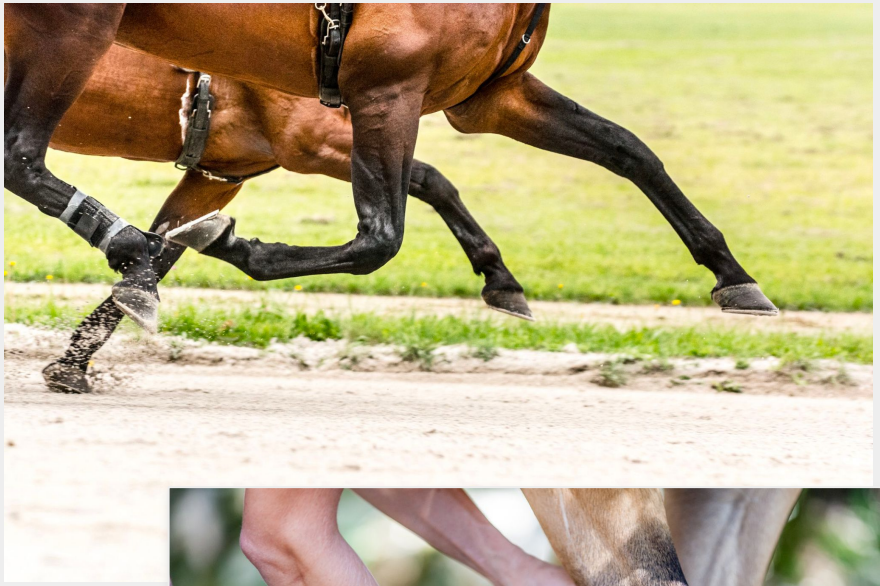
The evaluation of vasodilation and stress properties with the application of Pulsed Electromagnetic Field Therapy (PEMF) on the Equine Distal Limb

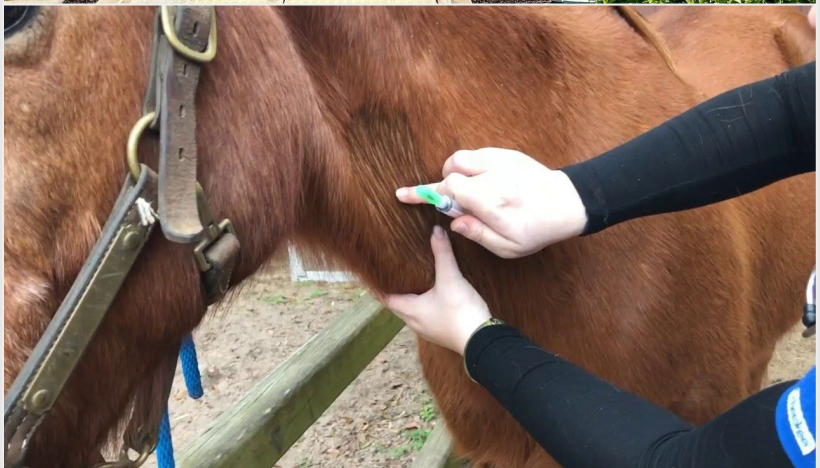
Team Horse Wellness
Samantha Campos
Stephanie Inzunza
Jackeline Alvarez
Hannah Esqueda

Department of Animal and Veterinary Sciences
WK Kellogg Arabian Horse Center
Don B. Huntley College of Agriculture

The issue-

- **Distal Limb injuries are extremely common among equine athletes**
  - Musculoskeletal Breakdowns
- **Caring for these injuries are:**
  - Expensive
  - Lengthy in time to heal
  - Labor intensive
  - Most cases, Euthanasia





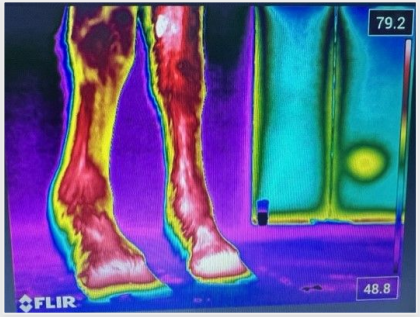
Pulsed Electromagnetic Field Therapy-

- Increases metabolic rate and cellular enzymatic activity
- Can be used on whole body or specific location
- Improves performance, Range of Motion, Speed and strength
- There is lack of research
- Other modalities are painful or not effective

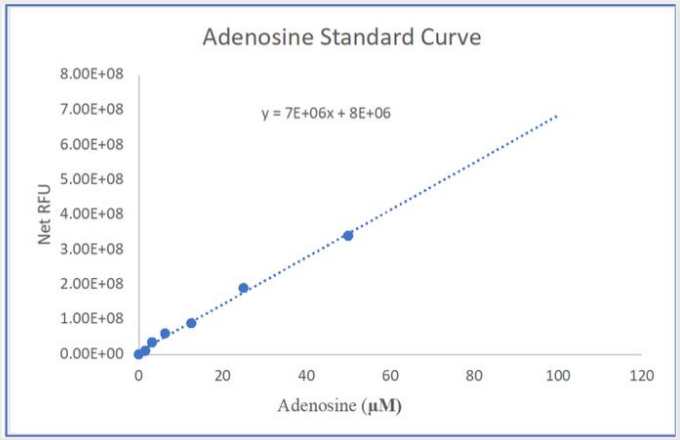
Methods-

- Pulsed Electromagnetic Field Therapy Treatment (25 Hz)
- Data collected from 10 Arabian horses
- **Jugular blood samples were collected :**
  - Prior to treatment (baseline)
  - 3 minutes after each treatment
  - 30 minutes post treatment
  - Plasma stored at -80° until analysis
- **Samples analyzed for:**
  - Cortisol: Colorimetric ELISA (Arbor Assays, #k003-H1/H5)
  - Adenosine: Fluorometric Assay (Cell Biolabs, Inc #MET 5090)

- IACUC approved research protocol #22.006



Sample	Adenosine Concentration
11	0.1 μM
13	1.3 μM
15	1.1 μM
18	1.1 μM
22	1 μM
23	1.1 μM
26	1.1 μM



Results- Adenosine

- Most samples analyzed contained undetectable traces of plasma adenosine concentrations
  - Out of 30 samples analyzed, only 7 indicated a notable plasma adenosine concentration
  - Normal adenosine concentration in healthy dogs and humans ranges from 0.1-1.3 micromolar
- PEMF therapy did not cause a notable systemic increase in plasma adenosine

Results-Cortisol

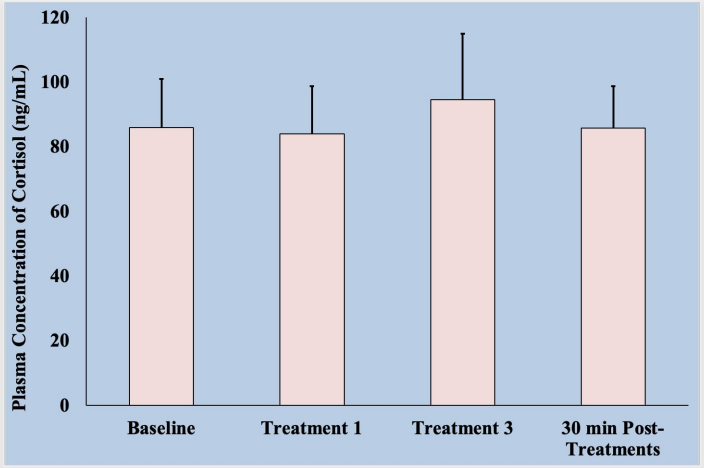
-There is some variation between the individual horses

-No significant differences were found between baseline and treatment (P=0.96)

-Data presented as means and standard error of the mean

-Data does not include treatment 2 samples

-Treatment overall does not result in stress



Cortisol levels for all 10 of the horses in ng/ml
Normal values for a resting horse are 20-90 ng/ml

Animal	Baseline	Treatment 1	Treatment 3	30 min Post-Treatments
Horse 1	34.2	43.5	59.5	42.6
Horse 2	48.0	27.8	36.6	54.6
Horse 3	88.8	71.7	109.2	85.3
Horse 4	83.8	85.7	78.8	92.4
Horse 5	59.0	66.8	58.4	72.2
Horse 6	130.4	130.4	106.2	81.2
Horse 7	24.8	34.0	35.0	32.3
Horse 8	100.6	112.5	94.3	119.8
Horse 9	110.6	89.4	107.0	104.1
Horse 10	179.3	178.0	260.1	173.1
MEAN	85.9	84.0	94.5	85.8
SEM	14.9	14.7	20.4	12.9

An Improved study-

- **Taking blood directly from area treated with PEMF**
  - Blood was taken from Jugular vein
  - Concentration may have decreased as circulation increased
- **Application of PEMF on the whole body**
  - Industry timelines (45-60 min)
  - Levels of circulating cortisol before and after application

Thank You Project Hatchery!
Questions?