AN INDIRECT METHOD FOR ESTIMATING THE NUMBER OF MYOFIBERS IN TRANSVERSE SECTIONS OF SKELETAL MUSCLE

by

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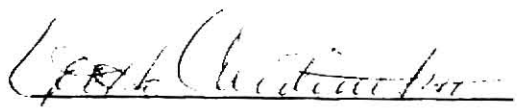

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INTRODUCTION

Most studies indicate that the number of myofibers in a muscle increase predominantly during the prenatal or the immediate postnatal stage of skeletal muscle growth and development. Thereafter, the total number of myofibers in a given muscle remains relatively unchanged throughout the animal's life (human muscle: MacCallum, 1898; pig muscle: Elliot, Wiggington and Corbin, 1943; rabbit muscle: Meara, 1947; mouse muscle: Rowe and Goldspink, 1969).

Since the total number of myofibers in a muscle does not significantly change within an animal's lifetime, it has been suggested that the total number of myofibers per muscle is genetically predetermined (Luff and Goldspink, 1970).

In German Shepherd dogs with pectineal hypotrophy, pectineus muscles are characterized by myofiber hypotrophy, particularly of type II myofibers (Cardinet et al, 1969). A cursory examination of transverse sections of pectineal muscles suggests that in some dogs there are fewer myofibers at 16-24 weeks than at 8 weeks of age. Thus, the possibility exists that a loss of myofibers as well as myofiber hypotrophy may be involved in the pathogenesis of the disease.

The determination of the number of myofibers in transverse sections of canine pectineus muscles by means of direct counting is extremely laborious and time consuming. This precludes the evaluation of a large number of specimens. Therefore, it was desirable to develop an indirect method

for estimating the total number of myofibers. The purpose of this report is to describe and evaluate a method for the indirect estimation of the total number of myofibers in transverse sections of canine pectineus muscles.

METHODS AND MATERIALS

Six pectineus muscles from 4 German Shepherd dogs were used in this study (Table 1). Anesthesia was induced by the intravenous administration of 2.5 or 4 percent sodium thiamylal (8 mg/lb), and the entire pectineus muscle was removed employing surgical asepsis. The removed muscles were weighed and held at 4°C for 30 minutes. Transverse sections were cut with a razor blade and frozen in 2-methyl-butane, cooled to -125 to -150°C in liquid nitrogen. Cryostat sections, 10u thick, were cut and incubated for the demonstration of myofibrillar ATPase (Padykula and Herman, 1955), and counter-stained with eosin. Transverse sections of pectineus muscles from Dogs 1 and 2 were cut near the tendon of insertion where the cross-sectional area of the muscle is smallest, while sections from Dogs 3 and 4 were obtained from the proximal third of the muscle where the cross-sectional area is greatest. In this manner, sections were obtained which varied in the number of fibers present.

General Outline of Myofiber Counting Methods

The total number of myofibers in transverse sections of the 6 muscles used was determined by direct and indirect counting methods. The totals determined by direct count were used to judge the accuracy of the indirect method. The indirect method of estimating the number of myofibers in a

transverse section involved sampling random areas within the section by obtaining photomicrographs. From these photomicrographs, the number of myofibers contained in the known area sampled was equated to the total area of the transverse section of the muscle. Three indirect method counting trials were performed for each muscle to estimate the number of myofibers present.

Direct Method of Counting Myofiber Number

A series of overlapping photographs were taken of each section until the entire transverse section had been photographed. The magnification used was arbitrarily selected to enlarge the fibers to a size compatible for counting by direct visualization. The individual photographs were pieced together to obtain a complete montage of the section (Fig. 1), and the total number of fibers (N_T) were counted, using a hand tally counter. Each myofiber was simultaneously marked with ink when counted to avoid counting the myofiber more than once.

Indirect Method for Estimating Myofiber Number

Sampling: Selection of Random Photomicrographs. The periphery of each transverse section was plotted on a piece of graph paper, the coordinates of each point on the periphery being determined from the microscope stage vertical and horizontal millimeter vernier scales. An arbitrary ten by ten unit square was drawn around the plotted periphery so that the stage vernier scale points would correspond to a number between 0.0 and 9.9 (Fig. 2). Random vertical and

horizontal coordinates, consisting of two digits each, were taken from a random numbers table to determine the point in the muscle to be photographed. If the random point fell within the periphery of the muscle, a 4" x 5" photomicrograph was taken at that point. This method was continued until 40 random points in the muscle had been selected and photographed.

Determination of Magnification and Area Sampled. Using the same physical set-up for taking the photomicrographs, a stage micrometer (0.1 mm divisions) was photographed. Following development of the negatives, the photomicrographs were enlarged to fill a rectangular 240.5 mm x 190.0 mm printing easel field (45,695 mm^2) and printed. From the enlarged image of the micrometer, the total print magnification (mag) was determined. Magnifications used varied between muscles and trials (Table 2). The magnifications were arbitrarily selected to enlarge the myofibers to sizes compatibile for easy direct visualization. From the determined magnification, the area of each photomicrograph (A_p) may be calculated:

$$A_p = \frac{45{,}695\ mm^2}{(mag)^2}$$

Determination of Myofiber Number/Photomicrograph. The number of myofibers in each photomicrograph (N_p) was obtained using the same method employed in the direct count. This included (1) all myofibers completely contained within the field, and (2) all myofibers partially contained in the field along one short (190.0) side of the rectangle and

along one long (240.5 mm) side; fibers contained partially in the field along the opposite sides were not counted.

Determination of Total Transverse Muscle Section Area. The microscope slide containing the transverse section of muscle and an overlaid transparent millimeter ruler were placed in a photographic enlarger, and the image of the muscle and ruler were projected on photographic paper from which a print (negative image) was developed. The enlarged transverse muscle section image was measured with a planimeter, and the magnification of the image was determined. From these measurements the total area of the transverse muscle section (A_T) may be calculated:

$$A_T = \frac{\text{Enlarged Area of Section, mm}^2}{(\text{mag})^2}$$

Estimation of Total Number of Myofibers. For any given picture the estimated total number of myofibers in the section (N_E) may be calculated from the parameters determined above:

$$N_E = \frac{N_p \times A_T}{A_p}$$

The determined number of myofibers/photomicrograph (N_p), magnification of the photomicrographs, and the total area of the transverse section (A_T) were computer programmed to provide a print out of the data for each trial (Table 3).

RESULTS

By the direct counting method, the total number of myofibers per transverse section varied from 12,368 to

163,223 (Table 4). The mean transverse sectional areas (A_T) varied from 31.9 to 170.7 mm^2, while the number of myofibers/mm^2 varied from 326 to 5117 (Table 4).

There were fewer myofibers in transverse sections at 24 weeks of age than at 8 weeks in the 2 dogs which were sampled bilaterally. These dogs (Dog Nos. 3 and 4) had their right pectineus muscles removed at 8 weeks of age (Table 1), and by direct count contained 163,223 and 151,175 myofibers, respectively (Table 4). At 24 weeks of age, the left pectineus muscles were removed (Table 1) and by direct count contained 54,019 and 101,929 myofibers, respectively (Table 4).

The parameters of N_p, ΣN_p, $\bar{N}_p$, $\%N_T$, N_E, N_T-N_E, %E, and %TMA determined for each photomicrograph in each trial are presented in Appendix Tables 1-18. The data presented in this section are derived from these tables.

In all trials there was observed to be a high degree of correlation between the $\%N_T$ sampled and the %TMA sampled, thereby $\%N_T$/%TMA was approximately 1. Therefore, results of analyses based on comparisons with $\%N_T$ or %TMA were essentially similar. Since the $\%N_T$ of an unknown muscle would not be known, the data has in most instances been analyzed with respect to %TMA since this is a parameter that can be readily determined from any muscle being sampled by the indirect method.

The %E of estimate by the indirect method varied between muscles and trials. Using the number of points sampled as a basis for comparison, the %E varied from -6.17% to +11.97%

after 40 points were sampled, and the mean %E ± S.E. for all muscles was 3.89 ± 1.17 (Table 5).

The %E at the end of 40 points sampled, including all trials of all muscles, was analyzed with respect to N_T and the number of myofibers/mm^2. The correlation coefficient derived between %E and N_T was 0.42 ($t = 1.85$; $p > 0.05$). The correlation coefficient derived between %E and the number of myofibers/mm^2 was 0.60 ($t = 2.99$; $p > 0.01$). The equation for the line of best fit for %E and the number of myofibers/mm^2 was: %E = 0.0017 myofibers/mm^2 + 1.25.

An analysis of the data based only on the number of sample points does not include an analysis that is comparable between trials with respect to $\%N_T$ or %TMA sampled, since the number of myofibers/mm^2 and the photomicrographic magnifications employed varied. The minimum $\%N_T$ and %TMA sampled for 40 sample points were 6.90 and 6.23, respectively, (Muscle No.4, Trial No. 2), while the maximum $\%N_T$ and %TMA were 53.44 and 52.67, respectively, (Muscle No. 1 Trial No. 1).

It is possible to analyze the data which includes both 40 sample points and the $\%N_T$ or %TMA supplied by comparing the mean %E, at each point from all muscles and trials, with the mean $\%N_T$ or %TMA at each point from all muscles and trials (Table 6). In this analysis there is a progressive decrease in the standard error of the mean; however, for all practical purposes there is very little change in the standard error after 13 sample points which corresponds to 4.35 %TMA and 4.46 $\%N_T$. A plot of the mean %E and its 95% confidence limits with the mean %TMA, indicates that its 95% confidence

limits of %E reaches a plateau at approximately 5-7 %TMA (Fig. 3). This plateau region corresponds to 15-21 sample points. This analysis of the data indicates that the indirect method tends to over estimate the number of myofibers by about 4% with the 95% confidence limits ranging from about 0% to about +7% when 5 %TMA has been sampled.

The above analysis introduces some bias since the mean %TMA values used are derived for extremely wide ranges in %TMA; e.g., at sample point 40 the %TMA of Muscle No. 1, Trial 1, was 52.67 but only 6.23 for Muscle No. 5, Trial 2. Therefore, an alternative analysis was made whereby the mean of all %E values was determined within groups of %TMA values (Fig. 4). This analysis was limited to values up to 6.99 %TMA since this was the highest group of %TMA sampled in all muscles and trials.

By this method of analysis, %E varied little after 2-6 %TMA had been sampled. Again, the error of estimate was high by about 4-6% and the 95% confidence limits ranged from about +3% to +7%.

The %E at 3-6 %TMA for all trials and muscles were analyzed with respect to N_T and the number of myofibers/mm^2 (Table 7).

DISCUSSION

The analysis of %E based on the number of points sampled indicates that after 15-20 samples, the estimation of N_T becomes reasonably constant, the mean %E ± S.E. at 20 points being 3.12 ± 1.35 (95% confidence limits, 0.29 to 5.96).

The analysis of %E at each 40 points in which the %TMA was averaged, indicates that the estimation of N_T becomes reasonably constant after 5-7 %TMA has been sampled, the mean %E ± S.E. at 5 %TMA being 3.41 ± 1.70 (95% confidence limits, -0.17 to 6.99). This would correspond to 15 sample points. The analysis of %E in which the %TMA values were grouped, indicates that perhaps as little as 2-3 %TMA need be sampled, the mean %E ± S.E. at 2.00-2.99 %TMA being 4.12 ± 1.10 (95% confidence limits, 1.92 to 6.32). This would correspond to 11 sample points. From these results, it would appear that utilization of the indirect method should include at least 15 sample points which sample at least 5 %TMA. Utilizing this protocol, an error of 4 percent can be anticipated with the 95% confidence limits of the %E between 0 and +7%.

Analysis of the relationship between %E and N_T suggests that N_T may have a modest influence on %E, whereby a larger %E can be anticipated with larger values of N_T ($r = 0.42$ at 40 points, $P > 0.05$; $r = 0.53$ at 5 %TMA, $P < 0.05$).

Analysis of the relationship between %E and the number of myofibers/mm^2 suggests that fiber density does influence the %E, whereby higher densities of fibers are associated with larger values of %E ($r = 0.60$ at 40 points, $P < 0.01$; $r = 0.61$ at 5 %TMA, $P < 0.01$). The principle component that would influence the number of fibers/mm^2 is fiber size. Thus, estimates of N_T in muscles with small fibers (e.g., 8 week-old muscle) would tend to be greater than in muscles with large fibers (e.g., 24 week-old muscle). Our results indicate that

approximately a 2 %E can be anticipated for every 1000 myofibers/mm^2. The relationship of %E and number of myofibers/mm^2 might be employed where %E = 0.002 myofibers/mm^2 +1.22, whereby the number of myofibers/mm^2 could be determined from the 15 sample points used in the trial.

The data obtained by direct count for Dogs 3 and 4 suggests that there are fewer myofibers present in 24 week-old pectineus muscles than at 8 weeks; i.e., 163,223 and 151,175 myofibers/section at 8 weeks, and 54,019 and 101,929 myofibers/section at 24 weeks, respectively. These differences would represent a loss of 67% and 32% of the myofibers, respectively. The magnitude of these differences would suggest the likelihood that a loss of myofibers is a component of canine pectineal hypotrophy. However, until variations in myofiber number with respect to sides sampled and sampling sites within a muscle are established, these differences must be viewed with caution.

In conclusion, the indirect method would appear to be accurate enough to determine changes in myofiber number between 8 and 24 weeks of age if the magnitude of change is as great as suggested by the direct counting results obtained in Dogs 3 and 4.

TABLE 1

Pectineus muscles of German Shepherd dogs used to determine the number of myofibers in transverse sections.

Muscle No.	Side	Dog No.	Sex	Age (weeks)
1	Right	1	Male	104
2	Left	2	Male	24
3	Left	3	Male	24
4	Left	4	Female	24
5	Right	4	Female	8
6	Right	3	Male	8

TABLE 2

Magnifications of photomicrographs used in the indirect method of estimating the total number of myofibers in the transverse sections.

Muscle No.	Trial No.	Magnification
	1	309 X
1	2	730 X
	3	730 X
	1	551 X
2	2	663 X
	3	505 X
	1	260 X
3	2	316 X
	3	338 X
	1	237 X
4	2	266 X
	3	327 X
	1	576 X
5	2	683 X
	3	612 X
	1	954 X
6	2	678 X
	3	840 X

TABLE 3

Computer data derived for each trial estimating the total number of myofibers in a transverse section of canine pectineus muscle.

Column No.	Symbol	Determinant
1	n	Photomicrograph number (1-40)
2	N_p	Number of myofibers/photomicrograph
3	ΣN_p	Number of myofibers counted in n photomicrographs
4	$\bar{N}_p$	Mean number of myofibers counted: $\Sigma N_p/n$
5	$\%N_T$	Percent of total number of myofibers counted: $[\Sigma N_p/N_T] \times 100$
6	N_E	Estimated total number of myofibers by indirect count: $N_p \times A_T/A_p$
7	N_T-N_E	Difference between total number of myofibers determined by direct count and indirect count
8	%E	Percent error of estimated number of myofibers by indirect count: $[(N_T - N_E)/N_T] \times 100$
9	%TMA	Percent of total transverse sectional area sampled: $n \times A_p/A_T \times 100$

TABLE 4

Total number of myofibers determined by direct count, mean transverse sectional area ± S.E. of 3 trials, and the number of myofibers/mm^2 in 6 canine pectineus muscles.

Muscle No.	Total No. Myofibers by Direct Method (N_T)	Mean Transverse Sectional Area ± S.E. of 3 Trials mm^2 (A_T)	Myofibers/mm^2 (N_T/Mean A_T)
1	12,368	36.6 ± 0.1	338
2	32,273	45.2 ± 0.1	714
3	54,019	165.8 ± 1.2	326
4	101,929	170.7 ± 0.4	597
5	151,175	63.1 ± 0.3	2396
6	163,223	31.9 ± 0.1	5117

TABLE 5

No. Points Sampled	Mean Percent Error of Estimate, %E ± S.E. (3 Trials)						
	Muscle No.						
	1	2	3	4	5	6	All Muscles
5	8.51±5.55	-1.43±0.69	7.09±8.93	-9.17±9.54	15.82±7.73	26.29±7.96	5.49±3.98
10	6.42±1.96	-2.44±1.21	1.12±3.70	-3.92±4.08	13.93±6.97	6.57±4.80	3.81±2.09
15	4.58±0.92	-2.52±0.69	2.08±4.22	-2.84±2.02	8.23±5.80	10.92±3.55	3.41±1.70
20	4.55±1.45	-0.85±0.84	2.94±3.47	-3.10±2.37	7.34±3.60	7.87±3.34	3.12±1.35
25	4.55±1.25	-0.10±0.89	4.84±3.37	-3.15±3.68	10.54±1.34	7.91±2.42	4.10±1.39
30	3.59±1.17	1.34±0.88	3.58±3.22	-2.36±3.44	8.59±0.51	8.70±2.12	3.91±1.21
35	3.57±1.33	1.40±1.27	4.15±3.91	-2.44±2.72	7.73±1.93	10.17±0.80	4.09±1.26
40	3.03±1.25	0.72±1.11	5.56±3.27	-2.17±2.17	6.59±2.36	9.58±0.98	3.89±1.17

TABLE 6

The mean percent error of estimate (%E), mean percent number of myofibers sampled ($\%N_T$), mean percent area sampled (%TMA), and the mean $\%N_T$/%TMA for 40 sample points of all muscles and trials.

Mean %E ± S.E.		Mean %TMA	Mean $\%N_T$	Mean $\%N_T$/%TMA
3.42	5.68	0.34	0.34	1.00
2.79	4.26	0.67	0.68	1.01
5.63	4.55	1.00	1.04	1.04
6.49	4.34	1.34	1.39	1.04
5.49	3.98	1.67	1.72	1.03
5.24	3.48	2.01	2.08	1.03
5.44	2.86	2.34	2.44	1.04
5.39	2.63	2.68	2.78	1.04
3.75	2.36	3.01	3.09	1.03
3.81	2.09	3.35	3.44	1.03
3.32	2.16	3.68	3.77	1.02
3.74	2.03	4.02	4.12	1.02
3.31	1.70	4.35	4.46	1.02
3.42	1.73	4.69	4.80	1.02
3.41	1.70	5.02	5.15	1.03
3.28	1.69	5.36	5.49	1.02
2.84	1.54	5.69	5.80	1.02
3.10	1.49	6.02	6.15	1.02
3.03	1.54	6.36	6.49	1.02
3.12	1.35	6.69	6.84	1.02
3.31	1.33	7.03	7.19	1.02
3.45	1.29	7.36	7.55	1.02
3.86	1.29	7.70	7.92	1.03
4.05	1.26	8.03	8.28	1.03
4.10	1.39	8.37	8.62	1.03
3.85	1.28	8.70	8.93	1.03
3.86	1.23	9.04	9.28	1.03
3.80	1.21	9.37	9.62	1.03
3.92	1.23	9.71	9.97	1.03
3.91	1.21	10.04	10.31	1.03
4.10	1.20	10.37	10.66	1.03
3.75	1.19	10.71	10.98	1.02
3.88	1.25	11.04	11.32	1.02
4.11	1.27	11.38	11.68	1.03
4.09	1.26	11.71	12.02	1.03
4.00	1.20	12.05	12.37	1.03
4.04	1.24	12.38	12.71	1.03
4.10	1.23	12.72	13.06	1.03
3.99	1.18	13.05	13.40	1.03
3.89	1.17	13.39	13.73	1.02

TABLE 7

Correlation and regression analyses of %E with respect to N_T and the number of myofibers/mm^2 at 3-6% TMA

	% TMA			
N_T	3	4	5	6
r	0.28	0.32	0.53	0.55
t	1.916	1.379	2.474	2.625
p	>0.05	>0.05	<0.05	<0.05
Slope($x10^5$)	3.8	3.4	5.1	5.5
Y-intercept	-0.14	0.39	-0.06	-0.27
Myofibers/mm^2				
r	0.41	0.46	0.61	0.66
t	1.800	2.048	3.072	3.544
p	>0.05	>0.05	<0.01	<0.01
Slope($x10^4$)	18	16	20	22
Y-intercept	0.26	0.81	1.22	0.97

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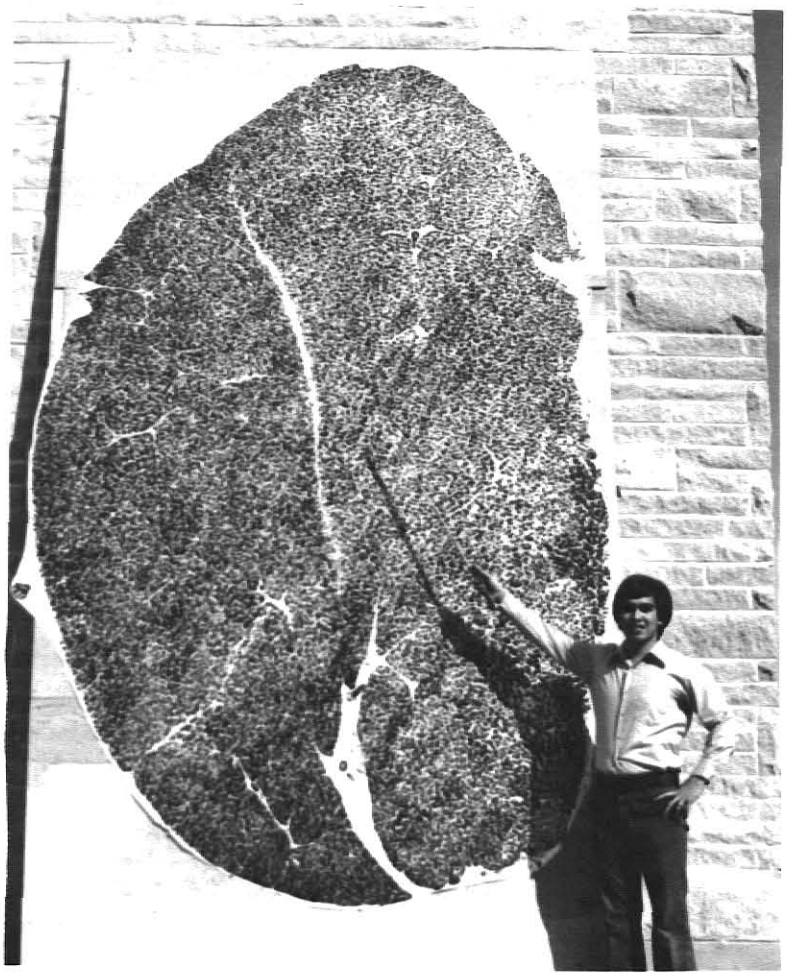

Fig. 1. Montage of pectineus muscle No. 4 composed of 300 8" x 10" photomicrographs.

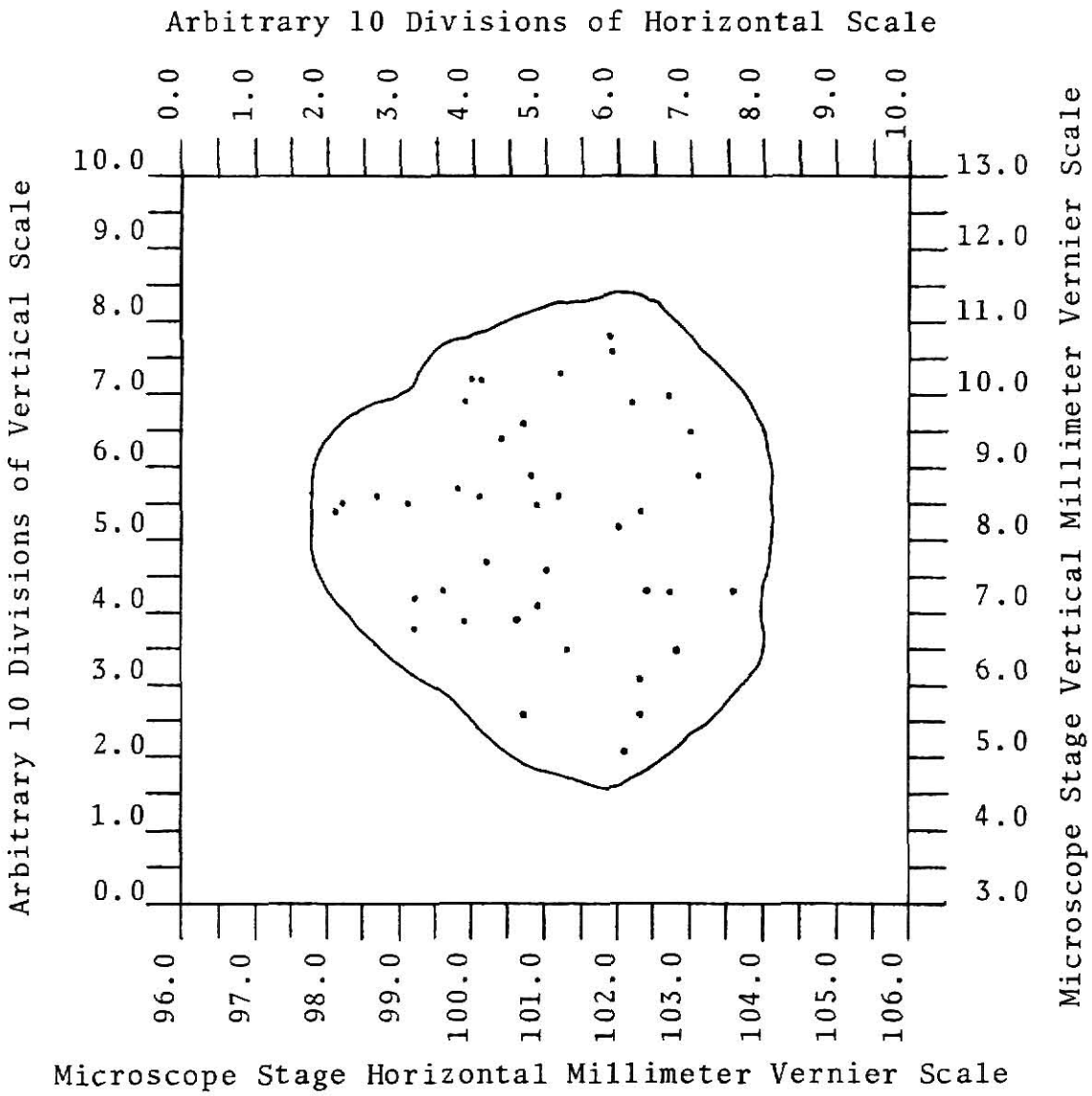

Fig. 2. Tracing of graph paper plot of transverse section periphery derived from vertical and horizontal microscope stage millimeter vernier scales (Muscle No. 6, Trial No. 1). The vertical and horizontal microscope stage scales are arbitrarily divided into 10 divisions to permit random selection of coordinates for photographic sampling of the section by use of a random numbers table. The dots within the periphery represent the random points obtained in this trial.

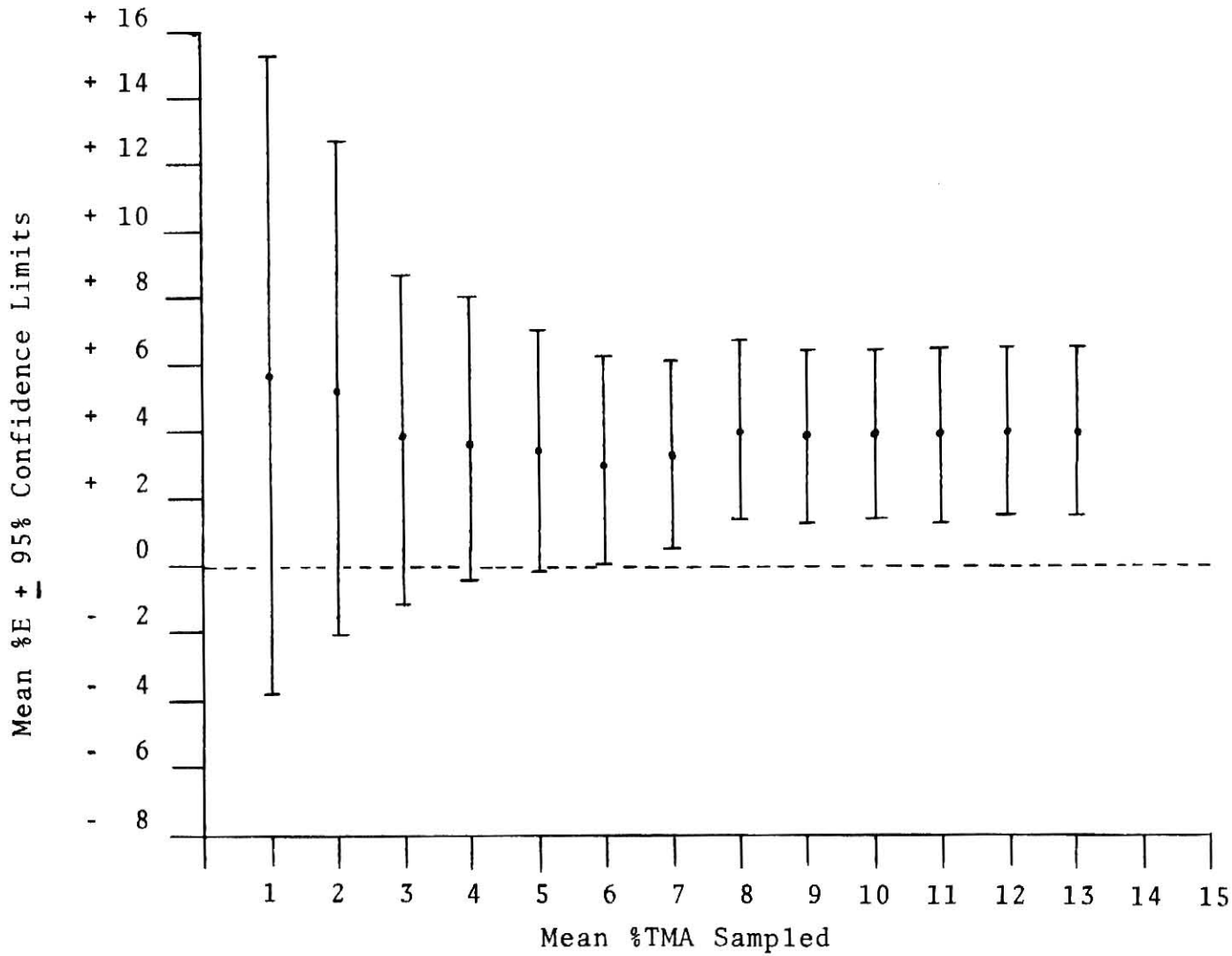

Fig. 3. Plot of the mean percent error of estimate (%E) and the 95% confidence limits with the mean percent area sampled (%TMA) for all 40 sample points from all muscles and all trials.

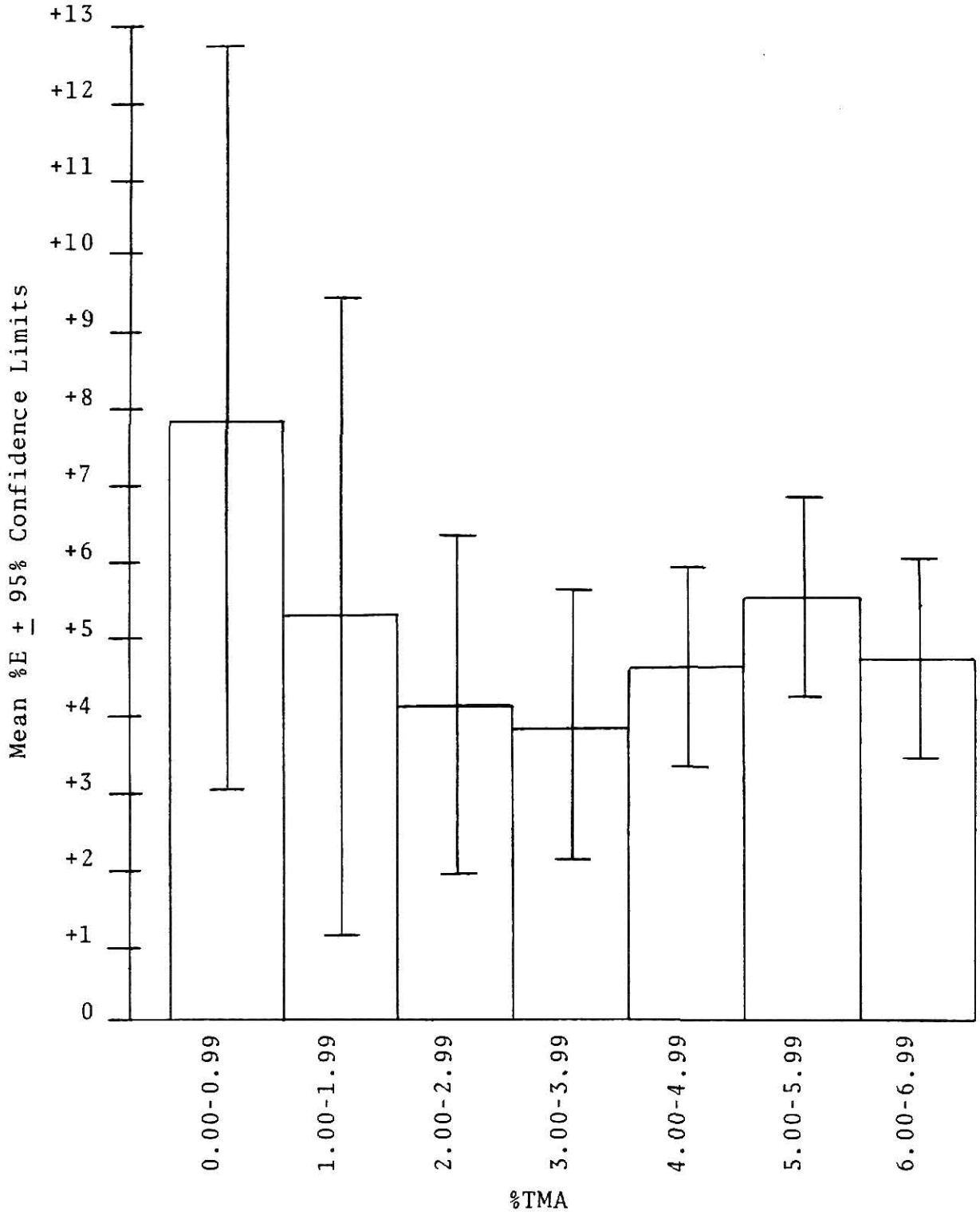

Fig. 4. Plot of mean percent error of estimate (%E) and the 95% confidence limits with the grouped values for the percent area sampled (%TMA) for all muscles and all trials.

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Appendix Table 1

Muscle No. 1 Rt. Pectineus Male 104 Weeks Mag=309X A_T=36.7 mm^2

N_T=12,368 Trial No. 1.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	170.	170.	170.0	1.37	12911.	543.	4.39	1.32
2	164.	334.	167.0	2.70	12683.	315.	2.55	2.63
3	184.	518.	172.7	4.19	13113.	745.	6.03	3.95
4	146.	664.	166.0	5.37	12607.	239.	1.93	5.27
5	153.	817.	163.4	6.61	12410.	42.	0.34	6.58
6	195.	1012.	168.7	8.18	12810.	442.	3.57	7.90
7	169.	1181.	168.7	9.55	12813.	445.	3.60	9.22
8	172.	1353.	169.1	10.94	12844.	476.	3.85	10.53
9	160.	1513.	168.1	12.23	12767.	399.	3.23	11.85
10	171.	1684.	168.4	13.62	12789.	421.	3.41	13.17
11	163.	1847.	167.9	14.93	12752.	384.	3.10	14.48
12	148.	1995.	166.3	16.13	12626.	258.	2.09	15.80
13	179.	2174.	167.2	17.58	12700.	332.	2.69	17.12
14	175.	2349.	167.8	18.99	12743.	375.	3.03	18.43
15	163.	2512.	167.5	20.31	12718.	350.	2.83	19.75
16	160.	2672.	167.0	21.60	12683.	315.	2.55	21.07
17	153.	2825.	166.2	22.84	12620.	252.	2.04	22.38
18	150.	2975.	165.3	24.05	12552.	184.	1.49	23.70
19	189.	3164.	166.5	25.58	12647.	279.	2.26	25.02
20	150.	3314.	165.7	26.79	12584.	216.	1.75	26.33
21	174.	3488.	166.1	28.20	12614.	246.	1.99	27.65
22	191.	3679.	167.2	29.75	12700.	332.	2.69	28.97
23	165.	3844.	167.1	31.09	12693.	325.	2.63	30.28
24	177.	4021.	167.5	32.51	12724.	356.	2.88	31.60
25	159.	4180.	167.2	33.80	12698.	330.	2.67	32.92
26	139.	4319.	166.1	34.92	12616.	248.	2.00	34.23
27	168.	4487.	166.2	36.28	12621.	253.	2.05	35.55
28	166.	4653.	166.2	37.62	12621.	253.	2.04	36.87
29	150.	4803.	165.6	38.83	12578.	210.	1.70	38.19
30	164.	4967.	165.6	40.16	12574.	206.	1.67	39.50
31	155.	5122.	165.2	41.41	12548.	180.	1.46	40.82
32	159.	5281.	165.0	42.70	12533.	165.	1.34	42.14
33	161.	5442.	164.9	44.00	12524.	156.	1.26	43.45
34	165.	5607.	164.9	45.33	12524.	156.	1.26	44.77
35	169.	5776.	165.0	46.70	12533.	165.	1.34	46.09
36	189.	5965.	165.7	48.23	12584.	216.	1.74	47.40
37	150.	6115.	165.3	49.44	12552.	184.	1.48	48.72
38	158.	6273.	165.1	50.72	12537.	169.	1.37	50.04
39	162.	6435.	165.0	52.03	12531.	163.	1.32	51.35
40	175.	6610.	165.3	53.44	12550.	182.	1.47	52.67

Appendix Table 2

Muscle No. 1 Rt. Pectineus Male 104 Weeks Mag=730X A_T=36.7 mm^2

N_T=12,368 Trial No. 2.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	28.	28.	28.0	0.23	11990.	-378.	-3.06	0.23
2	32.	60.	30.0	0.49	12846.	478.	3.87	0.47
3	37.	97.	32.3	0.78	13846.	1478.	11.95	0.70
4	40.	137.	34.3	1.11	14666.	2298.	18.58	0.93
5	35.	172.	34.4	1.39	14731.	2363.	19.10	1.17
6	26.	198.	33.0	1.60	14131.	1763.	14.26	1.40
7	33.	231.	33.0	1.87	14131.	1763.	14.26	1.63
8	23.	254.	31.8	2.05	13596.	1228.	9.93	1.87
9	28.	282.	31.3	2.28	13417.	1049.	8.49	2.10
10	36.	318.	31.8	2.57	13617.	1249.	10.10	2.34
11	28.	346.	31.5	2.80	13469.	1101.	8.90	2.57
12	32.	378.	31.5	3.06	13489.	1121.	9.06	2.80
13	27.	405.	31.2	3.27	13341.	973.	7.86	3.04
14	29.	434.	31.0	3.51	13275.	907.	7.33	3.27
15	25.	459.	30.6	3.71	13103.	735.	5.95	3.50
16	28.	487.	30.4	3.94	13034.	666.	5.38	3.74
17	30.	517.	30.4	4.18	13023.	655.	5.29	3.97
18	36.	553.	30.7	4.47	13156.	788.	6.37	4.20
19	29.	582.	30.6	4.71	13117.	749.	6.06	4.44
20	34.	616.	30.8	4.98	13189.	821.	6.64	4.67
21	28.	644.	30.7	5.21	13132.	764.	6.18	4.90
22	29.	673.	30.6	5.44	13100.	732.	5.91	5.14
23	34.	707.	30.7	5.72	13163.	795.	6.43	5.37
24	35.	742.	30.9	6.00	13239.	871.	7.04	5.60
25	30.	772.	30.9	6.24	13223.	855.	6.92	5.84
26	27.	799.	30.7	6.46	13159.	791.	6.40	6.07
27	29.	828.	30.7	6.69	13132.	764.	6.18	6.31
28	24.	852.	30.4	6.89	13030.	662.	5.35	6.54
29	29.	881.	30.4	7.12	13009.	641.	5.18	6.77
30	35.	916.	30.5	7.41	13075.	707.	5.72	7.01
31	35.	951.	30.7	7.69	13137.	769.	6.21	7.24
32	36.	987.	30.8	7.98	13208.	840.	6.79	7.47
33	38.	1025.	31.1	8.29	13301.	933.	7.54	7.71
34	29.	1054.	31.0	8.52	13275.	907.	7.33	7.94
35	17.	1071.	30.6	8.66	13103.	735.	5.95	8.17
36	28.	1099.	30.5	8.89	13072.	704.	5.70	8.41
37	27.	1126.	30.4	9.10	13032.	664.	5.37	8.64
38	28.	1154.	30.4	9.33	13004.	636.	5.14	8.87
39	25.	1179.	30.2	9.53	12945.	577.	4.67	9.11
40	40.	1219.	30.5	9.86	13050.	682.	5.51	9.34

Appendix Table 3

Muscle No. 1 Rt. Pectineus Male 104 Weeks Mag=730X A_T=36.4 mm^2

N_T=12,368 Trial No. 3.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	37.	37.	37.0	0.30	15562.	3194.	25.83	0.24
2	27.	64.	32.0	0.52	13459.	1091.	8.82	0.48
3	28.	92.	30.7	0.74	12898.	530.	4.29	0.71
4	28.	120.	30.0	0.97	12618.	250.	2.02	0.95
5	36.	156.	31.2	1.26	13123.	755.	6.10	1.19
6	28.	184.	30.7	1.49	12898.	530.	4.29	1.43
7	25.	209.	29.9	1.69	12558.	190.	1.54	1.66
8	38.	247.	30.9	2.00	12986.	618.	5.00	1.90
9	36.	283.	31.4	2.29	13226.	858.	6.93	2.14
10	28.	311.	31.1	2.51	13081.	713.	5.76	2.38
11	31.	342.	31.1	2.77	13077.	709.	5.73	2.62
12	28.	370.	30.8	2.99	12969.	601.	4.86	2.85
13	42.	412.	31.7	3.33	13330.	962.	7.76	3.09
14	26.	438.	31.3	3.54	13159.	791.	6.39	3.33
15	25.	463.	30.9	3.74	12983.	615.	4.97	3.57
16	33.	496.	31.0	4.01	13039.	671.	5.42	3.80
17	34.	530.	31.2	4.29	13113.	745.	6.02	4.04
18	23.	553.	30.7	4.47	12922.	554.	4.48	4.28
19	35.	588.	30.9	4.75	13017.	649.	5.24	4.52
20	31.	619.	30.9	5.00	13018.	650.	5.25	4.76
21	32.	651.	31.0	5.26	13039.	671.	5.42	4.99
22	25.	676.	30.7	5.47	12924.	556.	4.50	5.23
23	29.	705.	30.7	5.70	12892.	524.	4.24	5.47
24	30.	735.	30.6	5.94	12881.	513.	4.15	5.71
25	30.	765.	30.6	6.19	12870.	502.	4.06	5.94
26	33.	798.	30.7	6.45	12909.	541.	4.38	6.18
27	31.	829.	30.7	6.70	12914.	546.	4.41	6.42
28	26.	855.	30.5	6.91	12843.	475.	3.84	6.66
29	28.	883.	30.4	7.14	12807.	439.	3.55	6.89
30	29.	912.	30.4	7.37	12786.	418.	3.38	7.13
31	25.	937.	30.2	7.58	12713.	345.	2.79	7.37
32	28.	965.	30.2	7.80	12694.	316.	2.55	7.61
33	28.	993.	30.1	8.03	12656.	288.	2.33	7.85
34	33.	1026.	30.2	8.30	12692.	324.	2.62	8.08
35	38.	1064.	30.4	8.60	12786.	418.	3.38	8.32
36	22.	1086.	30.2	8.78	12688.	320.	2.59	8.56
37	38.	1124.	30.4	9.09	12777.	409.	3.31	8.80
38	32.	1156.	30.4	9.35	12795.	427.	3.45	9.03
39	27.	1183.	30.3	9.57	12758.	390.	3.16	9.27
40	18.	1201.	30.0	9.71	12629.	261.	2.11	9.51

Appendix Table 4

Muscle No. 2 Lt. Pectineus Male 24 Weeks Mag=551X A_T=45.1 mm^2

N_T=32,273 Trial No. 1.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	102.	102.	102.0	0.32	30576.	-1697.	-5.26	0.33
2	103.	205.	102.5	0.64	30726.	-1547.	-4.79	0.67
3	128.	333.	111.0	1.03	33274.	1001.	3.10	1.00
4	95.	428.	107.0	1.33	32075.	-198.	-0.61	1.33
5	109.	537.	107.4	1.66	32195.	-78.	-0.24	1.67
6	103.	640.	106.7	1.98	31975.	-298.	-0.92	2.00
7	112.	752.	107.4	2.33	32204.	-69.	-0.22	2.34
8	110.	862.	107.8	2.67	32300.	27.	0.08	2.67
9	82.	944.	104.9	2.93	31442.	-831.	-2.57	3.00
10	97.	1041.	104.1	3.23	31206.	-1067.	-3.31	3.34
11	120.	1161.	105.5	3.60	31639.	-634.	-1.96	3.67
12	122.	1283.	106.9	3.98	32050.	-223.	-0.69	4.00
13	104.	1387.	106.7	4.30	31983.	-290.	-0.90	4.34
14	114.	1501.	107.2	4.65	32139.	-134.	-0.41	4.67
15	93.	1594.	106.3	4.94	31855.	-418.	-1.29	5.00
16	135.	1729.	108.1	5.36	32394.	121.	0.37	5.34
17	108.	1837.	108.1	5.69	32392.	119.	0.37	5.67
18	98.	1935.	107.5	6.00	32225.	-48.	-0.15	6.00
19	92.	2027.	106.7	6.28	31980.	-293.	-0.91	6.34
20	107.	2134.	106.7	6.61	31985.	-288.	-0.89	6.67
21	108.	2242.	106.8	6.95	32004.	-269.	-0.83	7.01
22	129.	2371.	107.8	7.35	32307.	34.	0.10	7.34
23	130.	2501.	108.7	7.75	32596.	323.	1.00	7.67
24	124.	2625.	109.4	8.13	32787.	514.	1.59	8.01
25	107.	2732.	109.3	8.47	32759.	486.	1.50	8.34
26	116.	2848.	109.5	8.82	32836.	563.	1.74	8.67
27	124.	2972.	110.1	9.21	32997.	724.	2.24	9.01
28	123.	3095.	110.5	9.59	33135.	862.	2.67	9.34
29	119.	3214.	110.8	9.96	33222.	949.	2.94	9.67
30	106.	3320.	110.7	10.29	33174.	901.	2.79	10.01
31	99.	3419.	110.3	10.59	33061.	788.	2.44	10.34
32	107.	3526.	110.2	10.93	33031.	758.	2.35	10.67
33	113.	3639.	110.3	11.28	33056.	783.	2.43	11.01
34	137.	3776.	111.1	11.70	33292.	1019.	3.16	11.34
35	119.	3895.	111.3	12.07	33360.	1087.	3.37	11.68
36	114.	4009.	111.4	12.42	33382.	1109.	3.44	12.01
37	108.	4117.	111.3	12.76	33355.	1082.	3.35	12.34
38	112.	4229.	111.3	13.10	33361.	1088.	3.37	12.68
39	99.	4328.	111.0	13.41	33266.	993.	3.08	13.01
40	85.	4413.	110.3	13.67	33072.	799.	2.48	13.34

Appendix Table 5

Muscle No. 2 Lt. Pectineus Male 24 Weeks Mag=663X A_T=45.3 mm^2

N_T=32,273 Trial No. 2.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	78.	78.	78.0	0.24	34184.	1911.	5.92	0.23
2	75.	153.	76.5	0.47	33526.	1253.	3.88	0.46
3	65.	218.	72.7	0.68	31946.	-427.	-1.32	0.68
4	79.	297.	74.3	0.92	32540.	267.	0.83	0.91
5	66.	363.	72.6	1.12	31817.	-456.	-1.41	1.14
6	83.	446.	74.3	1.38	32577.	304.	0.94	1.37
7	71.	517.	73.9	1.60	32368.	95.	0.30	1.60
8	68.	585.	73.1	1.81	32047.	-226.	-0.70	1.83
9	83.	668.	74.2	2.07	32528.	255.	0.79	2.05
10	68.	736.	73.6	2.28	32256.	-17.	-0.05	2.28
11	67.	803.	73.0	2.49	31993.	-280.	-0.87	2.51
12	66.	869.	72.4	2.69	31737.	-536.	-1.66	2.74
13	77.	946.	72.8	2.93	31891.	-382.	-1.18	2.97
14	51.	997.	71.2	3.09	31210.	-1063.	-3.29	3.19
15	79.	1076.	71.7	3.33	31437.	-836.	-2.59	3.42
16	89.	1165.	72.8	3.61	31910.	-363.	-1.12	3.65
17	80.	1245.	73.2	3.86	32096.	-177.	-0.55	3.88
18	83.	1328.	73.8	4.11	32333.	60.	0.19	4.11
19	80.	1408.	74.1	4.36	32477.	204.	0.63	4.34
20	74.	1482.	74.1	4.59	32475.	202.	0.62	4.56
21	59.	1541.	73.4	4.77	32160.	-113.	-0.35	4.79
22	78.	1619.	73.6	5.02	32252.	-21.	-0.07	5.02
23	63.	1682.	73.1	5.21	32050.	-223.	-0.69	5.25
24	80.	1762.	73.4	5.46	32175.	-98.	-0.30	5.48
25	75.	1837.	73.5	5.69	32203.	-70.	-0.22	5.70
26	90.	1927.	74.1	5.97	32481.	208.	0.65	5.93
27	80.	2007.	74.3	6.22	32577.	304.	0.94	6.16
28	88.	2095.	74.8	6.49	32791.	518.	1.60	6.39
29	75.	2170.	74.8	6.72	32794.	521.	1.61	6.62
30	72.	2242.	74.7	6.95	32752.	479.	1.48	6.85
31	90.	2332.	75.2	7.23	32968.	695.	2.15	7.07
32	38.	2370.	74.1	7.34	32458.	185.	0.57	7.30
33	86.	2456.	74.4	7.61	32617.	344.	1.07	7.53
34	91.	2547.	74.9	7.89	32830.	557.	1.73	7.76
35	77.	2624.	75.0	8.13	32857.	584.	1.81	7.99
36	66.	2690.	74.7	8.34	32747.	474.	1.47	8.21
37	67.	2757.	74.5	8.54	32656.	383.	1.19	8.44
38	88.	2845.	74.9	8.82	32811.	538.	1.67	8.67
39	58.	2903.	74.4	9.00	32622.	349.	1.08	8.90
40	73.	2976.	74.4	9.22	32606.	333.	1.03	9.13

Appendix Table 6

Muscle No. 2 Lt. Pectineus Male 24 Weeks Mag=505X A_T=45.1 mm^2

N_T=32,273 Trial No. 3.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	133.	133.	133.0	0.41	33115.	842.	2.61	0.40
2	129.	262.	131.0	0.81	32617.	344.	1.07	0.80
3	110.	372.	124.0	1.15	30874.	-1399.	-4.33	1.20
4	132.	504.	126.0	1.56	31372.	-901.	-2.79	1.61
5	127.	631.	126.2	1.96	31422.	-851.	-2.64	2.01
6	136.	767.	127.8	2.38	31829.	-444.	-1.38	2.41
7	133.	900.	128.6	2.79	32012.	-261.	-0.81	2.81
8	141.	1041.	130.1	3.23	32399.	126.	0.39	3.21
9	83.	1124.	124.9	3.48	31095.	-1178.	-3.65	3.61
10	121.	1245.	124.5	3.86	30999.	-1274.	-3.95	4.02
11	116.	1361.	123.7	4.22	30806.	-1467.	-4.54	4.42
12	126.	1487.	123.9	4.61	30853.	-1420.	-4.40	4.82
13	140.	1627.	125.2	5.04	31161.	-1112.	-3.44	5.22
14	118.	1745.	124.6	5.41	31034.	-1239.	-3.84	5.62
15	128.	1873.	124.9	5.80	31090.	-1183.	-3.67	6.02
16	137.	2010.	125.6	6.23	31279.	-994.	-3.08	6.43
17	118.	2128.	125.2	6.59	31167.	-1106.	-3.43	6.83
18	126.	2254.	125.2	6.98	31178.	-1095.	-3.39	7.23
19	125.	2379.	125.2	7.37	31176.	-1097.	-3.40	7.63
20	154.	2533.	126.6	7.85	31534.	-739.	-2.29	8.03
21	143.	2676.	127.4	8.29	31728.	-545.	-1.69	8.43
22	106.	2782.	126.5	8.62	31485.	-788.	-2.44	8.84
23	141.	2923.	127.1	9.06	31643.	-630.	-1.95	9.24
24	130.	3053.	127.2	9.46	31673.	-600.	-1.86	9.64
25	136.	3189.	127.6	9.88	31761.	-512.	-1.59	10.04
26	121.	3310.	127.3	10.26	31698.	-575.	-1.78	10.44
27	140.	3450.	127.8	10.69	31815.	-458.	-1.42	10.84
28	164.	3614.	129.1	11.20	32137.	-136.	-0.42	11.25
29	149.	3763.	129.8	11.66	32308.	35.	0.11	11.65
30	116.	3879.	129.3	12.02	32194.	-79.	-0.25	12.05
31	128.	4007.	129.3	12.42	32183.	-90.	-0.28	12.45
32	123.	4130.	129.1	12.80	32135.	-138.	-0.43	12.85
33	121.	4251.	128.8	13.17	32074.	-199.	-0.62	13.25
34	129.	4380.	128.8	13.57	32075.	-198.	-0.61	13.66
35	112.	4492.	128.3	13.92	31955.	-318.	-0.98	14.06
36	111.	4603.	127.9	14.26	31836.	-437.	-1.36	14.46
37	105.	4708.	127.2	14.59	31682.	-591.	-1.83	14.86
38	144.	4852.	127.7	15.03	31791.	-482.	-1.49	15.26
39	152.	5004.	128.3	15.51	31947.	-326.	-1.01	15.66
40	111.	5115.	127.9	15.85	31839.	-434.	-1.34	16.07

Appendix Table 7

Muscle No. 3 Lt. Pectineus Male 24 Weeks Mag=260X A_T=164.8 mm^2

N_T=54,019 Trial No. 1

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	204.	204.	204.0	0.38	49731.	-4288.	-7.94	0.41
2	172.	376.	188.0	0.70	45830.	-8189.	-15.16	0.82
3	181.	557.	185.7	1.03	45261.	-8758.	-16.21	1.23
4	231.	788.	197.0	1.46	48024.	-5995.	-11.10	1.64
5	204.	992.	198.4	1.84	48365.	-5654.	-10.47	2.05
6	211.	1203.	200.5	2.23	48877.	-5142.	-9.52	2.46
7	348.	1551.	221.6	2.87	54014.	-5.	-0.01	2.87
8	256.	1807.	225.9	3.35	55063.	1044.	1.93	3.28
9	193.	2000.	222.2	3.70	54173.	154.	0.28	3.69
10	297.	2297.	229.7	4.25	55996.	1977.	3.66	4.10
11	193.	2490.	226.4	4.61	55182.	1163.	2.15	4.51
12	301.	2791.	232.6	5.17	56699.	2680.	4.96	4.92
13	192.	2983.	229.5	5.52	55938.	1919.	3.55	5.33
14	206.	3189.	227.8	5.90	55529.	1510.	2.80	5.74
15	297.	3486.	232.4	6.45	56654.	2635.	4.88	6.15
16	192.	3678.	229.9	6.81	56038.	2019.	3.74	6.56
17	220.	3898.	229.3	7.22	55897.	1878.	3.48	6.97
18	196.	4094.	227.4	7.58	55446.	1427.	2.64	7.38
19	188.	4282.	225.4	7.93	54940.	921.	1.70	7.79
20	268.	4550.	227.5	8.42	55459.	1440.	2.67	8.20
21	207.	4757.	226.5	8.81	55221.	1202.	2.23	8.61
22	187.	4944.	224.7	9.15	54783.	764.	1.42	9.02
23	234.	5178.	225.1	9.59	54882.	863.	1.60	9.43
24	217.	5395.	224.8	9.99	54799.	780.	1.44	9.85
25	206.	5601.	224.0	10.37	54616.	597.	1.11	10.26
26	143.	5744.	220.9	10.63	53856.	-163.	-0.30	10.67
27	235.	5979.	221.4	11.07	53983.	-36.	-0.07	11.08
28	198.	6177.	220.6	11.43	53779.	-240.	-0.44	11.49
29	224.	6401.	220.7	11.85	53808.	-211.	-0.39	11.90
30	244.	6645.	221.5	12.30	53997.	-22.	-0.04	12.31
31	267.	6912.	223.0	12.80	54355.	336.	0.62	12.72
32	192.	7104.	222.0	13.15	54119.	100.	0.18	13.13
33	194.	7298.	221.2	13.51	53912.	-107.	-0.20	13.54
34	258.	7556.	222.2	13.99	54176.	157.	0.29	13.95
35	206.	7762.	221.8	14.37	54063.	44.	0.08	14.36
36	250.	8012.	222.6	14.83	54254.	235.	0.44	14.77
37	178.	8190.	221.4	15.16	53960.	-59.	-0.11	15.18
38	213.	8403.	221.1	15.56	53907.	-112.	-0.21	15.59
39	338.	8741.	224.1	16.18	54637.	618.	1.14	16.00
40	229.	8970.	224.3	16.61	54667.	648.	1.20	16.41

Appendix Table 8

Muscle No. 3 Lt. Pectineus Male 24 Weeks Mag=316X A_T=164.4 mm^2

N_T=54,019 Trial No. 2.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	108.	108.	108.0	0.20	38801.	-15218.	-28.17	0.28
2	127.	235.	117.5	0.44	42214.	-11805.	-21.85	0.56
3	115.	350.	116.7	0.65	41914.	-12105.	-22.41	0.84
4	150.	500.	125.0	0.93	44908.	-9111.	-16.87	1.11
5	97.	597.	119.4	1.11	42896.	-11123.	-20.59	1.39
6	141.	738.	123.0	1.37	44190.	-9829.	-18.20	1.67
7	184.	922.	131.7	1.71	47321.	-6698.	-12.40	1.95
8	133.	1055.	131.9	1.95	47378.	-6641.	-12.29	2.23
9	153.	1208.	134.2	2.24	48222.	-5797.	-10.73	2.51
10	203.	1411.	141.1	2.61	50693.	-3326.	-6.16	2.78
11	138.	1549.	140.8	2.87	50591.	-3428.	-6.35	3.06
12	79.	1628.	135.7	3.01	48740.	-5279.	-9.77	3.34
13	167.	1795.	138.1	3.32	49606.	-4413.	-8.17	3.62
14	156.	1951.	139.4	3.61	50066.	-3953.	-7.32	3.90
15	164.	2115.	141.0	3.92	50657.	-3362.	-6.22	4.18
16	195.	2310.	144.4	4.28	51869.	-2150.	-3.98	4.45
17	139.	2449.	144.1	4.53	51756.	-2263.	-4.19	4.73
18	209.	2658.	147.7	4.92	53052.	-967.	-1.79	5.01
19	107.	2765.	145.5	5.12	52283.	-1736.	-3.21	5.29
20	154.	2919.	145.9	5.40	52435.	-1584.	-2.93	5.57
21	178.	3097.	147.5	5.73	52983.	-1036.	-1.92	5.85
22	177.	3274.	148.8	6.06	53465.	-554.	-1.02	6.12
23	228.	3502.	152.3	6.48	54702.	683.	1.26	6.40
24	165.	3667.	152.8	6.79	54893.	874.	1.62	6.68
25	162.	3829.	153.2	7.09	55025.	1006.	1.86	6.96
26	159.	3988.	153.4	7.38	55106.	1087.	2.01	7.24
27	152.	4140.	153.3	7.66	55088.	1069.	1.98	7.52
28	147.	4287.	153.1	7.94	55006.	987.	1.83	7.79
29	139.	4426.	152.6	8.19	54832.	813.	1.50	8.07
30	120.	4546.	151.5	8.42	54441.	422.	0.78	8.35
31	166.	4712.	152.0	8.72	54609.	590.	1.09	8.63
32	68.	4780.	149.4	8.85	53665.	-354.	-0.65	8.91
33	140.	4920.	149.1	9.11	53563.	-456.	-0.84	9.19
34	184.	5104.	150.1	9.45	53932.	-87.	-0.16	9.46
35	179.	5283.	150.9	9.78	54229.	210.	0.39	9.74
36	121.	5404.	150.1	10.00	53930.	-89.	-0.16	10.02
37	200.	5604.	151.5	10.37	54414.	395.	0.73	10.30
38	268.	5872.	154.5	10.87	55516.	1497.	2.77	10.58
39	168.	6040.	154.9	11.18	55640.	1621.	3.00	10.86
40	186.	6226.	155.6	11.53	55920.	1901.	3.52	11.13

Appendix Table 9

Muscle No. 3 Lt. Pectineus Male 24 Weeks Mag=338X A_T=168.1 mm^2

N_T=54,019 Trial No. 3.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	124.	124.	124.0	0.23	51723.	-2296.	-4.25	0.24
2	154.	278.	139.0	0.51	57980.	3961.	7.33	0.48
3	177.	455.	151.7	0.84	63264.	9245.	17.11	0.72
4	105.	560.	140.0	1.04	58397.	4378.	8.10	0.96
5	151.	711.	142.2	1.32	59315.	5296.	9.80	1.20
6	157.	868.	144.7	1.61	60344.	6325.	11.71	1.44
7	116.	984.	140.6	1.82	58635.	4616.	8.55	1.68
8	90.	1074.	134.3	1.99	55999.	1980.	3.66	1.92
9	143.	1217.	135.2	2.25	56404.	2385.	4.42	2.16
10	154.	1371.	137.1	2.54	57187.	3168.	5.87	2.40
11	163.	1534.	139.5	2.84	58170.	4151.	7.68	2.64
12	153.	1687.	140.6	3.12	58640.	4621.	8.56	2.88
13	128.	1815.	139.6	3.36	58237.	4218.	7.81	3.12
14	170.	1985.	141.8	3.67	59142.	5123.	9.48	3.36
15	105.	2090.	139.3	3.87	58119.	4100.	7.59	3.60
16	173.	2263.	141.4	4.19	58997.	4978.	9.21	3.84
17	140.	2403.	141.4	4.45	58961.	4942.	9.15	4.08
18	97.	2500.	138.9	4.63	57934.	3915.	7.25	4.32
19	156.	2656.	139.8	4.92	58309.	4290.	7.94	4.56
20	169.	2825.	141.3	5.23	58918.	4899.	9.07	4.79
21	191.	3016.	143.6	5.58	59907.	5888.	10.90	5.03
22	113.	3129.	142.2	5.79	59326.	5307.	9.82	5.27
23	130.	3259.	141.7	6.03	59104.	5085.	9.41	5.51
24	217.	3476.	144.8	6.43	60413.	6394.	11.84	5.75
25	136.	3612.	144.5	6.69	60266.	6247.	11.56	5.99
26	69.	3681.	141.6	6.81	59055.	5036.	9.32	6.23
27	166.	3847.	142.5	7.12	59432.	5413.	10.02	6.47
28	123.	3970.	141.8	7.35	59142.	5123.	9.48	6.71
29	129.	4099.	141.3	7.59	58958.	4939.	9.14	6.95
30	175.	4274.	142.5	7.91	59426.	5407.	10.01	7.19
31	129.	4403.	142.0	8.15	59245.	5226.	9.67	7.43
32	150.	4553.	142.3	8.43	59349.	5330.	9.87	7.67
33	211.	4764.	144.4	8.82	60217.	6198.	11.47	7.91
34	152.	4916.	144.6	9.10	60311.	6292.	11.65	8.15
35	159.	5075.	145.0	9.39	60483.	6464.	11.97	8.39
36	106.	5181.	143.9	9.59	60031.	6012.	11.13	8.63
37	149.	5330.	144.1	9.87	60088.	6069.	11.24	8.87
38	220.	5550.	146.1	10.27	60922.	6903.	12.78	9.11
39	126.	5676.	145.5	10.51	60707.	6688.	12.38	9.35
40	124.	5800.	145.0	10.74	60483.	6464.	11.97	9.59

Appendix Table 10

Muscle No. 4 Lt. Pectineus Female 24 Weeks Mag=237X A_T=171.0 mm^2

N_T=101,929 Trial No. 1.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	556.	556.	556.0	0.55	116542.	14613.	14.34	0.48
2	580.	1136.	568.0	1.11	113058.	17129.	16.80	0.95
3	623.	1759.	586.3	1.73	122900.	20971.	20.57	1.43
4	462.	2221.	555.3	2.18	116385.	14456.	14.18	1.91
5	432.	2653.	530.6	2.60	111218.	9289.	9.11	2.39
6	561.	3214.	535.7	3.15	112280.	10351.	10.16	2.86
7	503.	3717.	531.0	3.65	111302.	9373.	9.20	3.34
8	438.	4155.	519.4	4.08	108865.	6936.	6.81	3.82
9	390.	4545.	505.0	4.46	105852.	3923.	3.85	4.29
10	522.	5067.	506.7	4.97	106209.	4280.	4.20	4.77
11	403.	5470.	497.3	5.37	104233.	2304.	2.26	5.25
12	529.	5999.	499.9	5.89	104787.	2858.	2.80	5.72
13	552.	6551.	503.9	6.43	105627.	3698.	3.63	6.20
14	382.	6933.	495.2	6.80	103801.	1872.	1.84	6.68
15	438.	7371.	491.4	7.23	103002.	1073.	1.05	7.16
16	449.	7820.	488.8	7.67	102446.	517.	0.51	7.63
17	438.	8258.	485.8	8.10	101820.	-109.	-0.11	8.11
18	521.	8779.	487.7	8.61	102231.	302.	0.30	8.59
19	463.	9242.	486.4	9.07	101958.	29.	0.03	9.06
20	475.	9717.	485.8	9.53	101838.	-91.	-0.09	9.54
21	556.	10273.	489.2	10.08	102538.	609.	0.60	10.02
22	541.	10814.	491.5	10.61	103032.	1103.	1.08	10.50
23	491.	11305.	491.5	11.09	103027.	1098.	1.08	10.97
24	566.	11871.	494.6	11.65	103678.	1749.	1.72	11.45
25	466.	12337.	493.5	12.10	103438.	1509.	1.48	11.93
26	458.	12795.	492.1	12.55	103152.	1223.	1.20	12.40
27	491.	13286.	492.1	13.03	103143.	1214.	1.19	12.88
28	485.	13771.	491.8	13.51	103090.	1161.	1.14	13.36
29	446.	14217.	490.2	13.95	102759.	830.	0.81	13.84
30	411.	14628.	487.6	14.35	102205.	276.	0.27	14.31
31	412.	15040.	485.2	14.76	101694.	-235.	-0.23	14.79
32	478.	15518.	484.9	15.22	101647.	-282.	-0.28	15.27
33	342.	15860.	480.6	15.56	100739.	-1190.	-1.17	15.74
34	409.	16269.	478.5	15.96	100298.	-1631.	-1.60	16.22
35	531.	16800.	480.0	16.48	100612.	-1317.	-1.29	16.70
36	466.	17266.	479.6	16.94	100531.	-1398.	-1.37	17.17
37	464.	17730.	479.2	17.39	100442.	-1487.	-1.46	17.65
38	461.	18191.	478.7	17.85	100342.	-1587.	-1.56	18.13
39	498.	18689.	479.2	18.34	100445.	-1484.	-1.46	18.61
40	450.	19139.	478.5	18.78	100292.	-1637.	-1.61	19.08

Appendix Table 11

Muscle No. 4 Lt. Pectineus Female 24 Weeks Mag=266X A_T=169.8 mm^2

N_T=101,929 Trial No. 2.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	238.	238.	238.0	0.23	62573.	-39356.	-38.61	0.38
2	360.	598.	299.0	0.59	78610.	-23319.	-22.88	0.76
3	291.	889.	296.3	0.87	77909.	-24020.	-23.57	1.14
4	362.	1251.	312.8	1.23	82225.	-19704.	-19.33	1.52
5	241.	1492.	298.4	1.46	78452.	-23477.	-23.03	1.90
6	424.	1916.	319.3	1.88	83956.	-17973.	-17.63	2.28
7	432.	2348.	335.4	2.30	88187.	-13742.	-13.48	2.66
8	442.	2790.	348.8	2.74	91690.	-10239.	-10.05	3.04
9	366.	3156.	350.7	3.10	92194.	-9735.	-9.55	3.42
10	382.	3538.	353.8	3.47	93017.	-8912.	-8.74	3.80
11	392.	3930.	357.3	3.86	93931.	-7999.	-7.85	4.18
12	486.	4416.	368.0	4.33	96751.	-5178.	-5.08	4.56
13	341.	4757.	365.9	4.67	96205.	-5724.	-5.62	4.94
14	364.	5121.	365.8	5.02	96169.	-5760.	-5.65	5.33
15	363.	5484.	365.6	5.38	96120.	-5809.	-5.70	5.71
16	247.	5731.	358.2	5.62	94171.	-7758.	-7.61	6.09
17	307.	6038.	355.2	5.92	93379.	-8550.	-8.39	6.47
18	349.	6387.	354.8	6.27	93289.	-8640.	-8.48	6.85
19	324.	6711.	353.2	6.58	92863.	-9067.	-8.89	7.23
20	440.	7151.	357.5	7.02	94003.	-7926.	-7.78	7.61
21	303.	7454.	355.0	7.31	93320.	-8609.	-8.45	7.99
22	375.	7829.	355.9	7.68	93560.	-8369.	-8.21	8.37
23	395.	8224.	357.6	8.07	94007.	-7922.	-7.77	8.75
24	351.	8575.	357.3	8.41	93935.	-7994.	-7.84	9.13
25	106.	8681.	347.2	8.52	91293.	-10636.	-10.43	9.51
26	439.	9120.	350.8	8.95	92221.	-9708.	-9.52	9.89
27	396.	9516.	352.4	9.34	92661.	-9268.	-9.09	10.27
28	240.	9756.	348.4	9.57	91605.	-10324.	-10.13	10.65
29	364.	10120.	349.0	9.93	91746.	-10183.	-9.99	11.03
30	442.	10562.	352.1	10.36	92562.	-9367.	-9.19	11.41
31	449.	11011.	355.2	10.80	93384.	-8545.	-8.38	11.79
32	423.	11434.	357.3	11.22	93941.	-7988.	-7.84	12.17
33	361.	11795.	357.4	11.57	93970.	-7959.	-7.81	12.55
34	379.	12174.	358.1	11.94	94137.	-7792.	-7.64	12.93
35	360.	12534.	358.1	12.30	94152.	-7777.	-7.63	13.31
36	523.	13057.	362.7	12.81	95356.	-6573.	-6.45	13.69
37	341.	13398.	362.1	13.14	95202.	-6727.	-6.60	14.07
38	343.	13741.	361.6	13.48	95070.	-6859.	-6.73	14.45
39	412.	14153.	362.9	13.89	95409.	-6520.	-6.40	14.83
40	398.	14551.	363.8	14.28	95640.	-6289.	-6.17	15.21

Appendix Table 12

Muscle No. 4 Lt. Pectineus Female 24 Weeks Mag=327X A_T=171.2 mm^2

N_T=101,929 Trial No. 3.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	194.	194.	194.0	0.19	77742.	-24183.	-23.73	0.25
2	184.	378.	189.0	0.37	75738.	-26187.	-25.69	0.50
3	175.	553.	184.3	0.54	73868.	-28057.	-27.53	0.75
4	236.	789.	197.3	0.77	79045.	-22881.	-22.45	1.00
5	310.	1099.	219.8	1.08	88081.	-13844.	-13.58	1.25
6	274.	1373.	228.8	1.35	91701.	-10224.	-10.03	1.50
7	233.	1606.	229.4	1.58	91940.	-9986.	-9.80	1.75
8	246.	1852.	231.5	1.82	92770.	-9155.	-8.98	2.00
9	286.	2138.	237.6	2.10	95196.	-6729.	-6.60	2.25
10	222.	2360.	236.0	2.32	94573.	-7352.	-7.21	2.50
11	212.	2572.	233.8	2.52	93699.	-8226.	-8.07	2.74
12	228.	2800.	233.3	2.75	93504.	-8421.	-8.26	2.99
13	266.	3066.	235.8	3.01	94511.	-7414.	-7.27	3.24
14	274.	3340.	238.6	3.28	95603.	-6322.	-6.20	3.49
15	327.	3667.	244.5	3.60	97966.	-3959.	-3.88	3.74
16	240.	3907.	244.2	3.83	97854.	-4071.	-3.99	3.99
17	213.	4120.	242.4	4.04	97119.	-4806.	-4.72	4.24
18	328.	4448.	247.1	4.36	99025.	-2900.	-2.84	4.49
19	262.	4710.	247.9	4.62	99340.	-2586.	-2.54	4.74
20	304.	5014.	250.7	4.92	100464.	-1461.	-1.43	4.99
21	303.	5317.	253.2	5.22	101462.	-463.	-0.45	5.24
22	236.	5553.	252.4	5.45	101149.	-776.	-0.76	5.49
23	250.	5803.	252.3	5.69	101107.	-818.	-0.80	5.74
24	265.	6068.	252.8	5.95	101319.	-606.	-0.59	5.99
25	259.	6327.	253.1	6.21	101417.	-508.	-0.50	6.24
26	280.	6607.	254.1	6.48	101832.	-93.	-0.09	6.49
27	257.	6864.	254.2	6.73	101875.	-50.	-0.05	6.74
28	326.	7190.	256.8	7.05	102902.	977.	0.96	6.99
29	293.	7483.	258.0	7.34	103403.	1478.	1.45	7.24
30	288.	7771.	259.0	7.62	103803.	1878.	1.84	7.49
31	269.	8040.	259.4	7.89	103932.	2007.	1.97	7.74
32	220.	8260.	258.1	8.10	103439.	1514.	1.49	7.99
33	263.	8523.	258.3	8.36	103498.	1573.	1.54	8.23
34	276.	8799.	258.8	8.63	103707.	1782.	1.75	8.48
35	246.	9045.	258.4	8.87	103561.	1636.	1.60	8.73
36	265.	9310.	258.6	9.13	103634.	1709.	1.68	8.98
37	240.	9550.	258.1	9.37	103432.	1507.	1.48	9.23
38	239.	9789.	257.6	9.60	103231.	1306.	1.28	9.48
39	219.	10008.	256.6	9.82	102834.	909.	0.89	9.73
40	296.	10304.	257.6	10.11	103229.	1304.	1.28	9.98

Appendix Table 13

Muscle No. 5 Rt. Pectineus Female 8 Weeks Mag=576X A_T=63.7 mm^2

N_T=151,175 Trial No. 1.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	254.	254.	254.0	0.17	117425.	-33751.	-22.33	0.22
2	421.	675.	337.5	0.45	156027.	4852.	3.21	0.43
3	494.	1169.	389.7	0.77	180143.	28968.	19.16	0.65
4	440.	1609.	402.3	1.06	185961.	34786.	23.01	0.87
5	351.	1960.	392.0	1.30	181222.	30047.	19.88	1.08
6	390.	2350.	391.7	1.55	181068.	29893.	19.77	1.30
7	347.	2697.	385.3	1.78	178118.	26943.	17.82	1.51
8	442.	3139.	392.4	2.08	181395.	30220.	19.99	1.73
9	347.	3486.	387.3	2.31	179065.	27890.	18.45	1.95
10	375.	3861.	386.1	2.55	179494.	27319.	18.07	2.16
11	361.	4222.	383.8	2.79	177440.	26265.	17.37	2.38
12	343.	4565.	380.4	3.02	175867.	24692.	16.33	2.60
13	250.	4815.	370.4	3.19	171229.	20054.	13.27	2.81
14	250.	5065.	361.8	3.35	167254.	16079.	10.64	3.03
15	290.	5355.	357.0	3.54	165042.	13867.	9.17	3.24
16	318.	5673.	354.6	3.75	163915.	12740.	8.43	3.46
17	239.	5912.	347.8	3.91	160772.	9597.	6.35	3.68
18	317.	6229.	346.1	4.12	159982.	8807.	5.83	3.89
19	389.	6618.	348.3	4.38	161027.	9852.	6.52	4.11
20	357.	6975.	348.8	4.61	161228.	10053.	6.65	4.33
21	348.	7323.	348.7	4.84	161211.	10036.	6.64	4.54
22	501.	7824.	355.6	5.18	164411.	13236.	8.76	4.76
23	360.	8184.	355.8	5.41	164499.	13324.	8.81	4.98
24	381.	8565.	356.9	5.67	164984.	13809.	9.13	5.19
25	441.	9006.	360.2	5.96	166539.	15364.	10.16	5.41
26	307.	9313.	358.2	6.16	165593.	14418.	9.54	5.62
27	264.	9577.	354.7	6.34	163980.	12805.	8.47	5.84
28	327.	9904.	353.7	6.55	163522.	12347.	8.17	6.06
29	401.	10305.	355.3	6.82	164276.	13101.	8.67	6.27
30	249.	10554.	351.8	6.98	162637.	11462.	7.58	6.49
31	375.	10929.	352.5	7.23	162984.	11809.	7.81	6.71
32	285.	11214.	350.4	7.42	162008.	10833.	7.17	6.92
33	334.	11548.	349.9	7.64	161777.	10602.	7.01	7.14
34	235.	11783.	346.6	7.79	160214.	9039.	5.98	7.35
35	237.	12020.	343.4	7.95	158767.	7592.	5.02	7.57
36	342.	12362.	343.4	8.18	158749.	7574.	5.01	7.79
37	349.	12711.	343.5	8.41	158819.	7644.	5.06	8.00
38	221.	12932.	340.3	8.55	157328.	6153.	4.07	8.22
39	293.	13225.	339.1	8.75	156768.	5593.	3.70	8.44
40	213.	13438.	335.9	8.89	155310.	4135.	2.74	8.65

Appendix Table 14

Muscle No. 5 Rt. Pectineus Female 8 Weeks Mag=683X A_T=62.9 mm^2

N_T=151,175 Trial No. 2.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	295.	295.	295.0	0.20	189512.	38337.	25.36	0.16
2	383.	678.	339.0	0.45	217779.	66604.	44.06	0.31
3	247.	925.	308.3	0.61	198078.	46903.	31.03	0.47
4	313.	1238.	309.5	0.82	198827.	47652.	31.52	0.62
5	253.	1491.	298.2	0.99	191568.	40393.	26.72	0.78
6	404.	1895.	315.8	1.25	202896.	51721.	34.21	0.93
7	301.	2196.	313.7	1.45	201535.	50360.	33.31	1.09
8	276.	2472.	309.0	1.64	198506.	47331.	31.31	1.25
9	268.	2740.	304.4	1.81	195580.	44405.	29.37	1.40
10	170.	2910.	291.0	1.92	186943.	35768.	23.66	1.56
11	216.	3126.	284.2	2.07	182563.	31388.	20.76	1.71
12	246.	3372.	281.0	2.23	180519.	29344.	19.41	1.87
13	214.	3586.	275.8	2.37	177208.	26033.	17.22	2.02
14	277.	3863.	275.9	2.56	177261.	26086.	17.26	2.18
15	294.	4157.	277.1	2.75	178035.	26860.	17.77	2.33
16	260.	4417.	276.1	2.92	177347.	26172.	17.31	2.49
17	165.	4582.	269.5	3.03	173150.	21975.	14.54	2.65
18	294.	4876.	270.9	3.23	174023.	22848.	15.11	2.80
19	268.	5144.	270.7	3.40	173925.	22750.	15.05	2.96
20	216.	5360.	268.0	3.55	172167.	20992.	13.89	3.11
21	247.	5607.	267.0	3.71	171525.	20350.	13.46	3.27
22	289.	5896.	268.0	3.90	172167.	20992.	13.89	3.42
23	251.	6147.	267.3	4.07	171692.	20517.	13.57	3.58
24	139.	6286.	261.9	4.16	168259.	17084.	11.30	3.74
25	363.	6649.	266.0	4.40	170857.	19682.	13.02	3.89
26	231.	6880.	264.6	4.55	169993.	18818.	12.45	4.05
27	201.	7081.	262.3	4.69	168479.	17304.	11.45	4.20
28	262.	7343.	262.3	4.86	168473.	17298.	11.44	4.36
29	176.	7519.	259.3	4.97	166563.	15388.	10.18	4.51
30	194.	7713.	257.1	5.10	165165.	13990.	9.25	4.67
31	328.	8041.	259.4	5.32	166634.	15459.	10.23	4.83
32	252.	8293.	259.2	5.49	166486.	15311.	10.13	4.98
33	344.	8637.	261.7	5.71	168137.	16962.	11.22	5.14
34	321.	8958.	263.5	5.93	169257.	18082.	11.96	5.29
35	222.	9180.	262.3	6.07	168496.	17321.	11.46	5.45
36	247.	9427.	261.9	6.24	168223.	17048.	11.28	5.60
37	290.	9717.	262.6	6.43	168712.	17537.	11.60	5.76
38	229.	9946.	261.7	6.58	168144.	16969.	11.22	5.92
39	232.	10178.	261.0	6.73	167654.	16479.	10.90	6.07
40	258.	10436.	260.9	6.90	167606.	16431.	10.87	6.23

Appendix Table 15

Muscle No. 5 Rt. Pectineus Female 8 Weeks Mag=612X A_T=62.8 mm^2

N_T=151,175 Trial No. 3.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	280.	280.	280.0	0.19	144253.	-6922.	-4.58	0.19
2	270.	550.	275.0	0.36	141677.	-9498.	-6.28	0.39
3	366.	916.	305.3	0.61	157304.	6129.	4.05	0.58
4	284.	1200.	300.0	0.79	154557.	3382.	2.24	0.78
5	280.	1480.	296.0	0.98	152496.	1321.	0.87	0.97
6	318.	1798.	299.7	1.19	154385.	3210.	2.12	1.16
7	299.	2097.	299.6	1.39	154336.	3161.	2.09	1.36
8	295.	2392.	299.0	1.58	154041.	2866.	1.90	1.55
9	253.	2645.	293.9	1.75	151408.	233.	0.15	1.75
10	305.	2950.	295.0	1.95	151981.	806.	0.53	1.94
11	276.	3226.	293.3	2.13	151091.	-84.	-0.06	2.14
12	337.	3563.	296.9	2.36	152968.	1793.	1.19	2.33
13	253.	3816.	293.5	2.52	151228.	53.	0.03	2.52
14	271.	4087.	291.9	2.70	150398.	-777.	-0.51	2.72
15	215.	4302.	286.8	2.85	147756.	-3419.	-2.26	2.91
16	232.	4534.	283.4	3.00	145992.	-5183.	-3.43	3.11
17	411.	4945.	290.9	3.27	149859.	-1316.	-0.87	3.30
18	415.	5360.	297.8	3.55	153412.	2237.	1.48	3.49
19	307.	5667.	298.3	3.75	153662.	2487.	1.64	3.69
20	289.	5956.	297.8	3.94	153423.	2248.	1.49	3.88
21	353.	6309.	300.4	4.17	154777.	3602.	2.38	4.08
22	468.	6777.	308.0	4.48	158702.	7527.	4.98	4.27
23	497.	7274.	316.3	4.81	162934.	11759.	7.78	4.46
24	328.	7602.	316.8	5.03	163186.	12011.	7.95	4.66
25	352.	7954.	318.2	5.26	163912.	12737.	8.43	4.85
26	327.	8281.	318.5	5.48	164088.	12913.	8.54	5.05
27	164.	8445.	312.8	5.59	161139.	9964.	6.59	5.24
28	383.	8828.	315.3	5.84	162432.	11257.	7.45	5.43
29	423.	9251.	319.0	6.12	164345.	13170.	8.71	5.63
30	338.	9589.	319.6	6.34	164671.	13496.	8.93	5.82
31	246.	9835.	317.3	6.51	163448.	12273.	8.12	6.02
32	212.	10047.	314.0	6.65	161753.	10578.	7.00	6.21
33	324.	10371.	314.3	6.86	161910.	10735.	7.10	6.41
34	259.	10630.	312.6	7.03	161072.	9897.	6.55	6.60
35	329.	10959.	313.1	7.25	161313.	10138.	6.71	6.79
36	313.	11272.	313.1	7.46	161311.	10136.	6.70	6.99
37	396.	11668.	315.4	7.72	162465.	11290.	7.47	7.18
38	221.	11889.	312.9	7.86	161186.	10011.	6.62	7.38
39	291.	12180.	312.3	8.06	160897.	9722.	6.43	7.57
40	279.	12459.	311.5	8.24	160468.	9293.	6.15	7.76

Appendix Table 16

Muscle No. 6 Rt. Pectineus Male 8 Weeks Mag=954X A_T=32.1 mm^2

N_T=163,223 Trial No. 1.

n	N_p	ΣN_p	$\bar{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	378.	378.	378.0	0.23	241834.	78611.	48.16	0.16
2	153.	531.	265.5	0.33	169860.	6637.	4.07	0.31
3	307.	838.	279.3	0.51	178710.	15487.	9.49	0.47
4	292.	1130.	282.5	0.69	180736.	17513.	10.73	0.63
5	278.	1408.	281.6	0.86	180160.	16937.	10.38	0.78
6	114.	1522.	253.7	0.93	162289.	-934.	-0.57	0.94
7	351.	1873.	267.6	1.15	171185.	7962.	4.88	1.09
8	331.	2204.	275.5	1.35	176258.	13035.	7.99	1.25
9	73.	2277.	253.0	1.40	161863.	-1360.	-0.83	1.41
10	226.	2503.	250.3	1.53	160135.	-3088.	-1.89	1.56
11	75.	2578.	234.4	1.58	140940.	-13283.	-8.14	1.72
12	433.	3011.	250.9	1.84	160530.	-2693.	-1.65	1.88
13	345.	3356.	258.2	2.06	165160.	1937.	1.19	2.03
14	347.	3703.	264.5	2.27	169220.	5997.	3.67	2.19
15	276.	3979.	265.3	2.44	169711.	6488.	3.97	2.34
16	118.	4097.	256.1	2.51	163822.	599.	0.37	2.50
17	263.	4360.	256.5	2.67	164083.	860.	0.53	2.66
18	234.	4594.	255.2	2.81	163294.	61.	0.04	2.81
19	214.	4808.	253.1	2.95	161896.	-1327.	-0.81	2.97
20	359.	5167.	258.3	3.17	165285.	2062.	1.26	3.13
21	295.	5462.	260.1	3.35	166402.	3179.	1.95	3.28
22	303.	5765.	262.0	3.53	167650.	4427.	2.71	3.44
23	197.	5962.	259.2	3.65	165840.	2617.	1.60	3.60
24	305.	6267.	261.1	3.84	167061.	3838.	2.35	3.75
25	317.	6584.	263.4	4.03	168491.	5268.	3.23	3.91
26	280.	6864.	264.0	4.21	168900.	5677.	3.48	4.06
27	331.	7195.	266.5	4.41	170488.	7265.	4.45	4.22
28	282.	7477.	267.0	4.58	170842.	7619.	4.67	4.38
29	260.	7737.	266.8	4.74	170687.	7464.	4.57	4.53
30	279.	8016.	267.2	4.91	170947.	7724.	4.73	4.69
31	344.	8360.	269.7	5.12	172532.	9309.	5.70	4.85
32	335.	8695.	271.7	5.33	173839.	10616.	6.50	5.00
33	374.	9069.	274.8	5.56	175821.	12598.	7.72	5.16
34	374.	9443.	277.7	5.79	177688.	14465.	8.86	5.31
35	433.	9876.	282.2	6.05	180526.	17303.	10.60	5.47
36	241.	10117.	281.0	6.20	179794.	16571.	10.15	5.63
37	245.	10362.	280.1	6.35	179171.	15948.	9.77	5.78
38	339.	10701.	281.6	6.56	180164.	16941.	10.38	5.94
39	333.	11034.	282.9	6.76	181007.	17784.	10.90	6.10
40	258.	11292.	282.3	6.92	180608.	17385.	10.65	6.25

Appendix Table 17

Muscle No. 6 Rt. Pectineus Male 8 Weeks Mag=678X A_T=31.9 mm^2

N_T=163,223 Trial No. 2.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	N_T-N_E	%E	%TMA
1	717.	717.	717.0	0.44	229907.	66684.	40.85	0.31
2	587.	1304.	652.0	0.80	209064.	45841.	28.09	0.62
3	745.	2049.	683.0	1.26	219005.	55782.	34.18	0.94
4	745.	2794.	698.5	1.71	223975.	60752.	37.22	1.25
5	618.	3412.	682.4	2.09	218812.	55589.	34.06	1.56
6	421.	3833.	638.8	2.35	204842.	41619.	25.50	1.87
7	396.	4229.	604.1	2.59	193719.	30496.	18.68	2.18
8	538.	4767.	595.9	2.92	191068.	27845.	17.06	2.49
9	359.	5126.	569.6	3.14	182628.	19405.	11.89	2.81
10	516.	5642.	564.2	3.46	180911.	17688.	10.84	3.12
11	712.	6354.	577.6	3.89	185220.	21997.	13.48	3.43
12	551.	6905.	575.4	4.23	184508.	21285.	13.04	3.74
13	312.	7217.	555.2	4.42	178011.	14788.	9.06	4.05
14	743.	7960.	568.6	4.88	182313.	19090.	11.70	4.37
15	677.	8637.	575.8	5.29	184631.	21408.	13.12	4.68
16	585.	9222.	576.4	5.65	184815.	21592.	13.23	4.99
17	413.	9635.	566.8	5.90	181734.	18511.	11.34	5.30
18	671.	10306.	572.6	6.31	183590.	20367.	12.48	5.61
19	594.	10900.	573.7	6.68	183952.	20729.	12.70	5.93
20	332.	11232.	561.6	6.88	180077.	16854.	10.33	6.24
21	532.	11764.	560.2	7.21	179626.	16403.	10.05	6.55
22	412.	12176.	553.5	7.46	177466.	14243.	8.73	6.86
23	637.	12813.	557.1	7.85	178630.	15407.	9.44	7.17
24	503.	13316.	554.8	8.16	177908.	14685.	9.00	7.48
25	578.	13894.	555.8	8.51	178205.	14982.	9.18	7.80
26	489.	14383.	553.2	8.81	177382.	14159.	8.67	8.11
27	604.	14987.	555.1	9.18	177985.	14762.	9.04	8.42
28	452.	15439.	551.4	9.46	176805.	13582.	8.32	8.73
29	680.	16119.	555.8	9.88	178227.	15004.	9.19	9.04
30	584.	16703.	556.8	10.23	178528.	15305.	9.38	9.36
31	648.	17351.	559.7	10.63	179471.	16248.	9.95	9.67
32	421.	17772.	555.4	10.89	178091.	14858.	9.10	9.98
33	480.	18252.	553.1	11.18	177349.	14126.	8.65	10.29
34	635.	18887.	555.5	11.57	178122.	14899.	9.13	10.60
35	466.	19353.	552.9	11.86	177302.	14079.	8.63	10.92
36	591.	19944.	554.0	12.22	177641.	14418.	8.83	11.23
37	599.	20543.	555.2	12.59	178031.	14808.	9.07	11.54
38	466.	21009.	552.9	12.87	177278.	14055.	8.61	11.85
39	385.	21394.	548.6	13.11	175898.	12675.	7.77	12.16
40	522.	21916.	547.9	13.43	175685.	12462.	7.63	12.47

Appendix Table 18

Muscle No. 6 Rt. Pectineus Male 8 Weeks Mag=840X A_T=31.8 mm^2

N_T=163,223 Trial No. 3.

n	N_p	ΣN_p	$\overline{N}_p$	$\%N_T$	N_E	$N_T - N_E$	%E	%TMA
1	439.	439.	439.0	0.27	215592.	52369.	32.08	0.20
2	380.	819.	409.5	0.50	201104.	37881.	23.21	0.41
3	535.	1354.	451.3	0.83	221649.	58426.	35.79	0.61
4	503.	1857.	464.3	1.14	227992.	64769.	39.68	0.81
5	377.	2234.	446.8	1.37	219422.	56199.	34.43	1.02
6	276.	2510.	418.3	1.54	205442.	42219.	25.87	1.22
7	291.	2801.	400.1	1.72	196509.	33286.	20.39	1.43
8	366.	3167.	395.9	1.94	194413.	31190.	19.11	1.63
9	231.	3398.	377.6	2.08	185417.	22194.	13.60	1.83
10	383.	3781.	378.1	2.32	185684.	22461.	13.76	2.04
11	466.	4247.	386.1	2.60	189608.	26385.	16.17	2.24
12	400.	4647.	387.3	2.85	190178.	26955.	16.51	2.44
13	195.	4842.	372.5	2.97	182915.	19692.	12.06	2.65
14	490.	5332.	380.9	3.27	187038.	23815.	14.59	2.85
15	435.	5767.	384.5	3.53	188811.	25588.	15.68	3.05
16	392.	6159.	384.9	3.77	189042.	25819.	15.82	3.26
17	299.	6458.	379.9	3.96	186559.	23336.	14.30	3.46
18	410.	6868.	381.6	4.21	187381.	24158.	14.80	3.67
19	368.	7236.	380.8	4.43	187031.	23808.	14.59	3.87
20	211.	7447.	372.3	4.56	182860.	19637.	12.03	4.07
21	335.	7782.	370.6	4.77	181987.	18764.	11.50	4.28
22	303.	8085.	367.5	4.95	180478.	17255.	10.57	4.48
23	466.	8551.	371.8	5.24	182581.	19358.	11.86	4.68
24	347.	8898.	370.8	5.45	182074.	18851.	11.55	4.89
25	352.	9250.	370.0	5.67	181706.	18483.	11.32	5.09
26	304.	9554.	367.5	5.85	180459.	17236.	10.56	5.29
27	420.	9974.	369.4	6.11	181415.	18192.	11.15	5.50
28	295.	10269.	366.8	6.29	180110.	16887.	10.35	5.70
29	486.	10755.	370.9	6.59	182129.	18906.	11.58	5.91
30	411.	11166.	372.2	6.84	182787.	19564.	11.99	6.11
31	425.	11591.	373.9	7.10	183623.	20400.	12.50	6.31
32	290.	11881.	371.3	7.28	182335.	19112.	11.71	6.52
33	309.	12190.	369.4	7.47	181408.	18185.	11.14	6.72
34	432.	12622.	371.2	7.73	182313.	19090.	11.70	6.92
35	324.	12946.	369.9	7.93	181650.	18427.	11.29	7.13
36	359.	13305.	369.6	8.15	181501.	18278.	11.20	7.33
37	421.	13726.	371.0	8.41	182184.	18961.	11.62	7.53
38	301.	14027.	369.1	8.59	181280.	18057.	11.06	7.74
39	261.	14288.	366.4	8.75	179918.	16695.	10.23	7.94
40	398.	14686.	367.1	9.00	180306.	17083.	10.47	8.15

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AN INDIRECT METHOD FOR ESTIMATING THE NUMBER OF MYOFIBERS IN TRANSVERSE SECTIONS OF SKELETAL MUSCLE

by

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ABSTRACT

The total number of myofibers in each transverse section of 6 pectineus muscles from 4 dogs was determined by direct and indirect counting methods.

Direct myofiber counts were determined from photographic montages of the transverse sections; the number of myofibers in the sections ranged from 12,368 to 163,223.

The indirect counting method utilized random photographic sampling of transverse sections. The number of myofibers per unit area of the samples was equated to the total cross-sectional area of the section to estimate the number of myofibers present. Three independent estimates of the number of myofibers in each transverse section were obtained by this indirect method.

The indirect method tended to over estimate the number of myofibers in transverse sections by approximately 4 percent. The percent error of the estimate did not appreciably change after 15 sample points, which sampled at least 5% of the total muscle area. The results suggest that the error of the estimate tends to be greater as the number of myofibers/mm^2 increases, whereby a 2% error can be anticipated for every 1000 myofibers/mm^2.