

# Plasma Levels of A Long-Acting Oxytetracycline In Cattle

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## Introduction

This study was designed to follow blood levels of a long-acting oxytetracycline given to yearling heifers in three treatment regimens.

## Materials and Methods

Yearling Hereford-type heifers were divided into 3 groups of 4 on a bodyweight (BW) basis. Group T1 (mean BW  $308 \pm 8$  Kg) was given a single intramuscular dose of long-acting oxytetracycline (Liquamycin LA-200, 200 mg oxytetracycline/ml; Pfizer Inc., New York, New York) at 9 mg/lb BW. Group T2 (mean BW  $340 \pm 12$  kg) was given the same drug in the same manner at 9 mg/lb BW with a repeat dose at 72 hours. Group T3 (mean BW  $342 \pm 10$  kg) was given a single injection of the drug at 18 mg/lb BW. Animals were observed for 1 hour after dosage for any untoward effect.

Group T1 cattle were from the Washington State University Beef Herd. Groups T2 and T3 were purchased from a single source. Cattle were fed grass or hay for at least two weeks before treatment. None were given any oxytetracycline or other antibiotics for at least 2 weeks before treatment or during the experimental period.

All injections were given into the gluteal muscles using a 16 gauge 1 1/2 inch needle with no more than 10 ml volume given per individual intramuscular site.

Blood samples were obtained by jugular venipuncture at 0, 4, 12, 24, 48, 72, 96, 120, 144, 168, 192, and 216 hours post treatment. Samples were collected into heparinized 10 ml vacutainer tubes and kept on ice or under refrigeration (4°C) until centrifugation. Plasma was stored in glass vials at -22°C. The samples were sent by air packed in ice to Pfizer Central Research, Groton, Conn., where they were analyzed by the standard microbiological plate assay for oxytetracycline.

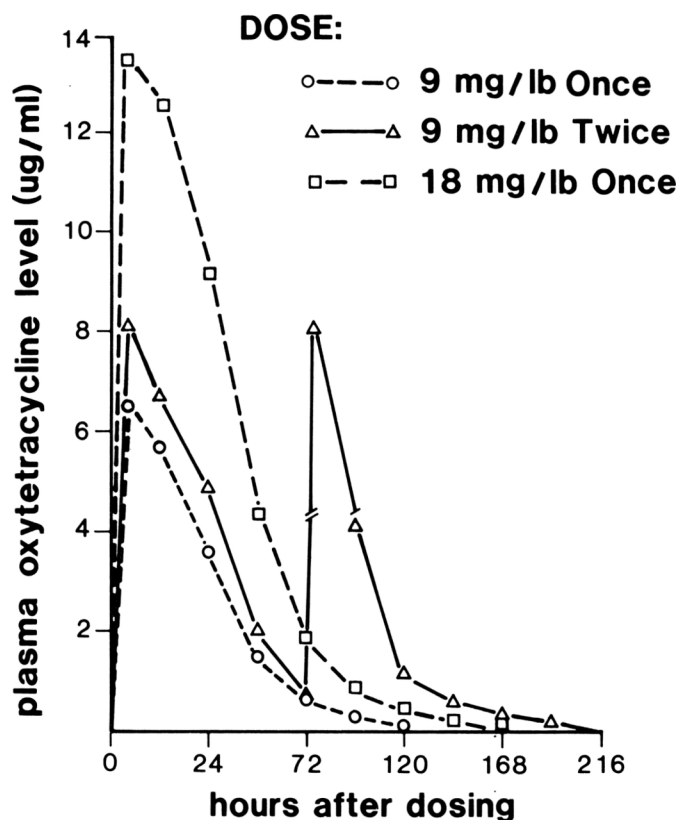


Figure 1. Mean plasma levels of a long-acting oxytetracycline in groups of 4 Hereford-type heifers given: 1. 9 mg/lb bodyweight (BW) at 0 hours, 2. 9 mg/lb BW at 0 and 72 hours, or 3. 18 mg/lb BW at 0 hours.

## Results

Plasma oxytetracycline levels are given for each animal in table 1, and for each group in Figure 1. The mean plasma concentrations  $\pm$  standard deviation are also shown in table 1. Two samples were accidentally broken in the laboratory. Group T3 (18 mg oxytetracycline/lb BW) had detectable blood levels at 192 hours, some 72 hours longer than animals of Group T1 (9 mg oxytetracycline/lb BW). The double injection of 9 mg/lb BW in Group T2 resulted in detectable blood levels for the most prolonged period.

No clinical abnormalities were seen in the hour after dosing. There was a moderate degree of swelling and pain at the injection sites in all groups. The swelling persisted until 9 days, the end of the experiment but had largely disappeared after 2 to 3 days. No untoward reaction was seen with any dosage in the 2 weeks after injection.

### Discussion

There were no figures available on blood levels and persistence after intramuscular injection of what is already a

widely-used drug. This study showed that oxytetracycline was detectable in blood up to 216 hours after a single 18mg/kg dose or after two 9 mg/kg doses at 0 and 72 hours. The latter regimen is probably the one of choice if a dose lasting longer than 120 hours is required, since 18 mg/kg involves injection of a large volume of drug at one time.

Dose Level	Animal Number	Hours Post Treatment: Plasma Oxytetracycline Levels (ug/ml)											
		0	4	12	24	48	72	96	120	144	168	192	216
9 mg x 1 (Group T1)	1	NZ	5.3	4.6	2.9	1.3	0.5	0.2	NZ	NZ	NZ	NZ	NZ
	2	NZ	8.4	7.4	4.5	2.1	1.0	0.4	0.2	NZ	NZ	NZ	NZ
	3	NZ	NS	5.1	3.5	1.2	0.5	0.3	0.1	NZ	NZ	NZ	NZ
	4	NZ	5.9	5.6	3.4	1.5	0.6	0.2	NZ	NZ	NZ	NZ	NZ
	Mean ± SD	NZ	6.5 ± 1.3	5.7 ± 1.1	3.6 ± 0.6	1.5 ± 0.3	0.6 ± 0.2	0.3 ± 0.1	0.1 ± 0.1	NZ	NZ	NZ	NZ
9 mg x 2 (Group T2)	5	NZ	NS	6.8	4.2	1.9	0.8	3.4	1.0	0.7	0.5	0.3	NZ
	6	NZ	9.0	7.2	5.1	2.3	0.8	4.4	1.0	0.6	0.4	0.2	0.1
	7	NZ	7.4	6.2	4.2	1.5	0.5	4.2	1.5	0.6	0.5	0.2	0.1
	8	NZ	7.8	6.6	5.9	2.4	0.6	4.3	1.1	0.4	0.2	NZ	NZ
	Mean ± SD	NZ	8.1 ± 0.7	6.7 ± 0.4	4.9 ± 0.7	2.0 ± 0.4	0.7 ± 0.1	4.1 ± 0.4	1.15 ± 0.2	0.6 ± 0.1	0.4 ± 0.1	0.2 ± 0.1	0.5 ± 0.05
18 mg x 1 (Group T3)	9	NZ	13.8	12.2	9.2	4.4	1.4	0.9	0.4	0.3	0.2	NZ	NZ
	10	NZ	13.5	13.1	9.8	5.6	2.9	1.2	0.7	0.3	0.2	0.1	NZ
	11	NZ	14.1	13.1	8.6	3.4	1.4	0.8	0.5	0.3	0.3	0.2	0.2
	12	NZ	12.2	11.8	8.7	4.7	2.0	0.8	0.4	0.2	0.2	NZ	NZ
	Mean ± SD	NZ	13.4 ± 0.7	12.6 ± 0.6	9.1 ± 0.5	4.4 ± 0.8	1.9 ± 0.6	0.9 ± 0.2	0.5 ± 0.1	0.3 ± 0.04	0.2 ± 0.4	0.1 ± 0.1	0

TABLE 1: Plasma Oxytetracycline Levels Following Intramuscular Administration of Liqueamycin-LA 200 at Various Dosage Levels (NZ-no zone of inhibition, NS-no sample).