Pituitary Pars Intermedia Dysfunction
Fast Facts Updates

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Management of the endocrine horse:
The horse owner, the farrier, the veterinarian and the nutritionist

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Foundation

- Only test horses with history and clinical signs ***consistent*** with pituitary pars intermedia dysfunction (PPID)
- To establish a diagnosis of PPID *and at recheck*, use a ***combination*** of:
  - History from owner
  - Clinical signs
  - Laboratory results
- ***Always evaluate:***
  - adrenocorticotropic hormone (ACTH)
  - insulin and glucose

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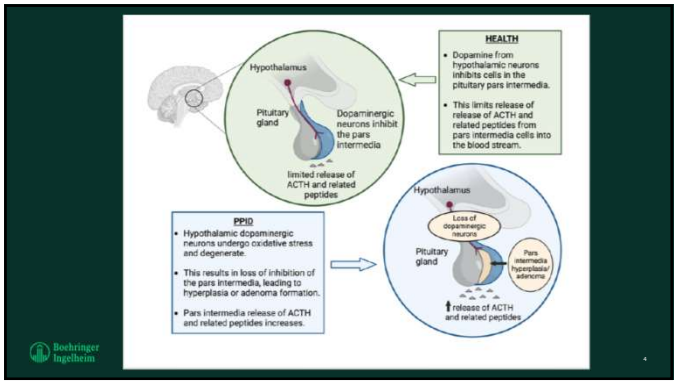

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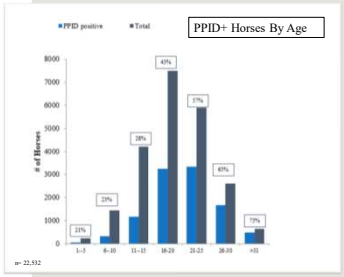
Risk Factors: Who Gets PPID?

- Risk Factors: Age, (Breed??)
  - Ponies are more susceptible
    - Morgan horses
    - Paso Fino
    - Arabian
    - Quarter horses
    - Saddlebreds
    - Warmbloods
    - TWH
- 21% horses/ponies > 15 years of age



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Early

- Change in attitude/lethargy
- Decreased athletic performance
- Change in attitude/lethargy
- Regional hypertrichosis
- Delayed haircoat shedding
- Loss of epaxial muscle mass (topline)
- Abnormal sweating
- Regional adiposity
- Infertility
- Desmitis/tendonitis
- Laminitis/recurrent sole abscesses

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Advanced

- Dull attitude/altered mentation
- Exercise intolerance
- Generalized hypertrichosis
- Loss of seasonal haircoat shedding
- Skeletal muscle atrophy
- Rounded abdomen
- Abnormal sweating (increased or decreased)
- Polyuria/polydipsia
- Recurrent infections
- Regional adiposity (Bulging supraorbital fat)
- Infertility
- Laminitis/recurrent sole abscesses
- Excessive mammary gland secretions
- Blindness
- Parasitism
- Tendon and suspensory ligament laxity

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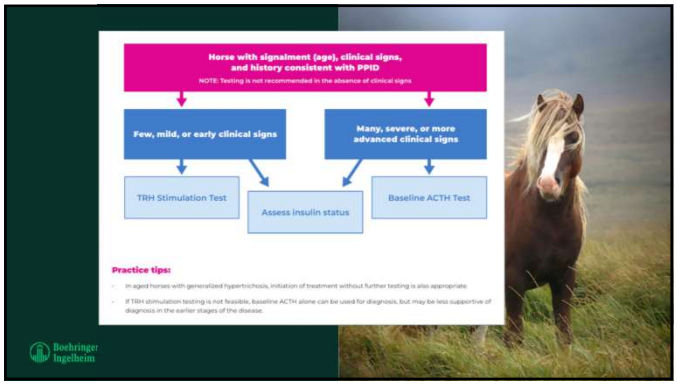

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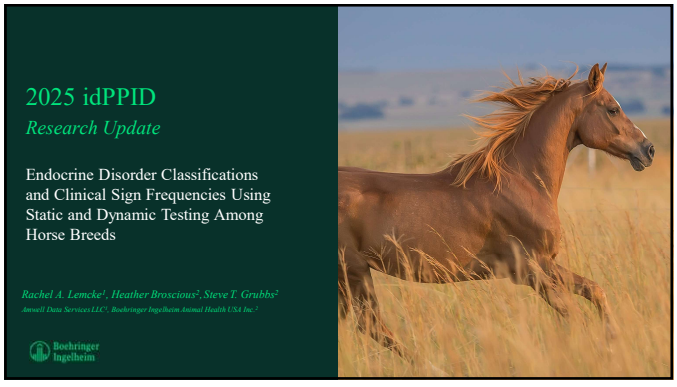

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Endocrine Disorder Classifications and Clinical Sign Frequencies Using Static and Dynamic Testing Among Horse Breeds

Main findings:

Not utilizing spring TRH-stimulation ACTH testing *missed 18-39% of PPID positive cases.*

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ACTH Concentrations are Similar After TRH-Stimulation with Compounded vs Chemical Grade TRH in Horses

R.M. Hoffman[1], J.C. Haffner[1], and S.T. Grubbs[2]

[1]Middle Tennessee State University, Murfreesboro, TN

[2]Boehringer Ingelheim Animal Health, Inc, St. Joseph, MO

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No conflicts of interest. This study was funded by Boehringer Ingelheim Animal Health & the John Miller Chair in Equine Reproduction at MTSU

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TRH-Stim test is useful for PPID Diagnosis

- Sigma-Aldrich
  - has been the standard provider of chemical grade TRH
  - 6-month use date
- Hagyard Pharmacy now compounds TRH for horse use
  - it has not been compared to Sigma chemical grade TRH
  - 30-day use date

SIGMA-ALDRICH

HAGYARD PHARMACY

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Hypothesis

ACTH response 10 minutes after TRH-Stim would **not** differ based on TRH source

Sigma chemical grade vs Hagyard compounded

Secondary hypothesis:

When refrigerated per label, Hagyard compounded TRH is effective one month beyond the 30-day "use by" date

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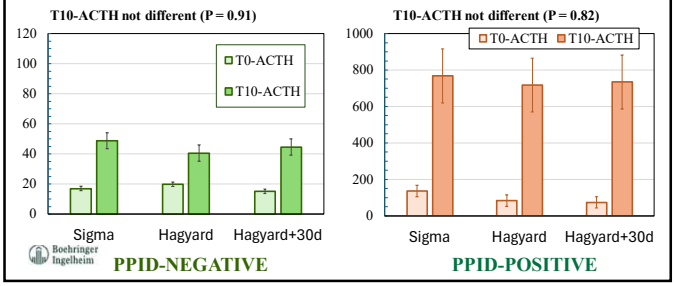
ACTH after TRH-Stimulation



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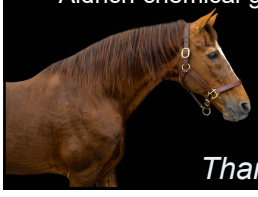
Conclusions

Based on these findings, Hagyard Pharmacy compounded TRH is equally effective to Sigma-Aldrich chemical grade TRH for PPID diagnosis



The Hagyard TRH is effective up to 30 days after the "use by" date when refrigerated for storage

Thank you!

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One-Week Repeatability of TRH–Stimulation Procedure for Diagnoses of Pituitary Pars Intermedia Dysfunction in Horses

[1]R.M. Hoffman, [1]J.C. Haffner and [2]S.T. Grubbs
[1]Middle Tennessee State University, Murfreesboro, TN
[2]Boehringer Ingelheim Animal Health USA Inc., Duluth, GA

- This study evaluated if the thyrotropin releasing hormone (TRH) stimulation procedure repeated at weekly intervals yielded reproducible diagnosis of pituitary pars intermedia dysfunction (PPID) in horses
- Previous work in this laboratory found consistent TRH-stimulation results at 4-week intervals
- Understanding TRH-stimulation repeatability is useful if a TRH-stimulation test was initiated but unable to be completed due to unforeseen circumstances, or when PPID research protocols require multiple times of testing

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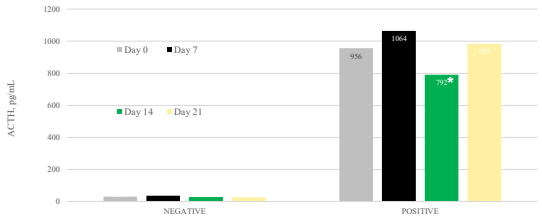
Average T10-ACTH in PPID-Negative and PPID-Positive Horses
* Statistically lower, but not clinically relevant



Conclusions: Consistent results were obtained when the TRH-stimulation test was repeated at weekly intervals for 21 days.

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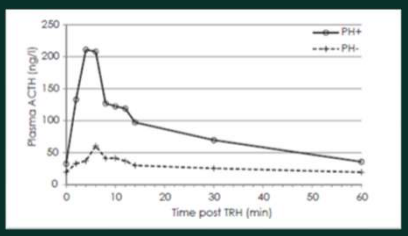
TRH Stimulation Test Measuring ACTH



Median plasma ACTH responses to 1 mg TRH IV in 44 horses with PI hyperplasia (PH+, open circles and solid line) and 22 horses with normal pituitary glands (PH-, + and dashed line).

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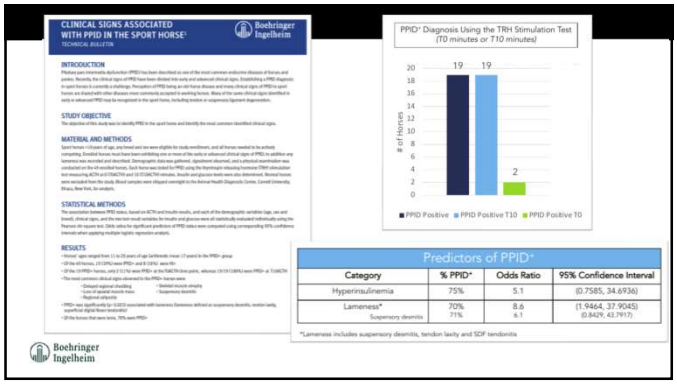

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Comparison of Resting ACTH and Dynamic ACTH Evaluation for Pituitary Pars Intermediary Dysfunction During Fall and Spring Seasons in a Single Herd of Horses

R.M. Hoffman[1], J.C. Haffner[1], and S.T. Grubbs[2]
[1]Middle Tennessee State University, Murfreesboro, TN
[2]Boehringer Ingelheim Animal Health, Inc, St. Joseph, MO

No conflicts of interest. This study was funded by Boehringer Ingelheim Animal Health & the John Miller Chair in Equine Reproduction at MTSU

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Pituitary Pars Intermediary Dysfunction

EARLY PPID

- Subtle signs
- No Hypertrichosis
- Resting ACTH unreliable in early horses especially in spring
- Resting ACTH has shown increased sensitivity for early cases during the fall (anecdotal)

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Recommended Diagnostic Cutoffs

T30-ACTH, pg/mL after TRH-Stimulation

	PPID Unlikely	Interpretive Zone	PPID Likely
SPRING	<30	30–70	>70
FALL	<141	141–320	>320

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Conclusions

For SPRING & FALL

- Diagnostic cutoffs were established for T30-ACTH
- Compared to Resting ACTH, T30-ACTH was a more reliable test in both spring and fall

Thank you!

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Duration of Effectiveness of Frozen/Thawed Thyrotropin Releasing Hormone to Stimulate ACTH Release in Horses

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  - [2]Around the Bend Veterinary Services, Bend, OR,
  - [3]Boehringer Ingelheim Animal Health USA, Inc., Duluth, GA

This study was funded by the John C. Miller Chair of Excellence in Equine Reproduction at Middle Tennessee State University and Boehringer Ingelheim Animal Health USA Inc.

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Conclusions

The thyrotropin releasing hormone stimulation test produced repeatable ACTH concentrations in samples collected 10 min after administration of TRH in horses when using TRH that has been thawed and stored at 5ºC for up to 56 days.

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The Effect of Trailering on Thyrotropin Releasing Hormone Stimulation of Adrenocorticotropic Hormone Concentration in Horses

[1]J.C. Haffner, [1]R.M. Hoffman and [2]S.T. Grubbs
[1]Middle Tennessee State University, Murfreesboro, TN
[2] Boehringer Ingelheim Animal Health USA Inc., Duluth, GA

Objective: Does trailer stress affect T10ACTH concentration following TRH administration?

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Basal and TRH-Stim. ACTH Levels Pre- and Post-Trailering

	Basal ACTH (pg/mL)						10. min.-TRH-Stim. ACTH Levels (pg/mL)					
Horse	Pre-Trailer Ride (Stalled)	0 min. PT	15 min. PT	30 min. PT	60 min. PT	120 min. PT	Pre-Trailer Ride (Stalled)	0 min. PT	15 min. PT	30 min. PT	60 min. PT	120 min. PT
H1	25.4	27	34.7	37.7	15.1	9.3	43.7	34.7	41.8	39.5	27.5	14.4
H2	22	21.6	27.7	17.8	13.2	14	109	34.6	52.6	35.6	28	29
H3	17.3	67.2	51	40.4	21.5	11.6	69.9	65.9	63.3	52.9	44.2	29
H4	28.7	56.1	41.4	28.1	15.2	18.1	42.2	63	50.2	42	30.8	44.2
H5	25.1	44.2	27.7	16	19.7	4.99	98	68.1	57.2	70.3	101	46.9
H6	20.6	17.8	17.2	14	11.7	15.4	79	33.3	33.8	24.4	26.4	35.6
H7	22.3	205	66.8	41.6	11.2	9.27	41.4	153	58.2	98.1	21.3	29.6
H8	19.9	20.3	15.6	14.6	14	16.2	22.8	25.8	24.1	23.9	24	26.7
H9	7.99	9.87	10.9	3.64	10.3	14.6	59.3	38.5	54.2	29.7	49.4	28
H10	8.53	27	12	14.8	13.4	18.5	54.6	34	23.7	25.7	34	49.7

Fig. 2. ACTH levels (pg/mL) at different time points pre- and post-trailering (PT), and before and after TRH-stimulation. ACTH levels in orange represent false positive PPID values.

Conclusions and Clinical Importance: A 40-minute trailer ride resulted in multiple false positive results (basal ACTH) for PT30-min. The T10ACTH does not appear to be affected by trailer stress compared to basal ACTH.

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Conclusions

- Use of the TRH stimulation test results in a higher diagnostic sensitivity
  - Especially in horses that are "early" PPID
  - T30ACTH can be useful despite the "extra" time
  - Up to 40% of early PPID horses may be missed when evaluated using resting ACTH
- The TRH stimulation test produced repeatable T10ACTH concentrations when using TRH that was frozen then thawed, and stored at 5ºC for up to 56 days
- Stress from trailering may affect the **resting** ACTH (false increase) for up to 30 minutes post-trailering
- The TRH stimulation test (T10ACTH) does not appear to be affected by trailer stress compared to resting ACTH

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Princess – after 6 months Tx

Manage the whole horse

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Questions

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