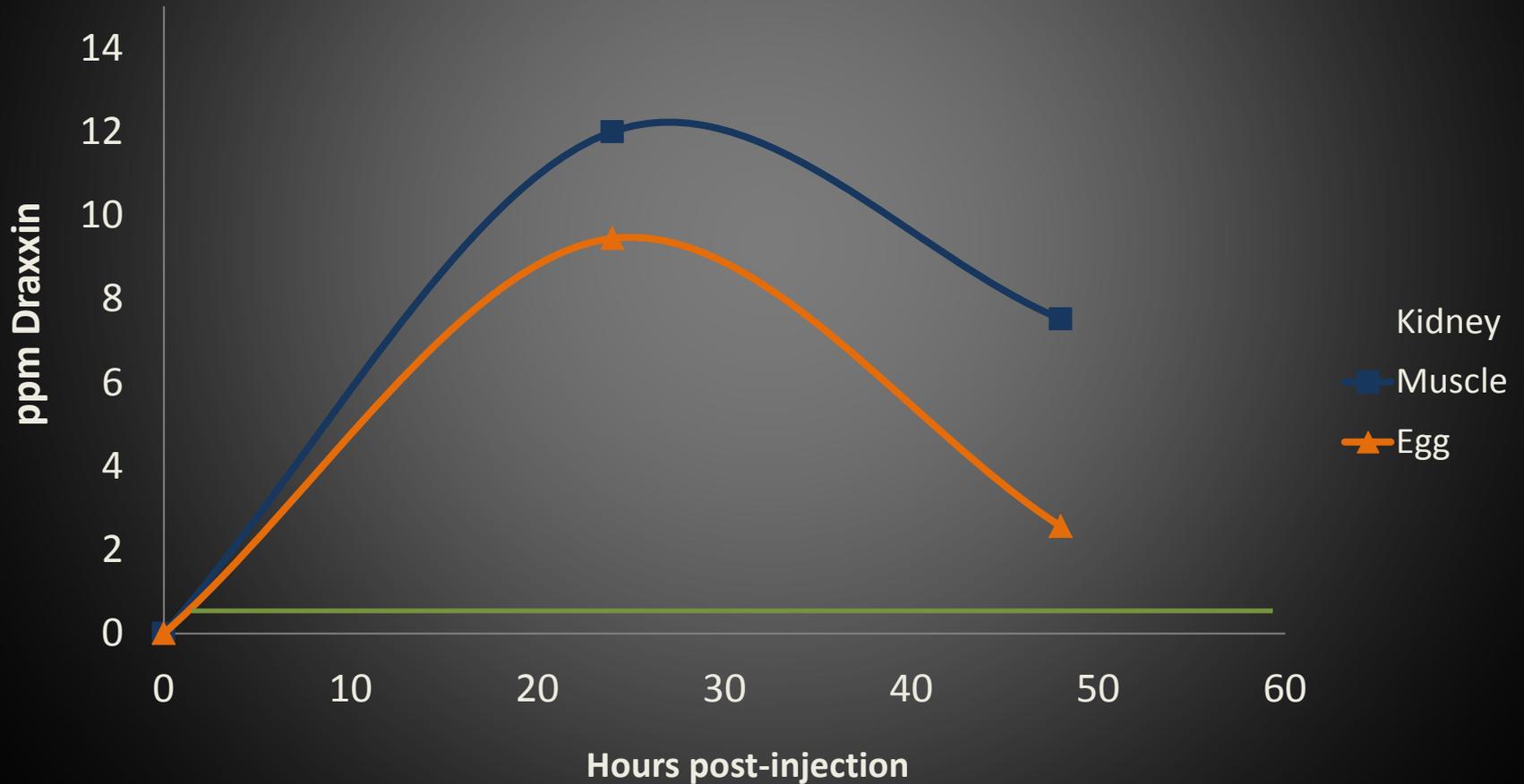
Preliminary results, 10 mg/kg dose

Draxxin tissue residues (ppm) averaged,
10 mg/kg dose, LWS SCS



Preliminary results, 10 mg/kg dose

Draxxin tissue residues (ppm) averaged,
10 mg/kg dose, LWS SCS



Conclusions and uncertainties

- Draxxin is detectable in the kidney, muscle and eggs above the MIC
- Kidney concentrations are higher than muscle and egg
 - Metabolism
- Muscle residues
 - implications for carcass outplanting
- Egg residue dropped below MIC at day 4
 - above MIC days 7 through 35
- Will Draxxin help us control BKD?
- If we discontinue antibiotic injections of adult SCS, will BKD once again be major cause of mortality?

Questions?

