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Feeding Cattle During a Pandemic: What We Learned and What's Next





- I. Timeline
- II. β -agonist response
- III. Steroidal implants
- IV. Take home messages

Timeline

- March 16 through March 27, 2020- DDGS/Wet distillers become scarce. Feedlots looking for alternative protein supplies. Board drop but cash is positive to board. Cattle are pushed up in pipeline.
- March 30 through April 10, 2020- Packing plants slow throughput; Many questions arise about how long cattle can be fed ractopamine and potential withdrawal times

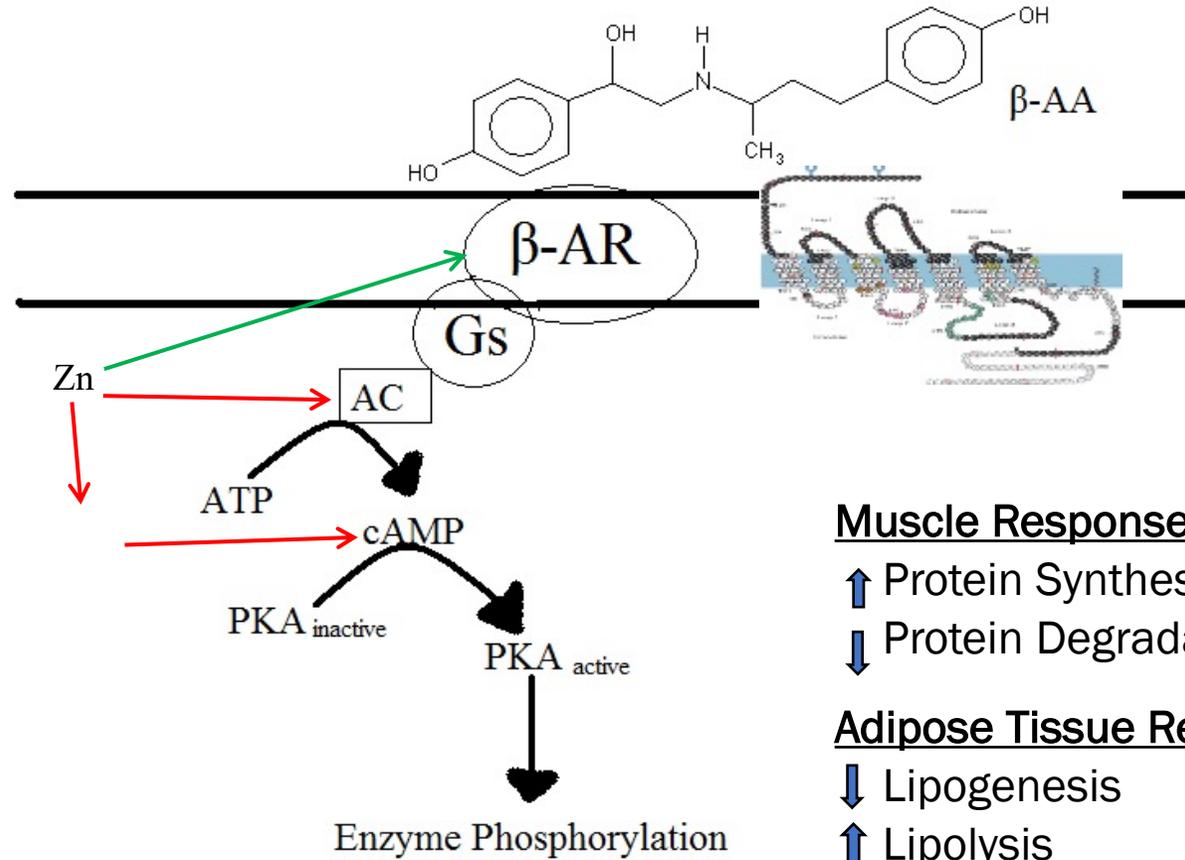
Timeline

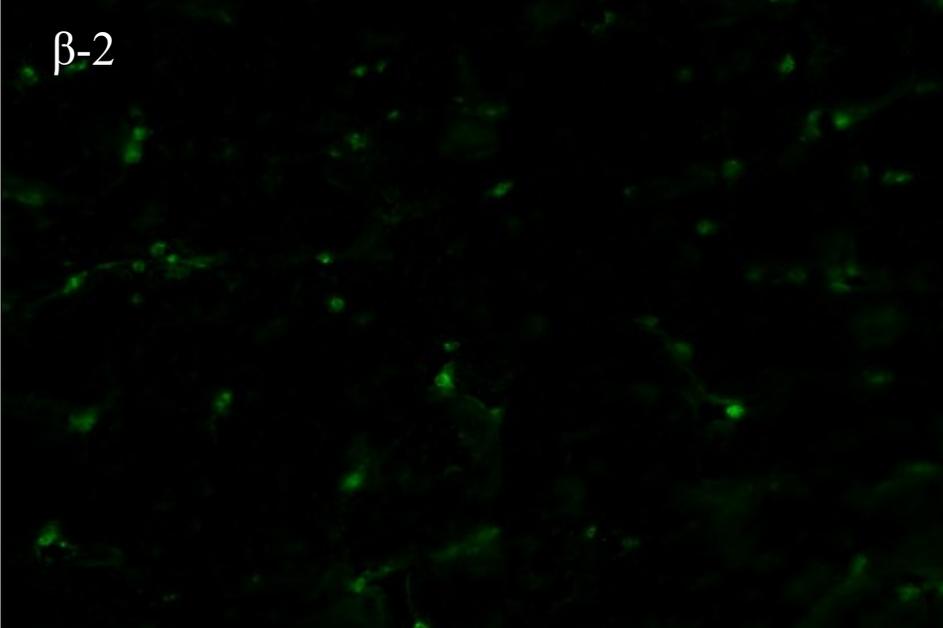
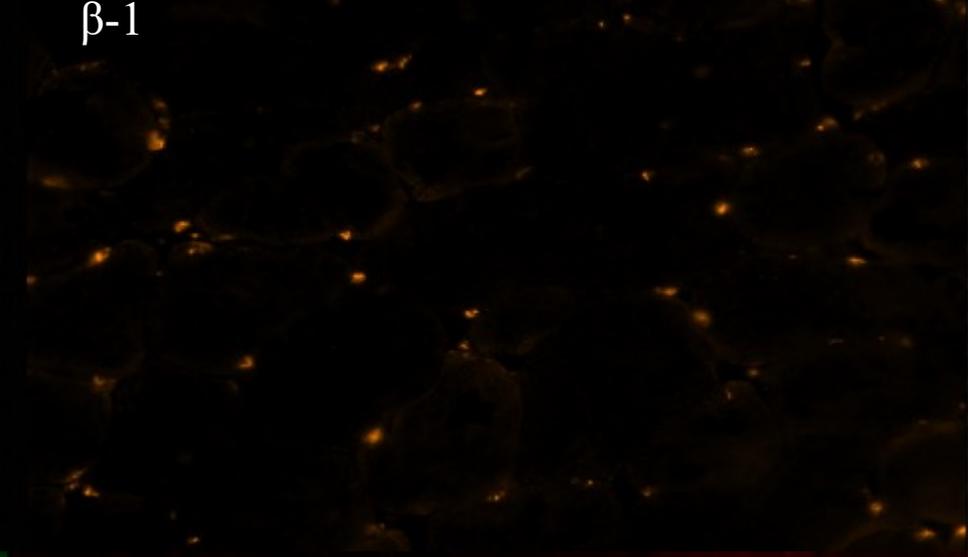
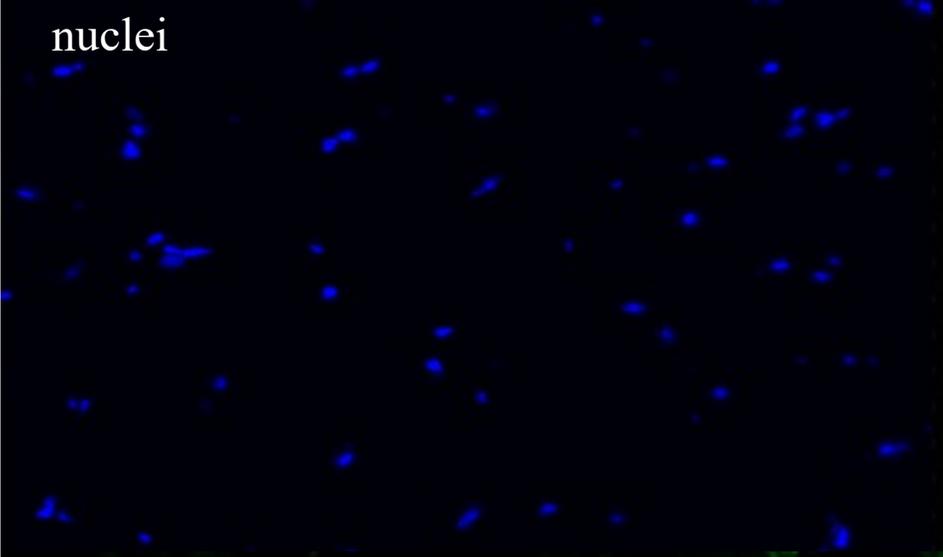
- April 13 through April 24, 2020- All protein supplements become scarce. Cattle get backed up as much as 60 to 90 days.
- April 27 through October 1, 2020- Proposed set aside program details are released; Plants slowly increase capacity

Year	Month	\$/CWT
2020	January	125
	February	122
	March	114
	April	111
	May	111
	June	110
	July	98
	August	104
	September	105
	October	108
	November	109
	December	111
2021	January	112

β -Adrenergic Agonists

Signal Transduction of GPR receptors





Survey

1. During the heart of the pandemic, how many feedlots (percentage of your clients) tried to maintain ractopamine feeding?
2. Because of the pandemic, have you seen a decrease in ractopamine feeding currently; what percentage?
3. Do you think you will ever get back to pre-pandemic levels of usage?

Survey

1. During the heart of the pandemic, how many feedlots (percentage of your clients) tried to maintain ractopamine feeding?

0 to 40%. Many tried but failed.....

The ones that were able to continue all had arrangements with packers.

Survey

2. Because of the pandemic, have you seen a decrease in ractopamine feeding currently; what percentage?

40 to 50%

Survey

3. Do you think you will ever get back to pre-pandemic levels of usage?

No; also, other issues unrelated to Covid; Most feeders have increased DOF to offset ractopamine response

Effects of various ractopamine hydrochloride withdrawal periods on performance, health, and carcass characteristics in yearling steers

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Effect of extended withdrawal of zilpaterol hydrochloride on performance and carcass traits in finishing beef steers¹

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J. N. Shook,* D. L. Step,[‡] L. O. Burciaga-Robles,* D. R. Stein,* D. A. Yates,[†]
J. P. Hutcheson,[†] W. T. Nichols,[†] and J. L. Montgomery[†]

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[†]Intervet/Schering-Plough Animal Health, De Soto, KS 66018;

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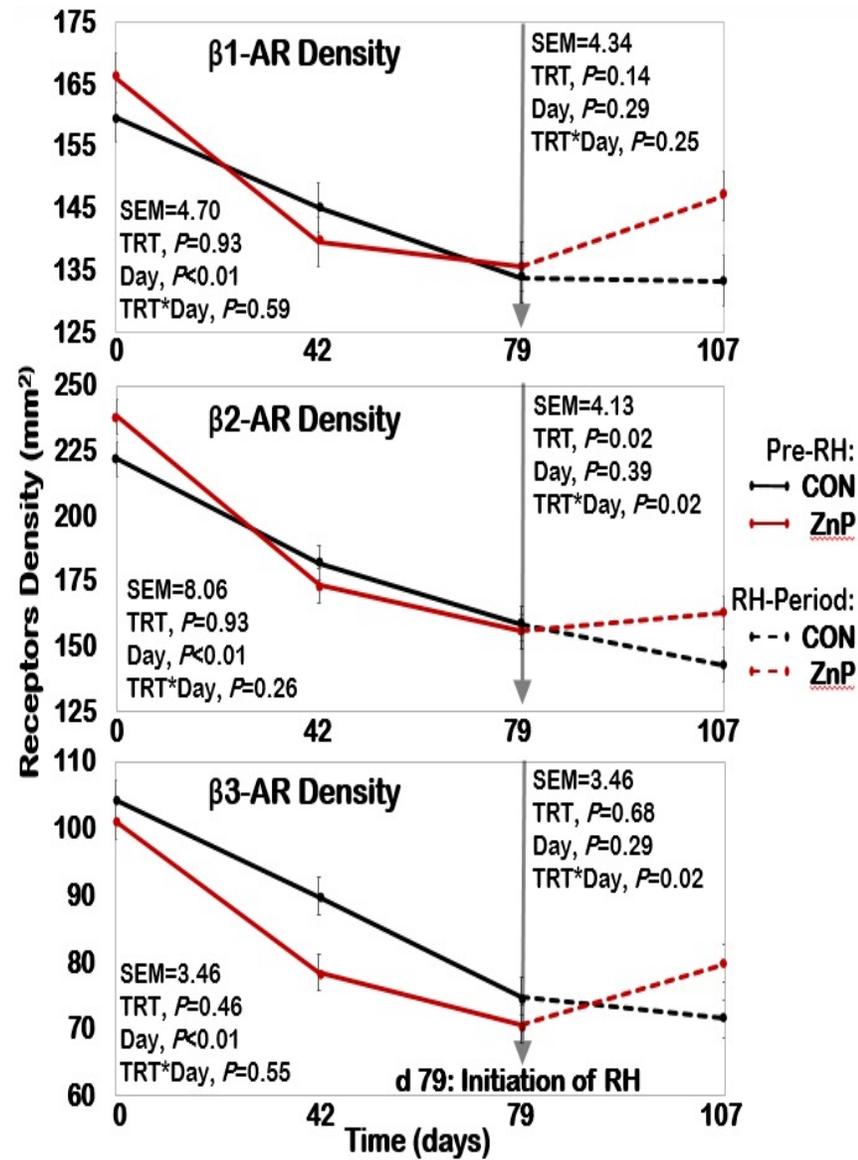
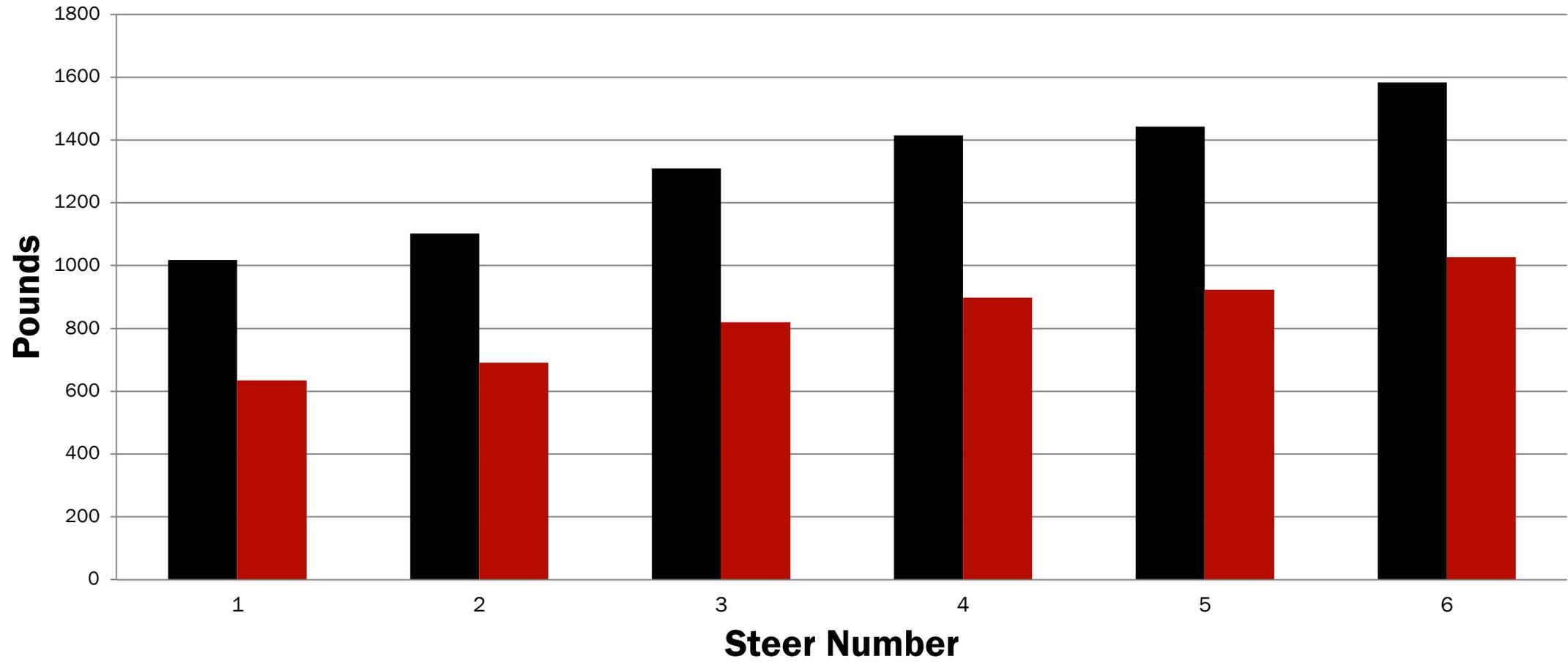


Figure 1. β -adrenergic receptor density in control (CON; 0g/(h-d) additional Zn) and Zn-added (Zn) 1g/(h-d) additional Zn) finishing steers before and during ractopamine hydrochloride feeding.

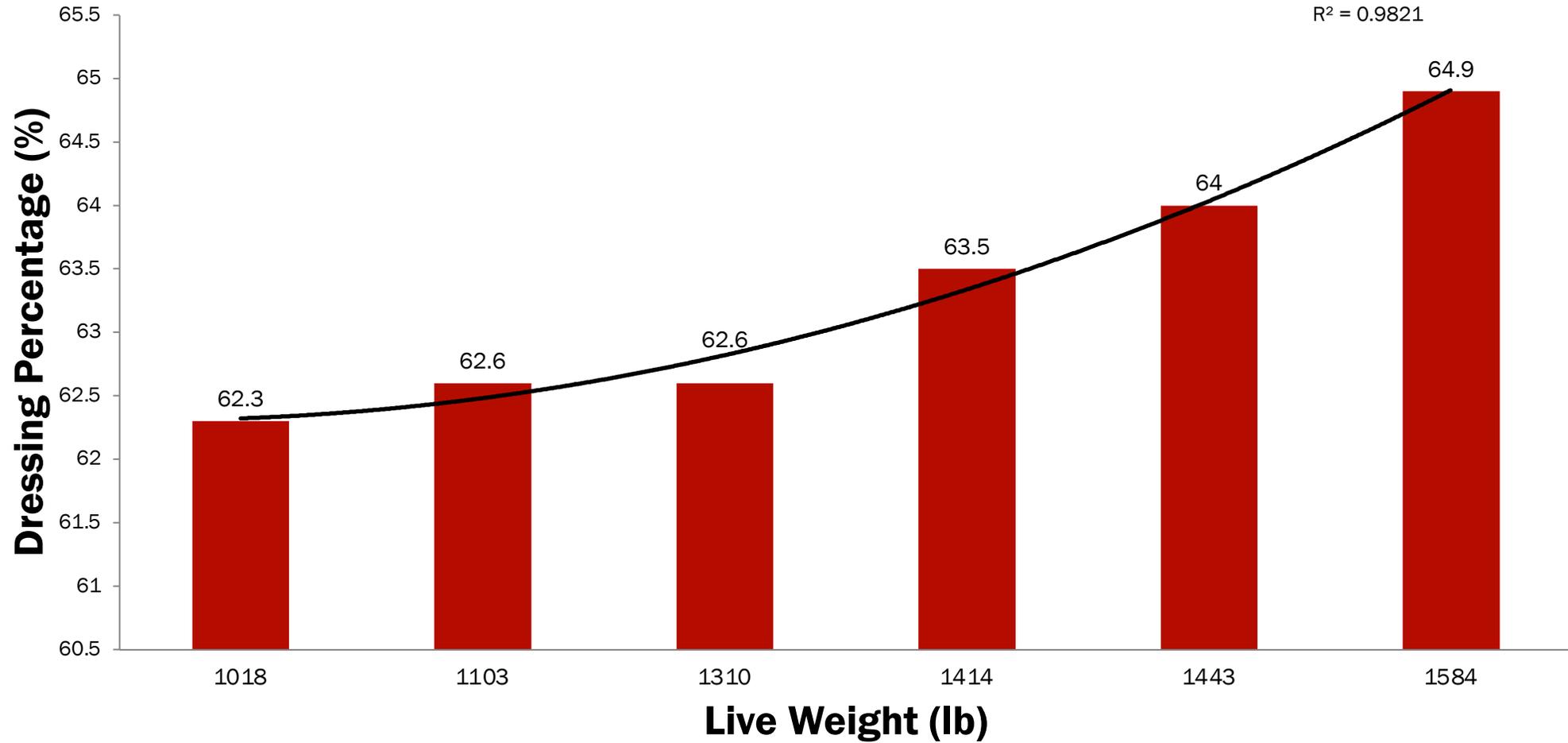
Days on Feed

Live and Hot Carcass Weights

■ Live Weight (lb) ■ Hot Carcass Weight (lb)

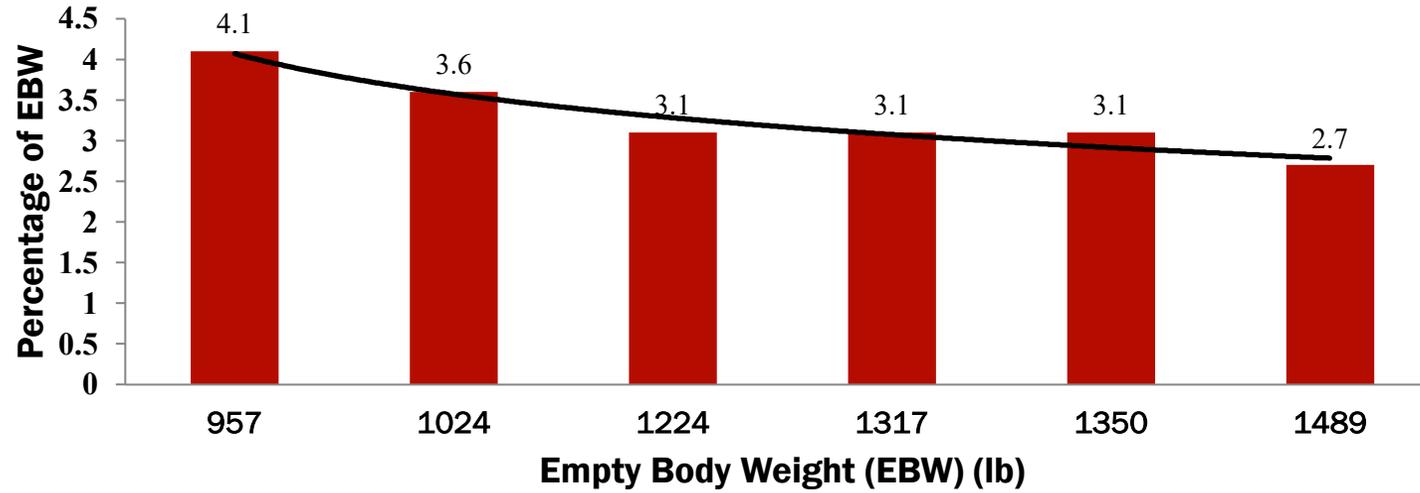


Dressing Percentage



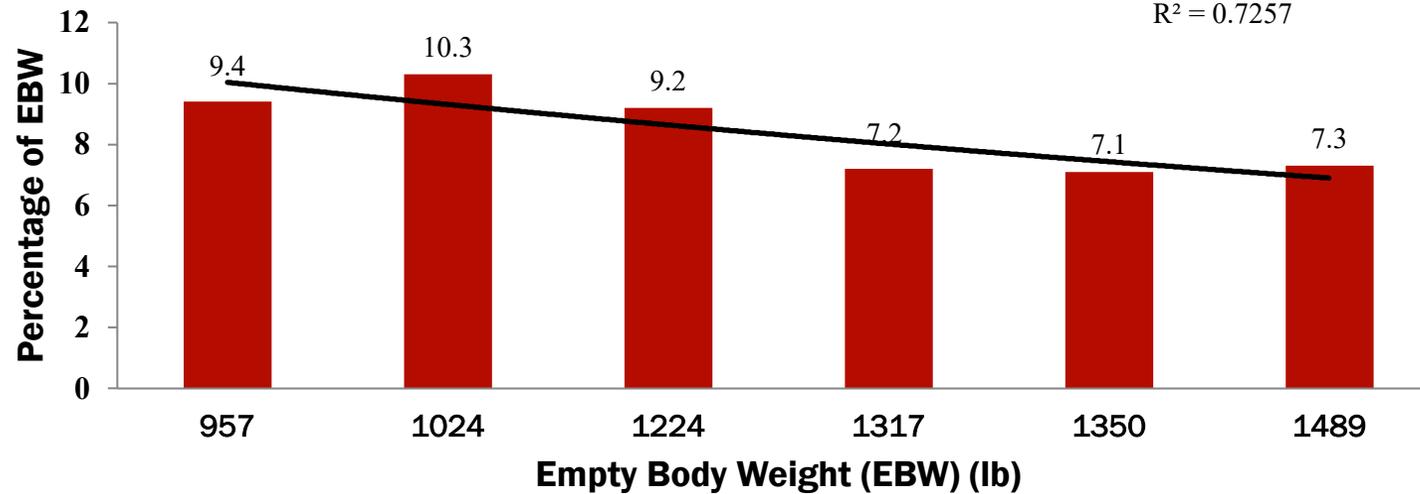
Blood as a Percentage of EBW

$R^2 = 0.9366$

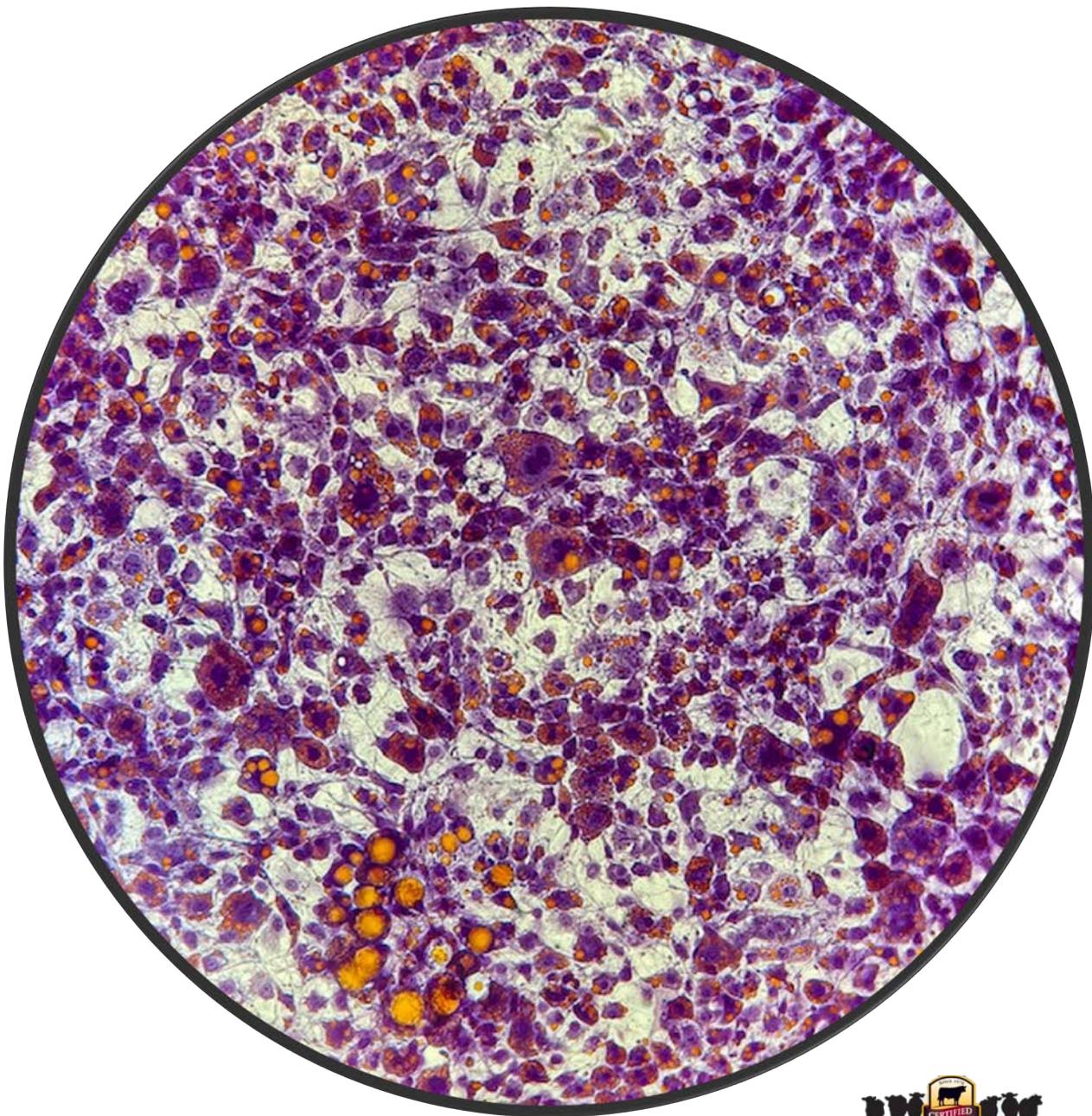
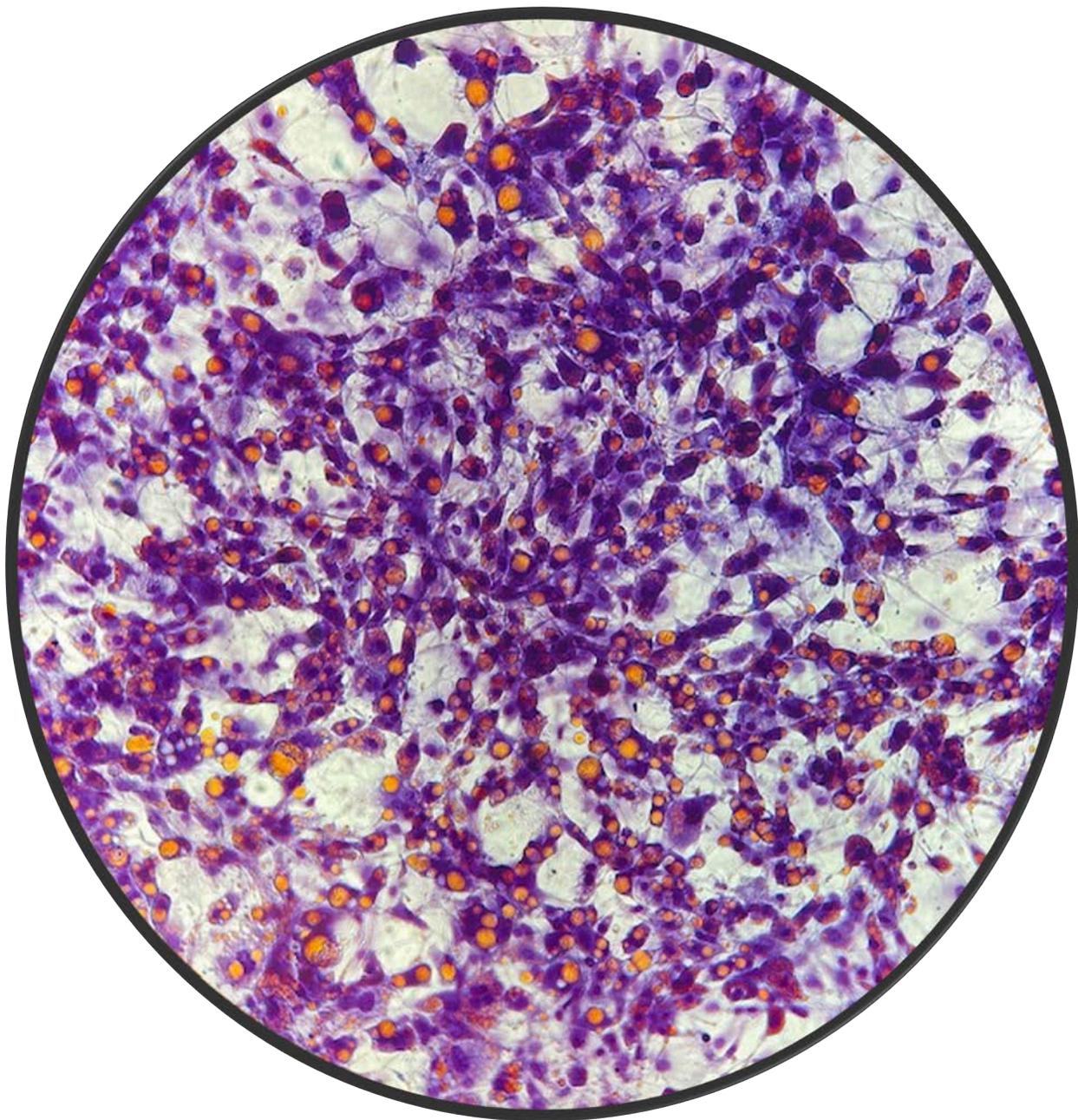


Hide as a Percentage on EBW

$R^2 = 0.7257$



Marbling and Maintenance Diets



Steroidal Implants

Classification: steroids with anabolic activity

- Estrogenic (female hormone)
 - ✓ *Natural - estradiol*
 - ✓ *Synthetic – diethylstilbestrol (DES)*
- Androgenic (male hormone)
 - ✓ *Natural – testosterone propionate*
 - ✓ *Synthetic - trenbolone acetate*
- Progestins (pregnancy hormone)
 - ✓ *Natural – progesterone*



The use of GETs in U.S. beef production

- Steroidal implants with anabolic activity
 - *Most common and widely used GET in cattle*
 - *Over 30 commercially-available in the U.S.*
 - *Calf-hood, stocker, and finishing*
 - *Zero-day withdrawal*



Current Events

Timeline

- 2017: Merck Animal Health has two new implants approved; Revalor X-R and Revalor X-H. FDA adds a statement on each of the labels.

Revalor®-XH

Intervet/Merck Animal Health

(trenbolone acetate and estradiol extended-release implant)

For Beef Heifers Fed In Confinement For Slaughter

DESCRIPTION

Revalor®-XH is an extended-release implant. One dose (implant) contains 200 mg of trenbolone acetate and 20 mg estradiol in 6 coated and 4 uncoated pellets, each containing 20 mg trenbolone acetate and 2 mg estradiol.

The small yellow pellets are coated with a polymer to provide extended release of the active ingredients. One cartridge contains 10 doses.

Manufactured by a non-sterilizing process.

INDICATIONS FOR USE

For increased rate of weight gain and improved feed efficiency for up to 200 days after implantation in beef heifers fed in confinement for slaughter.

Do not use in calves to be processed for veal. Effectiveness and animal safety in veal calves have not been established.

Not approved for repeated implantation (reimplantation) with this or any other cattle ear implant during the production phase(s) identified on labeling [beef heifers fed in confinement for slaughter] unless otherwise indicated on labeling because safety and effectiveness have not been evaluated.

Not to be used in animals intended for subsequent breeding, or in lactating dairy cows.

SYNOVEX® S is approved for:

- Increased rate of weight gain and improved feed efficiency in stocker and feedlot steers weighing more than 400 lb.
- For additional improvement in rate of weight gain in steers fed in confinement for slaughter, re-implant at approximately 70 days.

One implant (eight pellets) is administered to each steer by subcutaneous implantation in the middle one third of the ear.

Do not use in veal calves.

Timeline

- February 2020: Guidance 191 is initially released to the public. This document defines various production stages for beef production in the U. S. Clarifications are update in revised version released August 2020.

#191

**Changes to Approved NADAs —
New NADAs
vs.
Category II Supplemental NADAs**

Guidance for Industry

This version of the guidance replaces the version made available February 2020. This revision reorganizes Appendix III for better clarity.

Appendix III. Target Animal Classes of Major Food Animals

CVM has posted these tables on our website for easy access by users (<https://www.fda.gov/animal-veterinary/new-animal-drug-applications/classes-major-food-producing-animals-new-animal-drug-applications>).

Please note that the labeling for some approved animal drugs includes “legacy terms” that have been used since before FDA established the terminology in these tables; therefore, the tables do not encompass all terminology for all classes of major food-producing animals.

Cattle

Cattle are defined as animals of the *Bos* genus, either *Bos taurus taurus* or *Bos taurus indicus*. There are three major subclasses of cattle: veal calves, beef cattle, and dairy cattle.

B. Beef Steers

Weaned castrated male cattle (beef and dairy breeds) intended for slaughter, housed in any setting and receiving their diet from any source(s).

The following variants and subsets of variants of beef steers may be used to further define this subclass:

Variant	Subset	Definition
Growing Beef Steers on Pasture (stocker, feeder, and slaughter)	No subsets	Weaned growing beef steers (beef and dairy breeds) maintained on pasture and receiving the majority of their diet from grazing. Refers to cattle considered to be "stocker, feeder, and slaughter" cattle, and these words are always included in the parenthetical portion of the class name. "Stocker" refers to weaned growing cattle grazing pasture prior to finishing and slaughter; they are usually younger, weigh less, and are of lower condition (finish) than "feeder" cattle. "Feeder" refers to weaned growing cattle grazing pasture and of sufficient weight and maturity to be placed on high-energy rations for finishing; they are generally older, weigh more, and carry more condition (finish) than "stocker" cattle. "Slaughter" refers to weaned growing cattle grazing pasture and suitable for slaughter.
Growing Beef Steers in a Dry Lot	No subsets	Weaned growing beef steers (beef and dairy breeds) maintained in a dry lot. They receive the majority of their diet from harvested forage (possibly with a supplement).
Growing Beef Steers Fed in Confinement for Slaughter	Includes all subsets	Weaned growing and finishing beef steers (beef and dairy breeds) intended only for slaughter and confined in group pens and fed a progressively high-energy diet <i>ad libitum</i> as their sole ration until slaughter. May also be referred to as feed yard or feedlot cattle in the industry. <i>Includes growing beef steers in a grow yard (see definition below).</i>
Growing Beef Steers Fed in Confinement for Slaughter	Growing Beef Steers in a Grow Yard	A subset population of growing beef steers fed in confinement for slaughter, these are weaned growing beef steers (beef and dairy breeds) confined in group pens and fed a moderate- to high-roughage diet <i>ad libitum</i> as their sole ration prior to the finishing stage. Grow yards may also be referred to as starter yards or backgrounding yards in the industry.

Timeline

- April 2021: Pharmaceutical companies supposedly received a letter from U. S. FDA. Contents of this letter were confidential for each implant manufacturer. Companies have until approximately Oct. 1, 2021, to revise implant labels.

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Timeline

- May 28, 2021: FDA releases statement in response to industry questions.

FDA Letter to Industry on Beef Cattle Ear Implants

Dear Stakeholder,

The FDA would like to take the opportunity to address recent inquiries from the beef cattle industry regarding beef cattle ear implants, and to reassure cattle producers that there are no changes to how they may be using these products at this time.

The FDA assures beef cattle producers that approved, over-the-counter implants will remain available for the beef cattle industry. These products have a variety of approved conditions of use and the FDA has recognized that the labeling for certain products may be unclear to the end-user, particularly with regard to repeat implantation. To address this issue, the FDA has initiated a process to work with the drug sponsors to clarify the labeling of the affected beef cattle ear implant products.

The FDA plans to continue to work closely with beef cattle producers to provide additional information as it becomes available, in order to minimize any confusion.

GET Regulations

- *Any new GET marketed in the U.S.*
 - NADA: U.S. Food and Drug Administration
 - Thorough, multi-step scientific review
 - Animal well-being
 - Tolerance levels
 - Human food supply
 - Environmental impact
 - Pre-approval assessment



Identification and Environmental Implications of Photo-Transformation Products of Trenbolone Acetate Metabolites

Edward P. Kolodziej,^{*,†} Shen Qu,[‡] Kristy L. Forsgren,[§] Sarah A. Long,^{||} James B. Gloer,^{||} Gerrad D. Jones,[†] Daniel Schlenk,[§] Jonas Baltrusaitis,^{⊥,||} and David M. Cwiertny^{*,‡}

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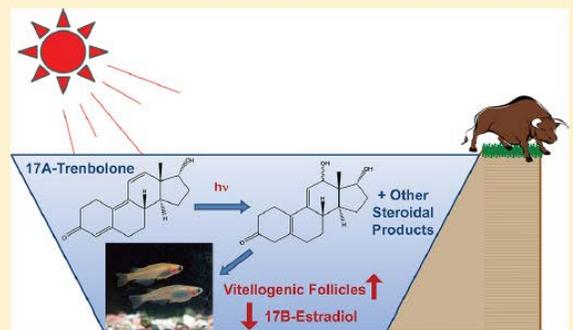
^{||}Department of Chemistry, University of Iowa, Iowa City, Iowa 52242-1527, United States

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Supporting Information

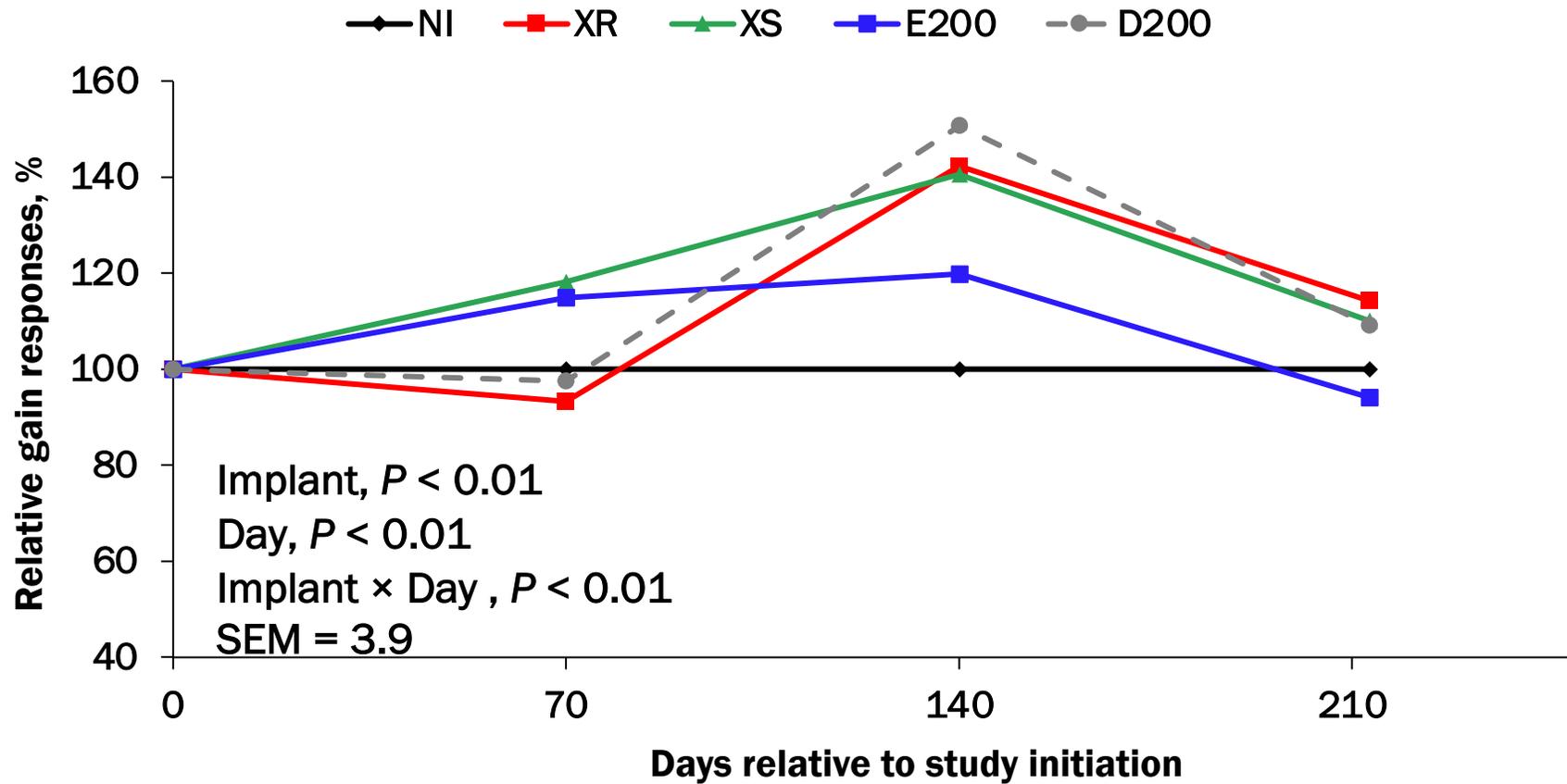
ABSTRACT: Despite the widespread use of the anabolic androgen trenbolone acetate (TBA) in animal agriculture, evidence demonstrating the occurrence of TBA metabolites such as 17 β -trenbolone (17 β -TBOH), 17 α -trenbolone (17 α -TBOH), and trenbolone (TBO) is relatively scarce, potentially due to rapid transformation processes such as direct photolysis. Therefore, we investigated the phototransformation of TBA metabolites and associated ecological implications by characterizing the photoproducts arising from the direct photolysis of 17 β -TBOH, 17 α -TBOH, and TBO and their associated ecotoxicity. LC-HRMS/MS analysis identified a range of hydroxylated products that were no longer photoactive, with primary photoproducts consisting of monohydroxy species and presump-



Impact of Sustainability/Efficiency

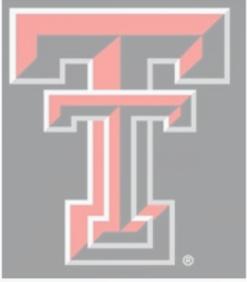
- Some feeders are using two high dose TBA/E2 implants during a > 200 DOF program
- Removing the second implant could be a 10 to 20 lb reduction in HCW
- With all the climate change discussion this summer, this is going backwards!

Relative gain responses



Feeders/Nutritionists Take Home Messages

- Many changes have occurred from a feedlot nutrition/growth perspective the past 18 months
- Utilize research-based findings to make your best decisions
- Don't give up on technology during these trying times!!!



Thank You!

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