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THE EFFECT OF GONADOTROPHINS AND OF THE THYMUS GLAND ON Zn^{65} UPTAKE AND ORGAN WEIGHTS IN MALE RATS

by

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Table of Contents

List of Tables

List of Figures

INTRODUCTION

The presence of zinc in living organisms and its role as an essential nutrient have been recognized since 1869 (1). Raoult and Breton described its presence in human liver in 1877 (2). However, it was not until 1926 that a systematic study of the distribution of zinc was conducted by Lutz, who found it to be present in all of the organs of the rat, cat and man (3). Since zinc is a trace element in living organisms, but ubiquitous in the environment, it was at first extremely difficult to obtain reliable measurements of its distribution in animal tissues and fluids (4). A new, simple method for the study of the distribution and metabolism of zinc was developed with the availability of the radioactive isotope, Zn^{65}. Studies by Sheline and coworkers in 1943 (5), and subsequently by many others (6,7,8,9) confirmed the value of isotope methods in the study of the distribution and physiology of zinc in animals. Spectrographic (10), colorimetric (11), histochemical (12) and atomic absorption methods have supplied us with additional quantitative data and have confirmed the usefulness of the isotopic tracer method in biological studies of zinc. In one study of the stable zinc content of various tissues of the rat, the following results were obtained in micrograms of zinc per gram of dry weight of tissues: pancreas, 101; liver, 107; kidney, 106; testes, 212; dorsolateral prostate, 891; lungs, 87; heart, 83; muscle, 50 (13). Isotopic zinc studies, reported by several workers as Zn^{65} uptake per gram of wet tissue show the following results: a high Zn^{65} uptake by the pancreas, liver, kidney, gastrointestinal tract and male reproductive structures; an intermediate rate of uptake by the thymus, pituitary and adrenal glands, lungs and heart; and low uptake in skeletal muscle, skin and erythrocytes (5,7,14).

Stirn and coworkers (15) were the first to establish the indispensibility of zinc for normal growth and development of the rat. The classic work of Keilin and Mann (16) in isolating carbonic anhydrase and establishing the presence of zinc as part of its molecule, provided the first indication of the mechanism of action of zinc. Since then it has been found to be a necessary component of many enzyme systems, either as part of the molecule (metallo-protein) or as a coenzyme (4,17). Some of these enzymes include carboxypeptidase of the pancreas (18), carbonic anhydrase of the erythrocytes (16) and prostate gland (19), dehydrogenases of the liver (4) and skeletal muscle (20), alkaline phosphatases of the kidney (21), and acid phosphatase of the prostate gland (22).

The uptake of zinc by the male reproductive system is especially noteworthy. As early as 1921, Bertrand and Vladesco (23), aware of the relatively large amounts of zinc in the human prostate gland and semen, postulated that the element might play an important role in reproduction. In a systematic study of the genital organs of the rat, Mawson and Fischer found that the dorsolateral prostate gland (DLP) had a remarkably high zinc content (24). Subsequently, other workers (25,26) found that the dorsolateral prostate gland of the rat takes up more Zn^{65} per gram of tissue than does any other organ. Radioautographic studies have localized the Zn^{65} in the epithelial cells and secretions of the lateral part of the prostate gland (27,28). Histochemical studies by Rixon (12) using dithizone, and by Sternberg (29) using a fluorescent technique have shown the zinc to be present in the apical region of the epithelial cells forming the luminal border of the lateral prostate gland. The organelles found associated with high concentrations of zinc are the ribosomes and the nucleoli (12).

In man there is a high concentration of zinc in prostate gland, seminal plasma and spermatozoa (30,31) and a relatively low concentration in testis, suggesting that the prostate gland is the source of human sperm zinc (32). In rats, the dorsolateral prostate gland has the highest concentration of zinc; however, its removal does not affect fertility (33), probably because there is a fairly high concentration of zinc in the testis of the rat (27).

The zinc content of the lateral prostate gland has been shown to be under hormonal control (26). Gunn and Gould (34) found that the Zn^{65} uptake of the dorsolateral prostate gland decreased following castration and could be brought up to pre-operative levels by the administration of testosterone. Millar et al (35) showed that testosterone administered to immature rats increased both the zinc content, as determined by the dithizone method, and the Zn^{65} uptake. In studies using mature hypophysectomized rats, it was found that human chorionic gonadotrophin (HCG) and luteinizing hormone (LH) could significantly increase the Zn^{65} uptake in the dorsolateral prostate gland over values found in uninjected, hypophysectomized rats (36,37). Follicle stimulating hormone (FSH) and prolactin were reported to have no effect on the Zn^{65} uptake in the dorsolateral prostate in hypophysectomized rats (37,39). However, recently Gunn et al found a synergistic effect of prolactin and LH on zinc uptake in the DLP (38).

All of the studies described above were performed on hypophysectomized and/or gonadectomized animals. While such procedures eliminate a number of complications, there are many disadvantages to their use. The multiple endocrine deficiencies created by the removal of the pituitary gland can not be corrected by the administration of one or several hormones. The adenohyphysial hormones interact with each other and with the hormones of their target organs in the maintenance of a homeostatic environment. For example, it has been reported that testosterone uptake is reduced in the ventral prostate gland of hypophysectomized animals and the authors suggest that some pituitary principle might affect the receptivity of target organs (40). A further consideration is the fact that, during the lifetime of a mammal, changing levels of gonadotrophins occur. With age there is a decline in gonadal steroids and a concomitant rise in gonadotrophins. At the time when testosterone levels are low, in apparent contradiction, prostatic hyperplasia occurs (41). It is important, therefore, to study the effect of various gonadotrophins on Zn^{65} uptake and organ weights in the rat with the intact testes and pituitary gland.

Human chorionic gonadotrophin (HCG) is known to stimulate the interstitial cells of the testis to secrete testosterone, and to secondarily promote hyperplasia of the accessory reproductive structures (42). Millar reported that in immature rats, the administration of HCG increased the Zn^{65} uptake of the DLP (36). HCG is thought to possess predominately LH-like activity with some FSH-like properties (43). In order to determine which components of HCG are responsible for the increased Zn^{65} uptake, LH and FSH, alone and in combination, as well as HCG, were used in the experiments to be described.

A synergistic effect of prolactin and LH has been reported in hypophysectomized rats, and of prolactin and testoterone in castrated rats, on both weight and Zn^{65} uptake of the DLP (38,44). These studies suggest an independent effect of prolactin not mediated by the testis. Therefore, the influence of prolactin on organ weight and Zn^{65} uptake was studied in animals with intact pituitary glands and gonads.

The hormonal stimulated growth and development of the secondary reproductive structures primarily involves the glandular epithelial cells (42). Since it has been demonstrated in the lateral prostate, that these are the cells that concentrate the zinc (12,28), the hormonal effect on Zn^{65} uptake might be secondary to the effect on these cells.

Early observers of the thymus gland concluded that it must play a role in growth and sexual development, since it seemed to be large in the new born animal and either smaller or harder to find in the older animal (45). Further studies in male animals showed that there was an inverse relationship between the size of the thymus gland and the levels of circulating testosterone. Martin studied the influence of thymectomy on the growth of secondary reproductive structures of the Long-Evans rat (46). Since this report shows that the weight of the ventral prostate gland was affected by removal of the thymus gland, it seemed of interest to investigate the effect of thymectomy on the weights of the dorsal and lateral prostate glands and on the Zn^{65} uptake of the reproductive structures. Thymectomy involves severe operative stress; since Martin's work suggests that the thymus in some way influences the testicular response to stress (47), both sham thymectomized and unoperated controls were used in all experiments.

Long Evans hooded rats were used in these experiments for two reasons; first, because Martin's thymectomy studies were performed on these rats and second, because there is inadequate information in the literature on zinc uptake in hooded rats. This work is an attempt to determine the effect of gonadotrophins on organ weight and Zn^{65} uptake in the thymectomized, sham thymectomized and unoperated, male, Long Evans rats.

TABLE I

ABBREVIATIONS USED IN TABLES AND TEXT

HCG	Human Chorionic Gonadotrophin
LH	Luteinizing Hormone or Interstitial Cell Stimulating Hormone
FSH	Follicle Stimulating Hormone
Prol.	Prolactin
V.P., Ven. Pros.	Ventral Prostate Gland
D.P., Dor. Pros.	Dorsal Prostate Gland
L.P., Lat. Pros.	Lateral Prostate Gland
D.L.P.	Dorsolateral Prostate Gland
S.V., Sem. Ves.	Seminal Vesicles
Coag. Gl.	Coagulating Glands
Prepu., Pre-pup.	Preputial Glands
Thymus	Thymus Gland
Adr.	Adrenal Glands
Sk. Mu., Skel. Musc.	Skeletal Muscle
Kid.	Kidney
Liv.	Liver
T, TMX	Thymectomy
S, Sham TMX	Sham Thymectomy
U	Unoperated
O	Operated

MATERIALS AND METHODS

Male hooded rats bred at Hunter College or purchased from local suppliers, were maintained on Purina rat pellets and tap water *ad libitum* in an air conditioned room. Animals with inadequate growth rates were discarded. When body weights were between 110 and 150 grams, rats were placed in sets of three with maximum weight range per set of 5 grams. One rat of each set of three was thymectomized, one sham thymectomized, and one left unoperated. Five such sets of three were housed together (15 rats) and kept for two weeks to recover from surgery before hormone treatments were begun. The same hormone treatment was given to each of the 15 rats, so that there were five animals in each surgical state receiving each hormone. Subsequently, each experiment was repeated in an attempt to obtain 10 animals in each surgical state receiving each hormone treatment. Since some animals died, the goal of 10 animals was not always achieved. Table 2 shows the distribution of animals within the hormonal and surgical groups.

Thymectomy was performed under ether anesthesia essentially in accordance with the methods described by (Segaloff) (48). Sham operation was almost identical with thymectomy, except that the gland was freed of some of its connective tissue and then returned to the thoracic cavity. The methods for matching the animals and for surgery are described by Martin (46).

Hormone administration was begun after the two week recovery period. The hormones were injected subcutaneously in

TABLE 2

DISTRIBUTION OF EXPERIMENTAL ANIMALS

HORMONAL TREATMENT	SURGICAL STATE UNOPERATED	 THYMECTOMIZED	 SHAM THYMECT-OMIZED	TOTAL
NO HORMONE	9	7	10	26
HCG	10	10	9	29
LH	10	7	9	26
PROLACTIN	10	8	11	29
FSH	5	3 + 4*	5 + 3*	20
FSH +PROL.	5 + 5*	4 + 2*	5 + 5*	26
FSH (.4mg.)	4	2	2	8
FSH + LH	4	5	4	13

* Data for these groups were not combined because there was an infection in the colony at the time of performance of the second experiment.

TABLE 2

Hormone	Name of Preparation	Source	Dosage per Injection*
HCG	Chorionic Gonadotrophin (Vitamix)	Human urine	100 I.U.
Prolactin	**NIH - P - B1	Bovine	1 mg.
FSH	**NIH - FSH - S3	Ovine	.2 mg. or .4 mg.
LH	**NIH - LH - B4	Bovine	.2 mg.
FSH + Prolactin			.2 mg. FSH 1 mg. Prolactin
FSH + LH			.2 mg. FSH .2 mg. LH

*0.1 ml. was injected subcutaneously

**These hormones were made available by the National Institutes of Health through the courtesy of Dr. A. Wilhelmi.

a series of 10 injections over a two week period. Table 3 lists the hormonal preparations used and the amount of each injection. The hormones were received as dry powders and were dissolved in sterile water just before administration.

Four weeks after surgery (two weeks after the start of hormone treatment) the rats were injected with approximately 20 microcuries of Zn^{65} of high specific activity containing less than 10 micrograms of stable zinc per dose. The amount of stable zinc in each dose was kept constant and, therefore, there was some variation in the radioactivity of the doses due to decay. The animals were then placed in metabolic cages with water but no food. At the time of injection of the Zn^{65} tracer, a standard was prepared by injecting an amount identical to the animal dose into a volumetric flask, and making the appropriate dilution for counting.

The animals were sacrificed by exsanguination under ether anesthesia, 24 hours after Zn^{65} administration. Gross autopsy observations were made and organs were excised and cleaned. Separation of the three prostate glands was performed under a good light source and with the aid of a binocular magnifying loop. The bilobed ventral prostate was first removed in one piece, thus exposing the two lobes of the lateral prostate. The lateral lobes were then carefully dissected from the urethra and the identification of the lateral lobe was facilitated by the obvious difference in color of the three parts of the prostate gland. The lateral lobes were considerably whiter than either the ventral or dorsal portions. The seminal vesicles were then reflected ventrally, exposing the dorsal prostate which was then carefully removed in one piece. All organs and tissues were placed on glassine paper and wet weighed on a torsion balance. Each organ was wrapped in the paper and placed in a counting tube.

The counting of all samples was done in a well-type crystal scintillation counter. The injection standards were counted daily along with the samples thus eliminating the necessity for decay calculations. Since the counting was done over a period of two years there is no direct mathematical relationship between the counts per minute and the Zn^{65} uptake. The results are expressed in per cent (%) of dose per organ and per cent of dose per gram of wet tissue.

RESULTS

I BODY WEIGHT

Initial body weights were restricted to a very narrow range for all groups of rats, with no significant differences between groups. The range for final body weights was somewhat larger, but again there were no significant differences between groups. Therefore, it may be concluded that neither surgery nor hormonal treatment exerted important influences on body weight gains throughout the study.

There was no consistent relationship between body weight and wet organ weight within any of the experimental groups; i.e., the heaviest animals within a group did not necessarily have the largest reproductive structures.

II ORGAN WEIGHTS

A. Effect of HCG on Organ Weights

HCG increased the weights of all accessory reproductive structures except the preputial glands in the unoperated animals (see Table XXIII). The ventral prostate gland, seminal vesicles and coagulating gland weighed almost twice as much as those of the no hormone controls. The increase in weight is statistically significant for all the accessory structures except the preputial glands. HCG caused a slight decrease in weight of the testes and kidneys, and both the thymus and adrenal glands are significantly smaller than in the animals that received no hormone.

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TABLE XXIII

EFFECT OF GONADOTROPHINS ON ORGAN WEIGHTS

Mean values in milligrams

SURGICAL STATE - Unoperated

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	206	81	139	541	62	2110	112	1889	411	39
HCG	370 (.001)	112 (.023)	194 (.009)	1076 (.001)	118 (.001)	2086	144	1851	246 (.003)	32 (.016)
LH	167	62 (.035)	97 (.001)	324 (.001)	43 (.021)	2275	115	1747	382	31 (.029)
Prol.	149 (.008)	76	133	518	59	2352	117	1691 (.05)	322	34
FSH	177	75	129	487	60	2452	143	1558 (.004)	297	29 (.015)
FSH + Prol.	158	69	129	578	53	2340	98	1715	319	29 (.039)

Parentheses enclose P values of $<$.05 for hormone versus no hormone (None) comparisons for each structure.

TABLE XXIV

EFFECT OF GONADOTROPHINS ON ORGAN WEIGHTS

Mean values in milligrams

SURGICAL STATE - Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	164	63	119	482	55	2433	107	1686		29
HCG	350 (.001)	118 (.024)	160	1166 (.001)	107 (.001)	2079	144 (.012)	1871		34
LH	144	67	123	377	48	2168	138	1615		33
Prol.	173	80	134	540	54	2413	110	1777		37
FSH	197	67	145 (.03)	564	72	2053	106	1952 (.05)		36
FSH + Prol.	148	66	138	555	43	2237	120	1531		36

Parentheses enclose P values of $\leq .05$ for hormone versus no hormone (None) comparisons for each structure.

TABLE XXV

EFFECT OF GONADOTROPHINS ON ORGAN WEIGHTS

Mean values in milligrams

SURGICAL STATE - Sham Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	149	69	105	448	54	2395	133	1704	312	33
HCG	401 (.001)	124 (.01)	238 (.001)	1258 (.001)	144 (.001)	2110	215 (.011)	1964 (.05)	222 (.05)	30
LH	146	61	91	296	39	2208	105	1774	369	33
Prol.	171	74	122	518	52	2317	129	1629	358	33
FSH	110	60	112	481	57	1764	107	1582	346	34
FSH + Prol.	191 (.035)	89	107	479	49	2256	97	1501	263	35

Parentheses enclose P values of $<$ .05 for hormone versus no hormone (None) comparisons for each structure.

In thymectomized rats, as in the unoperated group, HCG increased the weights of all accessory reproductive structures and decreased the weight of the testes (see Table XXIV). The weight increases are statistically significant for all except the lateral prostate gland. However, in contrast with the findings in unoperated animals, adrenal glands and kidneys of thymectomized rats were increased after HCG administration.

When the animals were subjected to sham thymectomy (see Table XXV), again the effect of HCG was to increase the weight of all structures except the testes, thymus and adrenal glands which were decreased. All the weight differences except that of the testes are statistically significant.

B. Effect of LH on Organ Weights

Injections of LH decreased the weight of the three prostate glands, the seminal vesicles and the coagulating gland in the unoperated animals (see Table XXIII). The decrease is statistically significant for all but the ventral prostate gland. The adrenal glands also show a significant decrease, the kidneys and thymus gland are slightly smaller, but the testes are somewhat heavier.

Removal of the thymus gland alters the response to LH. Weights of some of the accessory reproductive structures were reduced by LH while others were increased. None of these differences are statistically significant (see Table XXIV).

In sham thymectomized rats, the changes observed following LH administration were qualitatively similar to those found in LH treated unoperated animals (see Table XXV). Reduction in weight of accessory reproductive structures ranged from 2% to 34% with an average of 19%. However, differences between LH treated sham thymectomized rats and no hormone sham operated animals are not statistically significant.

C. Effect of Prolactin on Organ Weights

When prolactin was administered to unoperated rats, the ventral prostate gland weight was significantly decreased. There was a slight decrease in weight of the other secondary reproductive structures, except for the preputial gland which was increased by the hormone. The testes were slightly heavier, the thymus gland about 25% lighter and the kidneys significantly lighter in weight (see Table XXIII).

In thymectomized prolactin treated animals, organ weights were equal to or greater than those of the no hormone thymectomized group. None of the increases are statistically significant (see Table XXIV).

In the sham thymectomized rats, prolactin tended to increase the weight of three prostate glands, the seminal vesicles and the thymus gland, while all the other organs were decreased or about the same as the no hormone controls (see Table XXV). None of these differences are statistically significant. Thus in prolactin treated animals the effect of surgery seems to be greater than the effect of thymus deprivation.

D. Effect of FSH on Organ Weights

FSH tended to reduce the weights of all the accessory reproductive structures except the preputial glands in the unoperated animals (see Table XXIII). None of the differences are significant when compared with the no hormone controls. The testes weight was slightly increased, the thymus gland was reduced by about 25% and the kidneys and adrenals showed a significant weight reduction.

Thymectomy alters the organ weight response to FSH. All structures except the testes and preputial glands tend to show an increase in weight over that observed in the thymectomized no hormone controls (see Table XXIV). The increase is statistically significant for the lateral prostate gland and the kidneys.

When sham thymectomized rats were given FSH, the weights of the ventral and dorsal prostate glands, the preputial glands, testes and kidneys were all reduced. The other structures remained about the same or were slightly increased over the no hormone control levels (see Table XXV).

E. Effect of FSH plus Prolactin on Organ Weights

When prolactin was combined with FSH, all accessory reproductive structures except the seminal vesicles were decreased in the unoperated animals. These decreases, however, are not statistically significant. Adrenal gland weights were significantly reduced, kidney and thymus glands slightly reduced and testes were slightly increased (see Table XXIII).

When the FSH prolactin combination was administered to thymectomized rats, the ventral prostate and coagulating glands were reduced as in the unoperated animals; however, all other accessory reproductive structures were either equal in size or larger than those of the no hormone thymectomized rats. None of these differences are statistically significant (see Table XXIV).

FSH and prolactin caused a significant increase in weight of the ventral prostate gland in the sham thymectomized animals. The dorsal prostate gland and seminal vesicles were slightly increased, while the kidneys, preputial, thymus and coagulating glands were smaller in weight than in corresponding organs of rats that did not receive any hormone (see Table XXV).

F. Statistically Significant Differences in Organ Weights within Hormonal Groups Attributable to Surgical Procedures

An evaluation of the effect of thymectomy and sham thymectomy on organ weights within each hormonal group is shown in Table XXXIX. The organ weights of the thymectomized and sham operated animals were compared with each other and with the corresponding weights of the unoperated animals. Significant differences (P values of less than .05) are listed in this table. Note that in the no hormone controls (none), sham thymectomy caused a significant reduction in weight below the unoperated values in the lateral prostate, ventral prostate and thymus. The weights of the kidneys and adrenals were significantly smaller in the thymectomized animals than in the unoperated.

G. Modification of the Organ Weight Response to the Hormones by Surgery or by the Thymus Gland

An examination of the results suggests that, in some of the

TABLE XXXIX

EFFECT OF SURGERY ON ORGAN WEIGHTS WITHIN THE HORMONAL GROUP

(Statistically significant differences between surgical states)

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	S< U (.008)		S< U (.008)					T< U (.026)	S< U (.029)	T< U (.009)
HCG			T< S (.028)		T< S (.027)		U< S (.009)			
LH			T> S (.003) T> U (.013)							
FSH	S< T (.009) S< U (.02)					T< U (.035)		T> S (.045) T> U (.036)		
FSH + Prol.			T> S (.035)							

Parentheses enclose P values.

TABLE XXVI

EFFECT OF SURGERY ON THE RESPONSE TO GONADOTROPHINS

Mean organ weights in milligrams

Hormone		V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Adr.
None	O	155	66	110	462	54	2412		1696	32
	U	206	81	139	541	62	2110		1889	39
HCG	O		121		1212				1918	
	U		112		1076				1851	
Prol.	O	172			527	53				
	U	149			518	59				

O (operated) values represent averages for thymectomized and sham thymectomized rats which were combined when thymectomy and sham thymectomy produced differences from the (U) unoperated state which were in the same direction.
None of the differences between sham thymectomized and thymectomized rats were statistically significant.

TABLE XXVII

EFFECT OF THYMECTOMY ON THE RESPONSE TO GONADOTROPHINS

Mean organ weights in milligrams

Hormone		V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Adr.
FSH	T	197		145	564	72			1952	36
	U+S	144*		121	484	58			1570	31
LH	T	144	67	123	377	48	2168	138	1615	33
	U+S	157	62	94	311	41	2243	110	1759	32

Values for U (unoperated) and S (sham thymectomized) rats were combined whenever the animals with thymus glands (U+S) exhibited a similar direction of change from the thymectomized condition.

*The difference between the unoperated and sham thymectomized rats was statistically significant.

hormonal states surgery seems to modify the organ weight response, while in others the presence or absence of the thymus gland affects the weight response (see Tables XXVI and XXVII). Therefore, where the differences in weight attributable to the surgical procedures (thymectomy or sham thymectomy were in the same direction, the mean weights of the thymectomized and sham thymectomized animals were combined. This was true for the no hormone, HCG, and prolactin groups (see Table XXVI). Where differences in organ weight response was clearly attributable to the presence or absence of the thymus gland, values for unoperated and sham thymectomized rats were combined; data for animals receiving FSH and LH are presented in Table XXVII.

a. Effect of Surgery

Surgery alone, reduced the weights of all organs studied except the testes and preputial glands in animals not receiving any hormone (Table XXVI). When HCG was administered, surgery enhanced the organ weight response to the hormone. HCG increased the weights of all reproductive structures except the testes; both surgical groups exhibited greater increases than did the unoperated rats. HCG decreased the weight of the testes and the decrease was enhanced by surgery. Within the HCG treated groups, the operated rats had heavier dorsal prostate glands, seminal vesicles and kidneys than the unoperated group (see Table XXVI).

Prolactin reduced organ weights of unoperated animals, but tended to increase organ weight of operated animals. Prolactin seems therefore to act as a leveling agent which reduces or counteracts the effects of surgery.

b. Effect of Thymectomy

Thymectomy reverses the organ weight response to FSH. In thymectomized rats, FSH increased the weights of all organs except the testes and preputial glands. By contrast in the unoperated rats, FSH decreased the weights of all organs except the testes and preputial gland. The effects of FSH on sham operated rats are more difficult to evaluate, because sham operation alone reduced organ weights in animals receiving no hormone; further reductions attributable to FSH were noted in ventral and dorsal prostate glands. The ventral prostate, dorsal prostate, lateral prostate, coagulating and adrenal glands, seminal vesicles and kidneys of FSH treated thymectomized rats were larger than the corresponding structures in sham operated and unoperated rats given FSH (see Table XXVII).

LH seemed to cause the reduction of organ weights below that of the no hormone controls. This effect was obscured by thymectomy in all organs except ventral prostate glands, testes and kidneys. In these three organs thymectomy lowered the weight further. When a comparison is made between the thymectomized animals receiving LH and LH treated animals with intact thymus glands (sham thymectomized and unoperated), it is noted that all the accessory reproductive structures except the ventral prostate glands are heavier in the thymectomy group (see Table XXVII).

H. DISTRIBUTION OF PROSTATE WEIGHTS IN NO HORMONE, LH AND HCG TREATED RATS

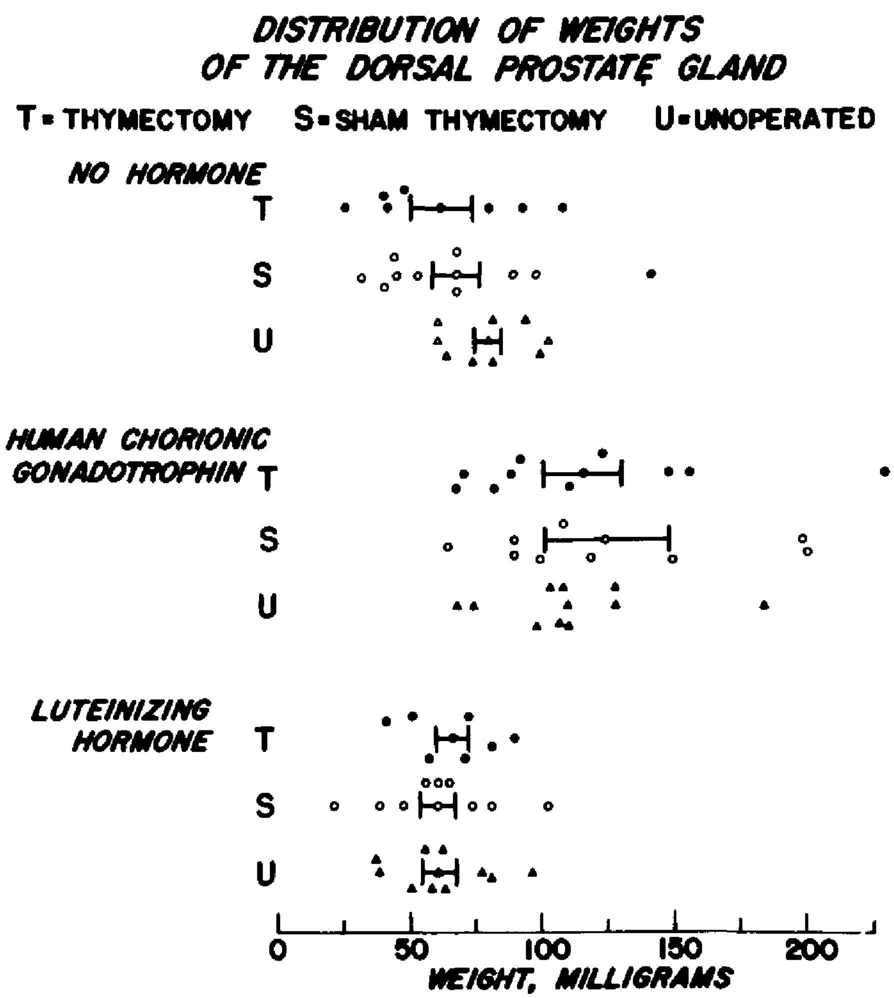
An alternate way of presenting the organ weight data is shown in Figures 1, 2 and 3. All the values for the dorsal prostate gland weights have been plotted for each surgical state of animals receiving HCG, LH and no hormone (Figure 1). Note that there is a much wider distribution of values in the HCG treated animals than in the other two hormonal groups. It can also be observed that, not only are the mean HCG organ weights considerably higher than the LH and no hormone groups, but most of the individual values are also higher.

The effects of surgery and thymectomy can also be evaluated. When HCG is administered, the dorsal prostate weights of the two operated groups are higher than the unoperated, while in the no hormone animals, the reverse is true. In the animals treated with LH, the organ weights of the unoperated and sham thymectomized are lower than in the untreated animals, while the dorsal prostate weights of the thymectomized animals are about the same as those of the no hormone thymectomized rats. A similar analysis can be made of the ventral prostate weights (Figure 2) and the lateral prostate weights (Figure 3).

I. EFFECT OF FSH, FSH PLUS PROLACTIN AND FSH PLUS LH ON ORGAN WEIGHTS (a Second Experiment)

A second experiment was performed comparing FSH, FSH plus

Figure 1


DISTRIBUTION OF WEIGHTS
OF THE DORSAL PROSTATE GLAND
T = THYMECTOMY S = SHAM THYMECTOMY U = UNOPERATED
NO HORMONE
T
S
U
HUMAN CHORIONIC
GONADOTROPHIN T
S
U
LUTEINIZING
HORMONE T
S
U
0
50
100
150
200
WEIGHT, MILLIGRAMS

DISTRIBUTION OF WEIGHTS OF THE VENTRAL PROSTATE GLAND

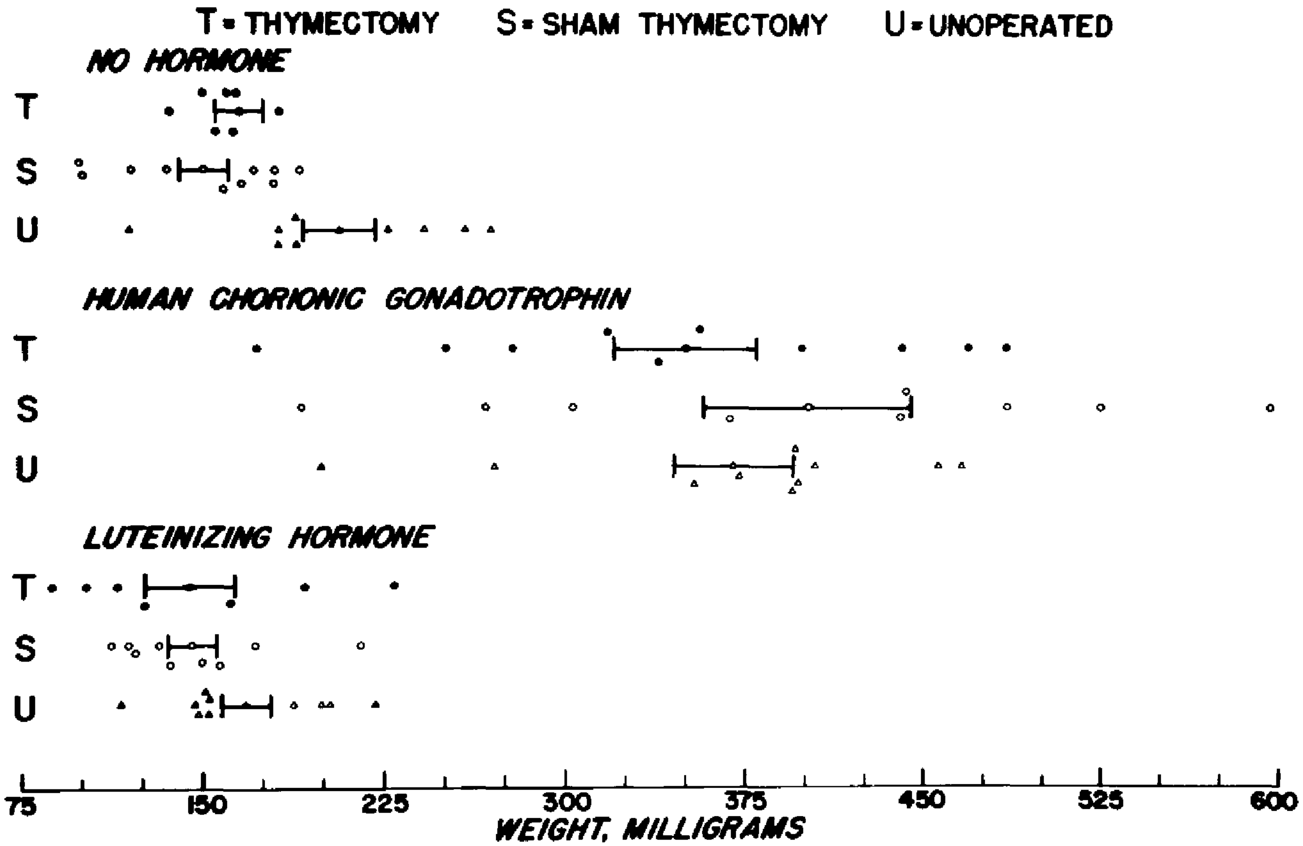
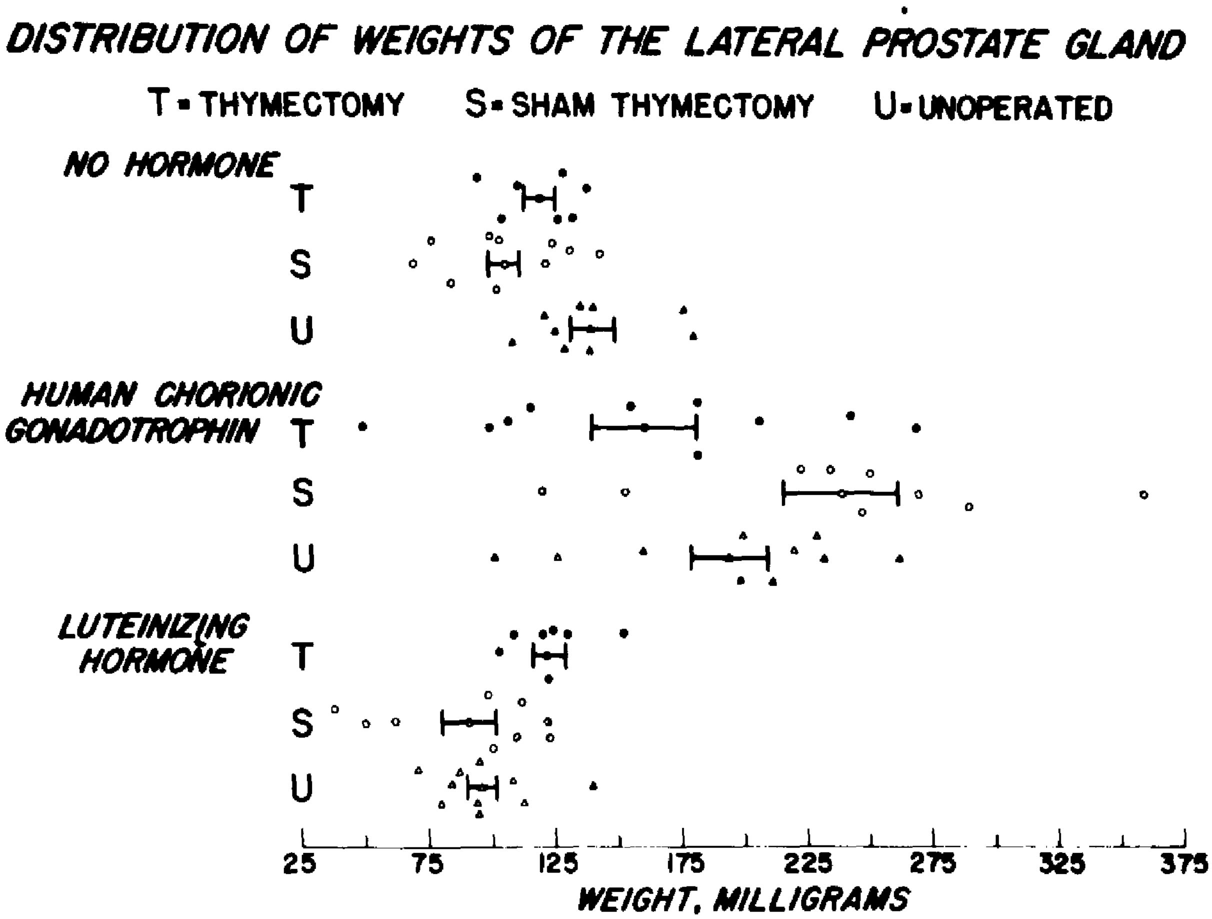


Figure 2

Figure 3


DISTRIBUTION OF WEIGHTS OF THE LATERAL PROSTATE GLAND
T = THYMECTOMY
S = SHAM THYMECTOMY
U = UNOPERATED
NO HORMONE
HUMAN CHORIONIC GONADOTROPHIN
LUTEINIZING HORMONE
T
S
U
25
75
125
175
225
275
325
375
WEIGHT, MILLIGRAMS

prolactin and FSH plus LH. Many problems were encountered and large numbers of animals died. It is possible that there was an infection in the colony and, therefore, those that survived were physiologically different than in the previous studies. However, although the organ weights were in a different range, the response to the hormones was qualitatively similar to that previously observed. The influence of the thymus gland on the weight response to FSH was again seen, in that the organ weights of the thymectomized animals were higher than those of the sham thymectomized rats (see Table XXVIII). In the first experiment, LH alone reduced organ weights, and in this experiment the reduction persisted in the presence of FSH. The influence of the thymus gland is seen when FSH and LH are given in combination, in that the weights of many of the structures are higher in the thymectomized animals.

TABLE XXVIII

EFFECT OF GONADOTROPHINS ON ORGAN WEIGHTS

Mean values in milligrams

Surgical State	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
HORMONE - FSH										
TMX	286	83	172	726	79	2432	107	1808		45
Sham TMX	234	74	166	639	68	2486	83	1600	300	38
HORMONE - FSH + Prolactin										
TMX	241	131	125	752	71	2726	138	1558		35
Sham TMX	217	101	144	667	71	2344	114	1656	329	36
Unoperated	216	108	146	735	80	2817	147	1939	313	43
HORMONE FSH + LH										
TMX	182	79	112	443	57	2210	90	1690		35
Sham TMX	155	77	124	386	42	2532	131	1637	382	41
Unoperated	159	70	81	277	50	1630	118	1607	347	39

III ZINC UPTAKE

A. Organization of Data

The Zn^{65} uptake studies are calculated for all groups and presented both as per cent of injected dose per gram of tissue and as per cent of injected dose per organ. The data are organized into tables and figures which are listed below and the description of the results is based on the tables and figures.

The effect of gonadotrophins on Zn^{65} uptake per gram of tissue is compared with the no hormone values in the following tables:

The effect of gonadotrophins on Zn^{65} uptake per organ is compared with the no hormone controls in the following tables:

The statistically significant differences attributable to surgical states within the hormonal group are presented in Table XL Page 43.

The results of the thymectomized and sham thymectomized animals, seem to indicate that the effect of the hormones on Zn^{65} uptake per gram of tissue was modified in some cases by the surgery itself and in others by the presence or absence of the thymus gland . Combined data are presented in the following tables:

The Zn^{65} uptake data of the three surgical states within a hormonal group have also been combined for some of the hormones and are presented in the following figures:

The lateral prostate gland exhibits the highest Zn^{65} of any of the organs in all the hormonal states of the unoperated animals (see Table XXIX).

Reference to Tables XXX and XXXI will show that the lateral prostate gland has the highest Zn^{65} uptake per gram in the two operated states as well. The following decreasing order of Zn^{65} uptake for the no hormone unoperated group obtains generally, with some minor variations, for all hormonal and surgical states: lateral prostate gland, dorsal prostate gland, liver, kidney, adrenal glands, coagulating glands, thymus gland, ventral prostate gland, seminal vesicles, testes, preputial gland, and skeletal muscle.

Since the lateral prostate has the highest zinc uptake and is most influenced by the hormones, it will be discussed separately in the first section of the Zn^{65} uptake results. Subsequently, the effect of each of the gonadotrophins on Zn^{65} uptake in the other tissues studied and the modification of the hormonal effects by surgery will be discussed.

B. EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE IN THE LATERAL PROSTATE GLAND

a. Zn^{65} Uptake per Gram

In the unoperated animals (Table XXIX), HCG significantly increases the Zn^{65} uptake in the lateral prostate gland to over twice the no hormone values. LH caused a slight increase. Prolactin had no demonstrable effect on Zn^{65} levels. FSH, however, significantly reduces the Zn^{65} uptake below that of no hormone controls, and this effect is not reversed when prolactin is combined with FSH. Both sham thymectomy and thymectomy reduced the Zn^{65} uptake per gram in the lateral prostate of animals receiving no hormone. Therefore, it appears that surgery reduces the Zn^{65} uptake below values for unoperated animals. The same effect is seen in HCG treated animals where, again the operated animals show a lower uptake than the unoperated (see Table XXXII). Prolactin seems to reverse the effect of surgery; so that, while unoperated prolactin treated animals have the same Zn^{65} uptake as the no hormone unoperated controls, prolactin treated operated animals show a significant increase in Zn^{65} uptake. Thus, surgery unmasks the effect of prolactin (Table XXXII). LH tends to increase Zn^{65} uptake in all surgical states, but the lowest values are found in thymectomized animals. Therefore, the presence of the thymus gland seems to be required for the maximum effect of LH. (Table XXXIII). FSH decreases Zn^{65} uptake in the lateral prostate in all three surgical states. The greatest reduction

TABLE XXIX

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per gram of tissue

SURGICAL STATE - Unoperated

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
None	.5445	1.547	2.754	.4226	.6724	.3620	.3840	1.013	.6582	.7144	1.451	.1787
HCG	.7840	2.214	6.220 (.008)	.4030	.8324	.4424 (.042)	.5885 (.028)	1.515 (.006)	.8983 (.050)	1.134 (.020)	1.901 (.022)	.1897
LH	.7820	1.602	3.118	.5557	.6906	.3563	.5374	1.304	.6156	.9423	1.451	.1787
Prol.	.7307	1.402	2.685	.4350	.5686	.3074	.3514	1.066	.6029	.7154	1.130	.1234
FSH	.4194	.8928 (.014)	1.672 (.009)	.3374	.3908	.2276 (.002)	.2630	.8156	.4546 (.035)	.5590	1.090	.0910 (.003)
FSH + Prol.	.4708	.9824 (.039)	1.762 (.011)	.2652	.3846	.2350 (.001)	.2352	.8160	.4692	.4288	1.044 (.037)	.0876 (.002)

Parentheses enclose P values of $<$.05 for hormone versus no hormone (None) comparisons for each structure.

TABLE XXX

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per gram of tissue

SURGICAL STATE - Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
None	.5708	1.399	2.151	.5460	.6491	.2888	.6642	1.355		1.057	1.549	.1717
HCG	.9307 (.035)	2.006	4.809 (.016)	.6187	.6816	.4738 (.023)	.6104	1.456		.9987	1.930	.1735
LH	.6488	1.211	2.996	.4708	.7431	.2704	.3617	1.143		.7868	1.433	.1470
Prol.	.6727	1.317	3.459 (.03)	.3972	1.222	.2577	.3845	1.163		.9136	1.524	.1618
FSH	.3313	.4943 (.011)	1.197	.2193	.4016	.1903	.2200	.6216 (.001)		.3996 (.006)	.7013 (.003)	.0770 (.005)
FSH+ Prol.	.5967	1.043	2.220	.2232 (.04)	.6537	.2337	.2322	.8140 (.001)		.5412 (.009)	1.042 (.015)	.1405

Parentheses enclose P values of $<.05$ for hormone versus no hormone (None) comparisons for each structure.

TABLE XXXI

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per gram of tissue

SURGICAL STATE - Sham Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
None	.7464	1.491	2.429	.5137	.5984	.3646	.4043	1.445	.7646	1.021	1.460	.1648
HCG	.6921	2.207	5.334 (.001)	.4760	.7974	.5196	.6034	1.604	1.001	1.290	2.048 (.034)	.2002
LH	.7337	1.838	3.823	.4882	.6914	.3427	.5412	1.261	.6625	.8287	1.556	.1824
Prol.	.7817	1.502	3.830	.4792	.7225	.3260	.3589	1.088	.6816	.8743	1.547	.1521
FSH	.4534 (.03)	.7708 (.03)	1.520	.2762	.3014 (.02)	.2356 (.04)	.2232	.8506 (.004)	.4376 (.008)	.5236 (.02)	1.276	.0992
FSH + Prol.	.5212	1.094	2.428	.2912	.3990	.2406 (.05)	.3120	.7938 (.003)	.5064 (.032)	.5308 (.021)	1.037	.0984

Parentheses enclose P values of <.05 for hormone versus no hormone (None) comparisons for each structure.

TABLE XXXII

EFFECT OF SURGERY ON THE RESPONSE TO GONADOTROPHINS

Zn^{65} Uptake in % of dose per gram of tissue

Hormone		V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
None	O	.6741	1.453	2.314	.5270	.6193		.5113	1.406		1.035		.1676
	U	.5445	1.547	2.754	.4226	.6724		.4043	1.013		.7144		.1787
HCG	O		2.107	5.072	.5474	.7395	.4967	.6069			1.639		.1868
	U		2.214	6.220	.4030	.8324	.4424	.5885			1.134		.1897
Prol.	O		1.394	3.673		.8802		.3696			.8908	1.532	.1562
	U		1.402	2.685		.5686		.3514			.7514	1.130	.1234
FSH +	O	.5547	1.071	2.336							.5354		.1171
Prol.	U	.4708	.9824	1.762							.4288		.0876

O (operated) values represent averages for thymectomized and sham thymectomized rats which were combined when thymectomy and sham thymectomy produced differences from the (U) unoperated state which were in the same direction.

None of the differences between sham thymectomized and thymectomized rats were statistically significant.

TABLE XXXIII

EFFECT OF THYMECTOMY ON THE RESPONSE TO GONADOTROPHINS

Zn^{65} Uptake in % of dose per gram of tissue

Hormone		V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Adr.	Liver	Sk.Mu.
FSH	T	.3313	.4943	1.197	.2193	.4016	.1903	.2200	.6216	.3996	.7013	.0770
	U+S	.4304	.8318	1.596	.3068	.3461	.2406	.2431	.8331	.5413	1.183	.0951
LH	T	.6488	1.211	2.996	.4708	.7431	.2704	.3617		.7868		.1470
	U+S	.7591	1.714	3.452	.5237	.6909	.3498	.5392		.8885		.1884

Values for U (unoperated) and S (sham thymectomized) rats were combined whenever the animals with thymus glands (U+S) exhibited a similar direction of change from the thymectomized condition. None of the differences between unoperated and sham thymectomized rats were statistically significant.

TABLE XXXIV

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per gram of tissue

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
SURGICAL STATE - Thymectomy												
FSH	.425	.940	2.89	.265	.451	.276	.512	1.20		.811	1.57	.182
FSH + Prol.	1.00	.952	7.84	.246	.530	.271	.450	1.30		.865	1.51	.176
FSH + LH	.669	.906	3.01	.281	.580	.296	.512	1.26		.853	1.58	.156
SURGICAL STATE - Sham Thymectomy												
FSH	.491	.828	1.68	.205	.323	.235	.507	1.26	.581	.972	2.16	.144
FSH + Prol.	.545	.971	5.26	.285	.528	.297	.462	1.32	.705	.828	1.36	.150
FSH + LH	.442	.856	2.41	.325	.536	.288	.401	1.20	.582	.761	1.75	.160
SURGICAL STATE - Unoperated												
FSH + Prol.	.470	.841	5.26	.265	.494	.258	.356	1.07	.640	.722	1.64	.177
FSH + LH	.460	.655	2.58	.398	.983	.372	.475	1.26	.645	.869	1.66	.181

is found in thymectomized rats, with approximately equal values obtained in sham operated and unoperated groups. This suggests that the absence of the thymus gland enhances the response to FSH. When prolactin is combined with FSH, the lateral prostate values are brought up to the no hormone levels in both operated groups, but prolactin exhibits no demonstrable effect in unoperated animals given FSH. The effect of surgery in enhancing the action of prolactin is again evident. In operated animals, prolactin counteracts the zinc lowering effects of FSH, while unoperated animals given prolactin plus FSH have values comparable to those of unoperated animals given FSH alone (Table XXXIII).

The Zn^{65} uptake per gram results of the second experiment are tabulated in Table XXXIV. Note that prolactin, when administered with FSH, raises the Zn^{65} levels in the lateral prostate gland above those following FSH alone. This is in agreement with data cited above. However, LH does not seem to be able to overcome the effect of FSH in reducing Zn^{65} uptake. Animals receiving LH and FSH resemble animals receiving FSH alone.

b. Zn^{65} Uptake per Organ

In the animals receiving no hormone, the zinc uptake per lateral prostate gland is significantly lower in the two operated states than in the unoperated (Table XL), consistent in direction with the differences in weight though greater in magnitude.

TABLE XL

EFFECT OF SURGERY ON Zn^{65} UPTAKE WITHIN THE HORMONAL GROUP

(Statistically significant differences between surgical states)

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
						% dose per organ						
None			$T < U$ (.02) $S < U$ (.029)									
HCG					$T < S$ (.006)		$T > U$ (.004)	$T < S$ (.003)				
FSH		$T < U$ (.001)				$T < U$ (.008)	$S < U$ (.023)					
FSH + Prol.						$T < S$ (.015)						
						% dose per gram						
None								$S > U$ (.035)				
FSH		$T < U$ (.005)								$T < S$ (.004)	$T < S$ (.013)	$T < S$ (.04)

Parentheses enclose P values.

The increase in Zn^{65} in the lateral prostate gland of rats receiving HCG is greater in both thymectomy and sham thymectomy states than in the unoperated state. When compared with the no hormone animals, the difference is statistically significant (Table XXXV, XXXVI AND XXXVII). When prolactin is administered, the effect of surgery is again seen in that the Zn^{65} uptake of the lateral prostate gland in both thymectomy and sham thymectomy groups tends to be increased over that of no hormone controls, while prolactin produces no increase in the uptake of the unoperated rats.

In the LH treated rats, both operated groups tend to show a Zn^{65} uptake per organ increase over the no hormone controls. In comparing the lateral prostate uptake in the three surgical states, the thymectomy group shows the lowest value. This again shows that the thymus gland is needed for maximum LH effect.

FSH reduces the Zn^{65} uptake in the lateral prostate gland below that of the no hormone controls in all three surgical states, but the difference is significant only for the unoperated groups. Since the weight of the lateral prostate gland in the thymectomized animals is significantly higher than in the no hormone controls, the smallest reduction in whole gland zinc uptake is found in this group. In both operated groups, prolactin combined with FSH raises the Zn^{65} levels in the lateral prostate gland above values found with FSH alone and up to or a little above those of the no hormone

TABLE XXXV

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per organ

SURGICAL STATE - Unoperated

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	.1107	.1362	.3646	.2244	.0372	.4178	.0418	.9383	.2583	.0268
HCG	.2666 (.001)	.2090	1.092 (.001)	.4812	.0942	.4624	.0823	1.362	.2022	.0346
LH	.1313	.1157	.3020	.1653 (.042)	.0303	.3952	.0598	1.113	.2369	.0272
Prol.	.1067	.1047	.3584	.2255	.0320	.3484 (.033)	.0403	.7537	.1903 (.008)	.0384
FSH	.0752	.0668 (.049)	.2090 (.02)	.1638	.0232 (.008)	.2750 (.002)	.0364	.6296	.1338 (.002)	.0156
FSH + Prol.	.0736	.0670	.2926	.1364 (.008)	.0176 (.001)	.2682 (.001)	.0210	.6810	.1458 (.001)	.0274

Parentheses enclose P values of $<$ .05 for hormone versus no hormone (None) comparisons for each structure.

TABLE XXXVI

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per organ

SURGICAL STATE - Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	.1024	.0872	.2380	.2438	.0348	.3528	.0671	1.136		.0301
HCG	.3215 (.002)	.2391 (.017)	.9397 (.002)	.6068 (.017)	.0716 (.023)	.4955	.1093 (.036)	1.302		.0326
LH	.1018	.0838	.2472	.1738	.0358	.3032	.0494	.8908		.0247
Prol.	.1163	.1046	.4350	.1901	.0561	.3070	.0468	1.027		.0268
FSH	.0666	.0326	.1723	.1220	.0290	.1940	.0230	.6200 (.002)		.0143 (.007)
FSH + Prol.	.0729	.0687	.3037	.1190	.0302	.2582	.0275	.6252 (.001)		.0274 (.02)

Parentheses enclose P values of $<$.05 for hormone versus no hormone (None) comparisons for each structure.

TABLE XXXVII

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per organ

SURGICAL STATE - Sham Thymectomy

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
None	.1155	.1074	.2415	.2328	.0326	.4388	.0524	1.212	.2311	.0330
HCG	.2530 (.001)	.2648 (.004)	1.163 (.001)	.4900 (.001)	.1167 (.001)	.5278	.1124	1.532	.1482	.0346
LH	.1037	.0971	.3227	.1278 (.02)	.0252	.3915	.0488	1.096	.2598	.0276
Prol.	.1360	.1200	.4145	.2518	.0373	.3788	.0474	.8410 (.016)	.2297	.0280
FSH	.0554 (.03)	.0508	.1668	.1268	.0288	.2398 (.010)	.0210 (.007)	.6586 (.001)	.1502 (.006)	.0182 (.002)
FSH + Prol.	.0980	.0904	.2510	.1306	.0192	.2790 (.027)	.0252 (.020)	.6426 (.001)	.1356 (.003)	.0182 (.001)

Parentheses enclose P values of $<.05$ for hormone versus no hormone (None) comparisons for each structure.

controls.

In the results of the second experiment, it can again be seen that prolactin, when administered with FSH, raises the Zn^{65} uptake per organ in the lateral prostate gland to twice that of FSH alone (Table XXXVIII). LH does not seem to exert any effect in the presence of FSH; the lateral prostate Zn^{65} per organ levels are about the same as with FSH alone.

c. Summary of Data on the Lateral Prostate Gland

The effect of the various gonadotrophins on Zn^{65} uptake in the lateral prostate gland expressed as per organ and per gram of tissues is presented in Figure 4. In this data presentation, values for all surgical states are combined for each of the hormones. FSH reduces the zinc uptake both per organ and per gram to about 50% of the no hormone values. Prolactin and LH both raise the Zn^{65} uptake per gram about 30% above the no hormone values. Prolactin increases the Zn^{65} uptake per organ over the no hormone controls but LH does not, because the weight of the lateral prostate gland is reduced by LH. HCG increases the Zn^{65} uptake per gram to twice the no hormone values and the Zn^{65} uptake per organ is four times that of the no hormone controls.

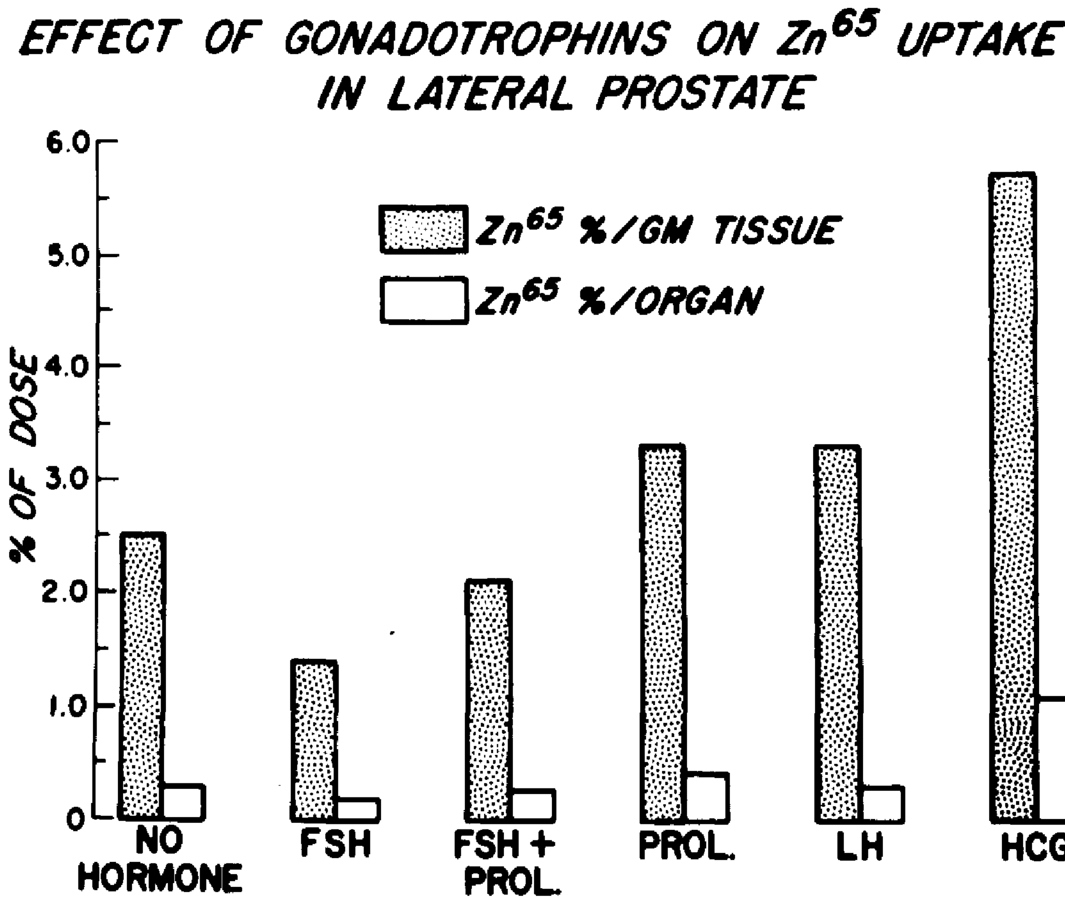
TABLE XXXVIII

EFFECT OF GONADOTROPHINS ON ZN^{65} UPTAKE

Mean values for % of dose per organ

Hormone	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.
SURGICAL STATE - Thymectomy										
FSH	.197	.080	.492	.191	.037	.333	.056	1.05		.037
FSH + Prol.	.231	.119	.996	.176	.034	.359	.062	1.03		.030
FSH + LH	.101	.070	.342	.113	.034	.326	.046	1.06		.030
SURGICAL STATE - Sham Thymectomy										
FSH	.115	.054	.281	.130	.022	.297	.040	1.04	.178	.037
FSH + Prol.	.119	.078	.767	.192	.038	.347	.047	1.09	.227	.030
FSH + LH	.069	.066	.306	.124	.022	.354	.048	.981	.223	.032
SURGICAL STATE - Unoperated										
FSH + Prol.	.101	.088	.778	.179	.038	.352	.053	1.02	.194	.031
FSH + LH	.072	.050	.203	.103	.027	.301	.056	1.019	.222	.034

Figure 4



STANDARD ERRORS OF THE MEANS
(all values are ±)

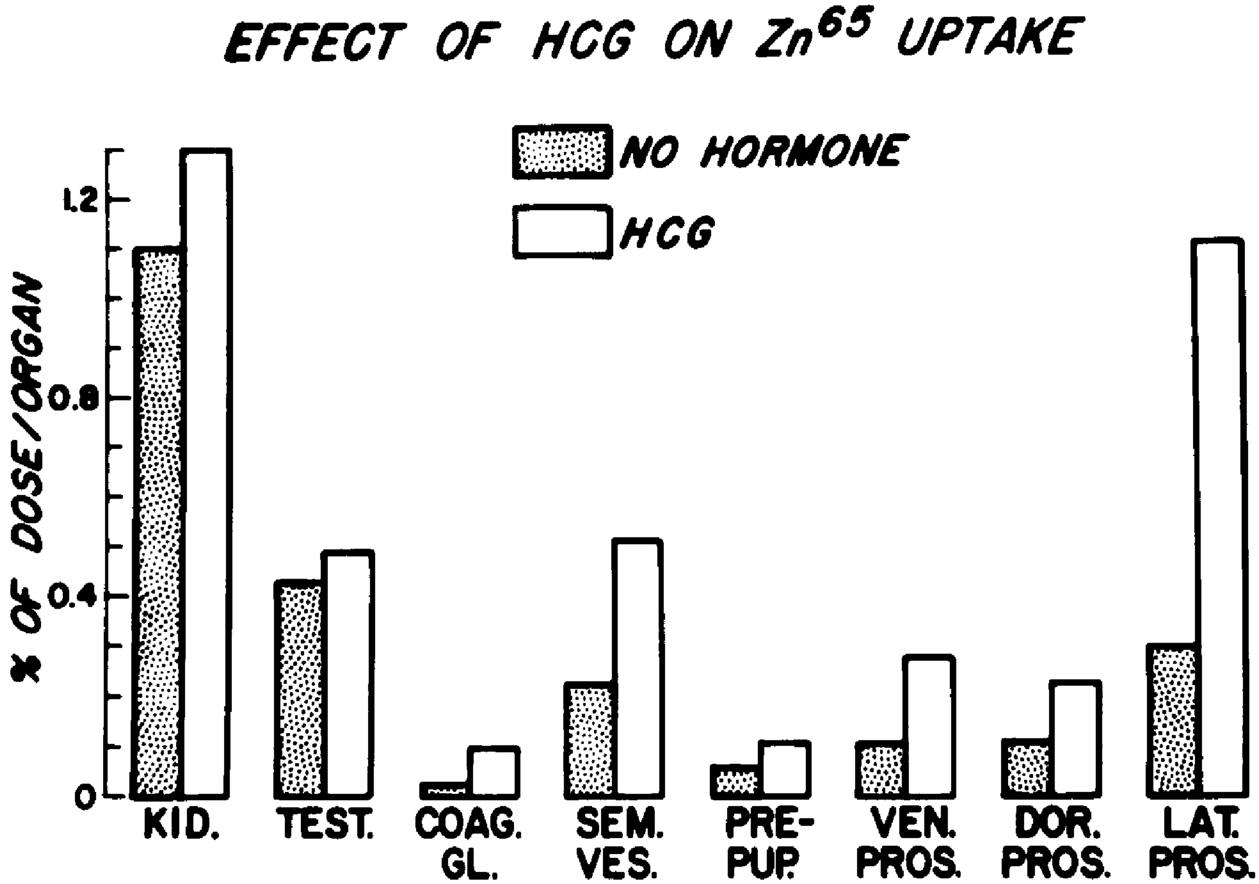
Hormone	%/gm tissue	%/organ
None	.1698	.0226
FSH	.1131	.0246
FSH + Prol.	.2097	.0255
Prol.	.4237	.0404
LH	.4231	.0433
HCG	.4891	.0764

C EFFECT OF HCG ON Zn^{65} UPTAKE

The effect of HCG on Zn^{65} uptake per organ is shown in Figure 5 and per gram in Figure 6 and the data presented in these figures again represents all the animals given HCG without regard for surgical state. The Zn^{65} uptake per organ was increased over the no hormone values in all the organs consistent with a weight increase (Figure 5). The Zn^{65} uptake in the lateral prostate gland shows a four fold increase. In Figure 6, it can be seen that the increases in Zn^{65} uptake per gram are of a smaller order of magnitude than the increases per organ. The Zn^{65} uptake per gram in the lateral prostate is twice that of the no hormone controls.

The effect of different surgical states in modifying the zinc uptake per gram response to HCG is shown in Tables, XXIX, XXX and XXXI. Note that in the unoperated state, the Zn^{65} uptake is significantly greater in the lateral prostate gland, testes, preputial gland, kidneys, adrenal gland, thymus gland and liver than in the organs of no hormone control animals. When the animals given HCG were thymectomized, only the lateral and ventral prostate glands and the testes show a statistically significant increase, while in the sham operated animals only the lateral prostate and liver are significantly greater. The Zn^{65} uptake per organ is increased by HCG in all the organs except the thymus in all three surgical states (Tables XXXV, XXXVI, and XXXVII). This is a reflection of the

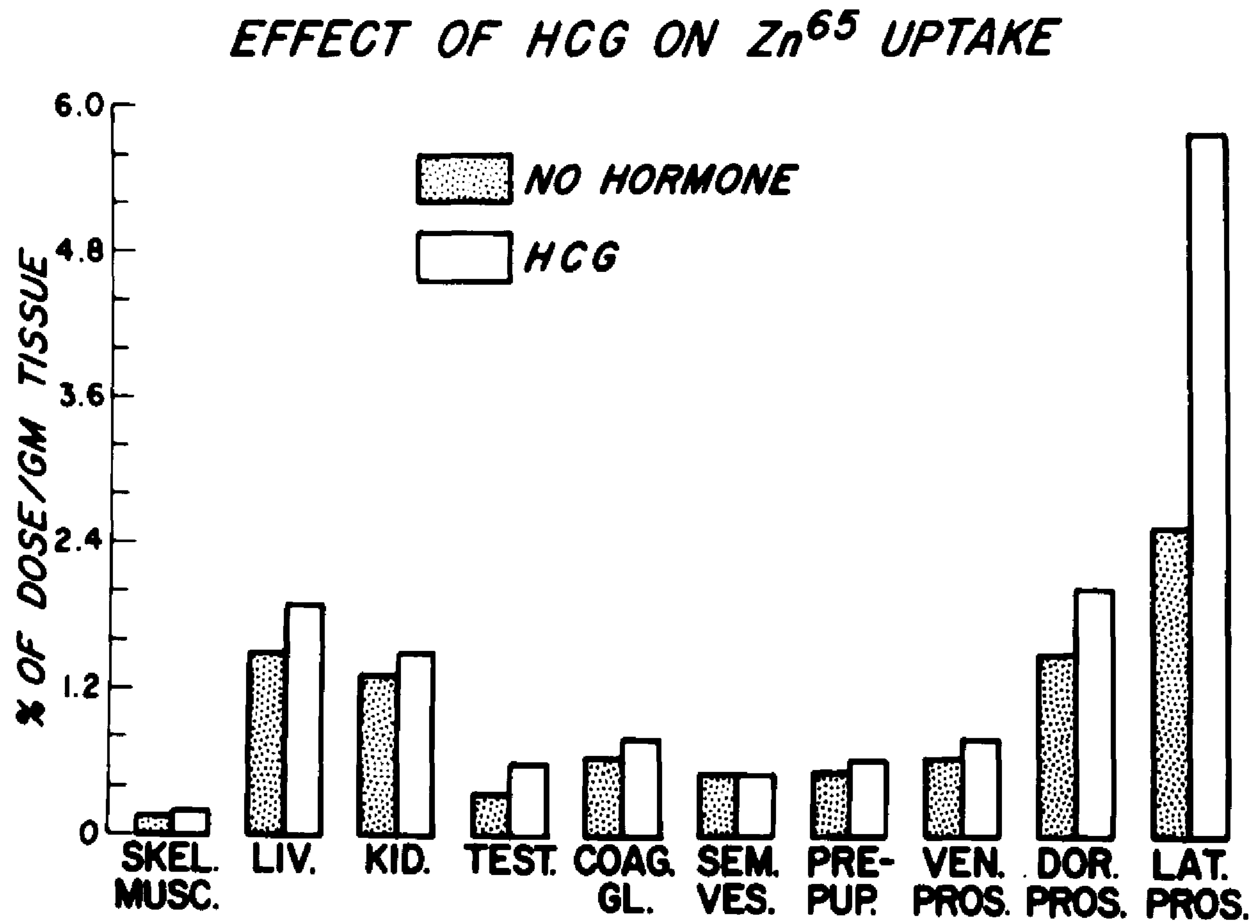
Figure 5



STANDARD ERRORS OF THE MEANS
(all values are ±)

Organ	No Hormone	HCG
Kid.	.0347	.0394
Test.	.0192	.0259
Coag. Gl.	.0029	.0087
Sem. Ves.	.0196	.0356
Pre-pup	.0055	.0127
Ven. Pros.	.0081	.0196
Dors. Pros.	.0126	.0226
Lat. Pros.	.0226	.0764

Figure 6



STANDARD ERRORS OF THE MEANS
(all values are ±)

Organ	No Hormone	HCG
Skel. Musc.	.0070	.0116
Liv.	.0651	.0866
Kid.	.0589	.0798
Testes	.0078	.0281
Coag. Gl	.0495	.0636
Sem. Ves.	.0408	.0301
Prepup.	.0599	.0325
Ven. Pros.	.0508	.0636
Dor. Pros.	.1006	.1931
Lat. Pros.	.1698	.4891

increase in organ weight caused by HCG. In the unoperated animals, statistically significant increases are found only in the ventral and lateral prostate glands (Table XXXV). The thymectomized animals show a significant increase over the no hormone controls in all the accessory reproductive structures, while in the sham operated animals, the increase is significant in all the accessory structures but the preputial gland.

D. EFFECT OF LH ON Zn^{65} UPTAKE

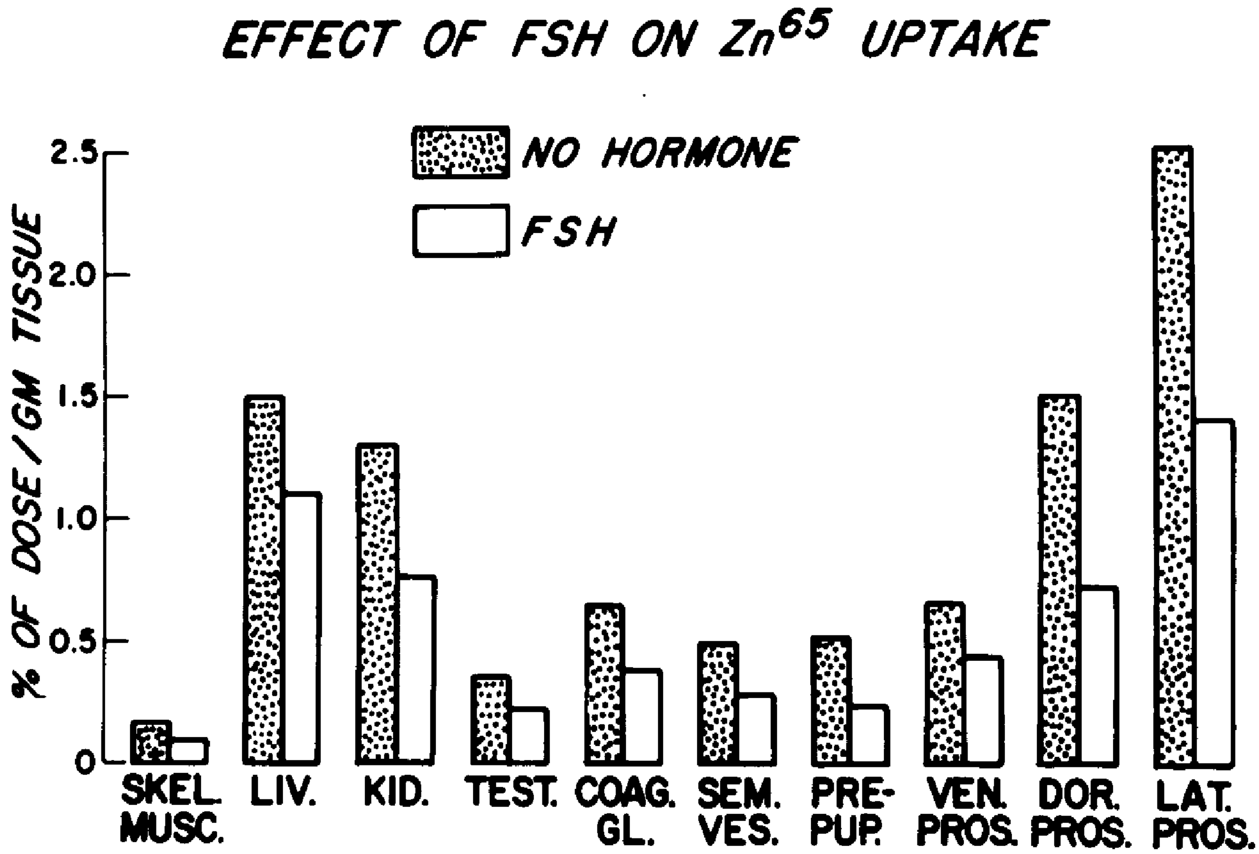
When LH is administered to unoperated animals, the Zn^{65} uptake per gram tends to be higher in the accessory reproductive structures, kidneys and adrenal glands (Table XXIX). In the sham operated animals the Zn^{65} uptake is elevated in the dorsal prostate, lateral prostate, coagulating and preputial glands (Table XXXI). While, when LH is given to animals that have been thymectomized, the ventral prostate, lateral prostate and coagulating glands are higher in Zn^{65} uptake and the seminal vesicles, dorsal prostate and preputial glands are lower than in the thymectomized animals that did not receive any hormone (Table XXX). None of these differences are statistically significant.

LH treated, unoperated rats exhibit a lowered Zn^{65} uptake per organ in all accessory reproductive structures except the ventral prostate (Table XXXV). These results are consistent with significantly reduced organ weights (Table XXIII). The uptake of seminal vesicles is significantly lower than in the no hormone unoperated rats. In the sham operated animals treated with LH all the accessory reproductive structures except the lateral prostate show a reduced Zn^{65} uptake per organ and the differences in the seminal vesicles is again significant (Table XXXVII). These results also reflect the lowered organ weights caused by LH (Table XXV). In thymectomized animals, LH has relatively little effect on Zn^{65} uptake per organ of the accessory reproductive structures other than the seminal vesicles (Table XXXVI). This is consistent with the effect of LH on organ weights in thymectomized rats (Table XXIV).

E. EFFECT OF FSH ON Zn^{65} UPTAKE

Zn^{65} uptake per gram of tissue of animals receiving FSH is compared with Zn^{65} uptake of animals receiving no hormone in Figure 7. Again the data of all three surgical states are combined. All the tissues show a reduction in Zn^{65} uptake varying from 30% to 50% of the no hormone values. In examining the surgical states separately, it is noted that in the unoperated animals, the Zn^{65} uptake tends to be reduced in all tissues and is significantly lower than in the no hormone controls for the dorsal and lateral prostate glands, testes, thymus gland and skeletal muscle (Table XXIX). In the thymectomized animals, Zn^{65} uptake is significantly lower for the dorsal prostate and adrenal glands, liver, kidney and skeletal muscle (Table XXX). In sham operated rats, the ventral prostate, dorsal prostate, coagulating, thymus and adrenal glands, testes,

Figure 7



STANDARD ERRORS OF THE MEANS
(all values are ±)

Organ	No Hormone	FSH
Skel. Musc.	.0070	.0063
Liv.	.0651	.1253
Kid.	.0589	.0385
Test.	.0078	.0108
Coag. Gl.	.0495	.0475
Sem. Ves.	.0408	.0274
Pre-pup	.0599	.0142
Ven. Pros.	.0508	.0352
Dor. Pros.	.1006	.0685
Lat. Pros	.1698	.1131

and kidneys all show a significantly lower Zn^{65} uptake than the no hormone values (Table XXXI).

When the data are expressed as Zn^{65} uptake per organ, it is seen that FSH reduces values in all organs of unoperated animals (Table XXXV). The differences are statistically significant for the dorsal prostate, lateral prostate and coagulating glands, the testes and thymus. Weight differences can not account for the reduction in Zn^{65} uptake per organ. Even in the kidneys and adrenal glands, where the weights are significantly lower, the zinc difference is greater than the weight difference. Similar results were found in the thymectomized and sham operated animals (Tables XXXVI and XXXVII).

In order to determine whether the FSH effect was dose dependent, o.4 mg of FSH was administered to a small group of rats (Table XIX). It seems as if this dose was too high and possibly in the toxic range, because the results were very variable and several of the animals died. Doses lower than o.4 mg should be studied to determine the maximum effective dose.

F. EFFECT OF PROLACTIN ON Zn^{65} UPTAKE

In the unoperated animals (Table XXIX) prolactin does not seem to cause any significant changes in Zn^{65} uptake per gram of tissue. In the thymectomized animals (Table XXX), prolactin increases the zinc uptake in the lateral prostate and coagulating gland, and the increase in the lateral prostate is statistically significant.

In the thymectomized animals (Table XXXVI) and in the sham operated (Table XXXVII), all the accessory reproductive structures have a higher zinc uptake per organ than the no hormone values. These results are consistent with weight differences, although in the lateral prostate gland the increase in zinc is greater than the increase in weight. None of the differences are statistically significant. Note also that the zinc uptake of the testes is lower in both prolactin treated operated groups than in the no hormone operated animals, although there are no differences in weight attributable to prolactin. The kidney of the sham operated animals has a significantly lower Zn^{65} uptake than this same organ in the no hormone animals, qualitatively consistent with the weight differences.

G. EFFECT OF FSH PLUS PROLACTIN ON Zn^{65} UPTAKE

When prolactin is administered with FSH, the Zn^{65} uptake per gram in the unoperated animals is about the same as when FSH is given alone (Table XXIX). Zn^{65} uptake is significantly lower than the no hormone values for dorsal and lateral prostate glands, testes, liver and skeletal muscle. However, in both sham thymectomized and thymectomized rats, the Zn^{65} uptake per gram in the dorsal and lateral prostate gland is brought up to the values of the no hormone, thymectomized and sham thymectomized animals

(Table XXX and XXXI). In the thymectomized animals receiving FSH and prolactin, the seminal vesicles, kidney, adrenals and liver show a significantly lower zinc uptake than the no hormone controls, while in the sham operated rats, the testes kidney, thymus and adrenal glands are significantly lower in Zn^{65} uptake per gram than in the no hormone animals.

The Zn^{65} uptake per organ values in FSH plus prolactin treated unoperated animals are again lower than in the no hormone group and very similar to the animals receiving FSH alone (Table XXXV). Only the lateral prostate shows some increase over the FSH levels, but the Zn^{65} uptake is still lower than in the no hormone group. The decrease in Zn^{65} uptake per organ is significantly lower in the seminal vesicles, coagulating gland, testis and thymus, when compared with the no hormone controls. In the thymectomized animals (Table XXXVI), the Zn^{65} uptake in the dorsal prostate is about the same as in the animals that did not receive any hormone and the lateral prostate shows a higher zinc uptake than the no hormone controls. The other organs have the same Zn^{65} uptake as in the rats receiving only FSH. In the sham thymectomized group (Table XXXVII), again the dorsal and lateral prostate glands show the same Zn^{65} uptake as the no hormone controls. The Zn^{65} uptake per organ in the ventral prostate gland is brought up close to the no hormone values, consistent with a higher organ weight. The uptake in the other organs in both operated groups is similar to that obtained when FSH is administered alone.

The effects of FSH and prolactin (separately and in combination) on Zn^{65} uptake per organ are summarized in Figure 8. FSH reduced Zn^{65} uptake in all organs; prolactin alone had relatively little effect in organs other than the lateral prostate; the FSH prolactin combination gave results similar to FSH alone in kidney, testes, ventral prostate and seminal vesicles. In the lateral prostate gland, where prolactin alone, raised the level of Zn^{65} above the no hormone controls, the combination of FSH plus prolactin brought the level of zinc uptake to that of the no hormone controls.

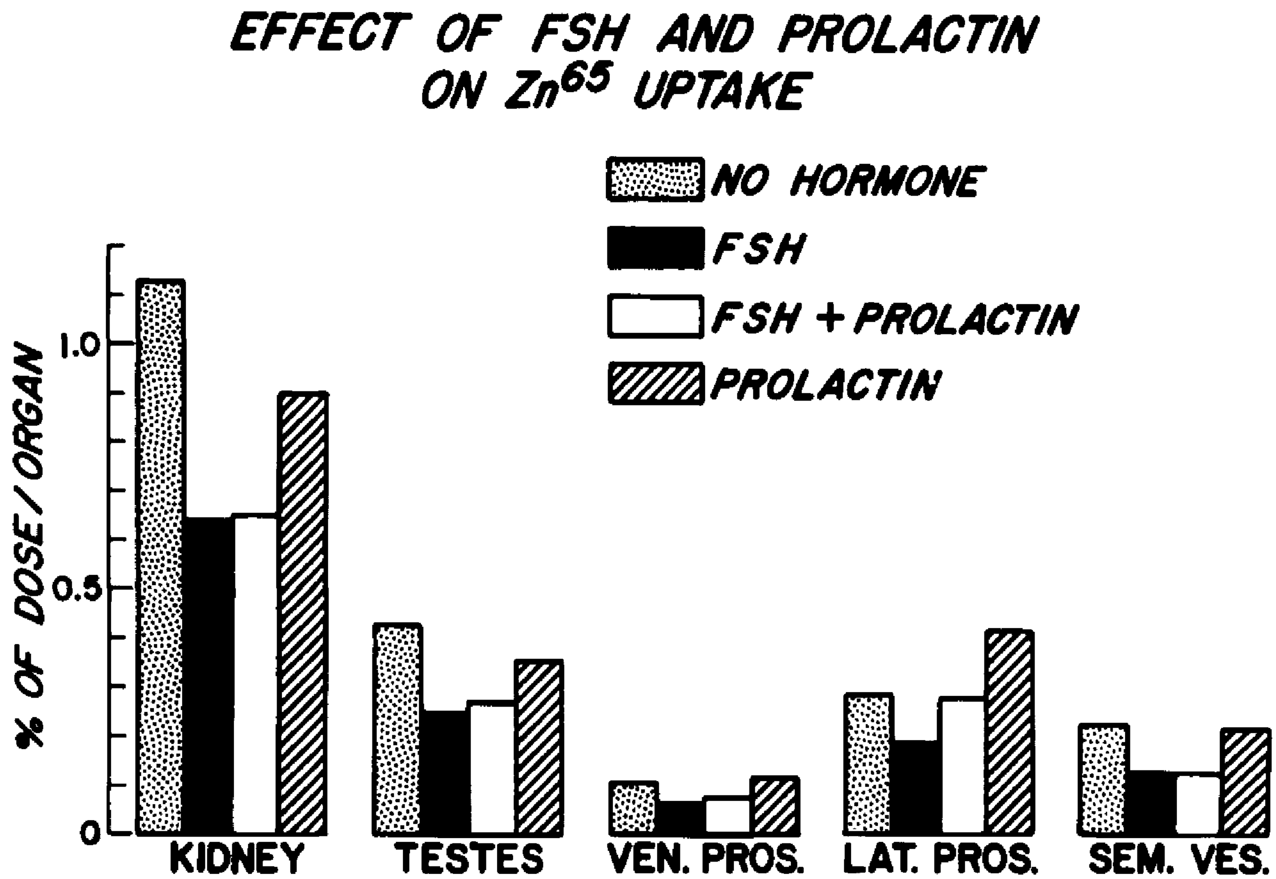
H. SUMMARY OF THE EFFECT OF SURGERY AND THYMECTOMY ON THE Zn^{65} RESPONSE TO THE GONADOTROPHINS

Surgery seemed to have an effect on the Zn^{65} response to the gonadotrophins in some of the hormonal states, while the presence or absence of the thymus gland seemed to modify the response to other hormonal conditions. This is consistent with the results found in the organ weight studies (Table XXXII).

a Effect of Surgery

In the animals that did not receive any hormone, surgery increased the Zn^{65} uptake per gram in the ventral prostate gland, seminal vesicles, prepuptial gland, kidneys and adrenal glands and decreased the Zn^{65} uptake in the dorsal prostate, lateral prostate and coagulating glands and the skeletal muscle, when

Figure 8



STANDARD ERRORS OF THE MEANS
(all values are ±)

Organ	No Hormone	FSH	FSH + Prol.	Prolactin
Kidney	.0347	.0284	.0205	.0533
Testes	.0192	.0149	.0045	.0169
Ven. Pros.	.0081	.0070	.0059	.0089
Lat. Pros.	.0226	.0246	.0255	.0404
Sem. Ves.	.0196	.0150	.0118	.0249

compared with the Zn^{65} uptake in the unoperated animals. The same general relationship between operated and unoperated animals was maintained after HCG administration. The most significant effect of HCG was the increase of Zn^{65} uptake in the lateral prostate gland; surgery reduced this effect.

When prolactin is administered, in those tissues in which Zn^{65} uptake per gram is in the same direction for the thymectomized and sham operated animals, the animals undergoing surgery seem to have a Zn^{65} uptake equal to or greater than those of unoperated animals receiving prolactin. Prolactin seems to overcome the effects of surgery, because, in those tissues which are reduced by surgery in the no hormone controls (dorsal and lateral prostate and coagulating glands) prolactin brings the Zn^{65} concentration up to or beyond those of the unoperated animals.

This surgery enhanced prolactin effect on Zn^{65} uptake in the lateral prostate is also seen in the FSH plus prolactin studies, where the Zn^{65} uptake per gram in the operated animals is up to the no hormone controls, while in the unoperated animals, it is like FSH alone. Note, also, that the Zn^{65} concentration in the dorsal and ventral prostate glands, adrenal glands and skeletal muscle is higher in the operated animals than in the unoperated.

b. Effect of Thymectomy (Table XXXIII)

Thymectomy seems to have an effect on the Zn^{65} uptake response to FSH and LH. When FSH is administered, Zn^{65} uptake is lower in thymectomized animals than in those that have retained their thymus glands for all tissues except the coagulating gland. This results from the greater reduction in Zn^{65} uptake below no hormone values in thymectomized animals. When LH is administered the Zn^{65} uptake per gram for thymectomized animals is less than for animals that have retained their thymus glands for all organs except the coagulating glands. The effect of LH in raising the Zn^{65} uptake in the lateral prostate gland is much greater in animals with intact thymus glands.

Table XL shows the effect of thymectomy and sham thymectomy on Zn^{65} uptake within each hormonal group. Most of the difference between surgical states in the Zn^{65} uptake per organ data are due to weight differences. However, the effect of thymectomy on the response to FSH is seen in both the Zn^{65} per gram and per organ data. There are several organs in which the thymectomized animals have a significantly lower Zn^{65} uptake than either the sham operated or unoperated rats.

DISCUSSION

The data of the FSH treated animals present some of the most important findings of these experiments. The function of FSH in male animals has been established as one of controlling the integrity of the germinal epithelium and the early stages of spermatogenesis. FSH thus far has not been implicated in the growth, development and functioning of the accessory reproductive structures in the male. In previously reported studies, FSH was found to have no effect on the Zn^{65} uptake of the dorsolateral prostate gland of mature, hypophysectomized rats, but it did increase the Zn^{65} uptake in the testes of these same animals (37).

The experiments described here show that, in the intact animal, FSH causes a significant decrease in zinc uptake in the lateral prostate gland as well as in all other tissues studied including the testes. It is possible that this effect of FSH is dependent upon intact and functioning testes.

Recently, there have been suggestions in the literature that FSH promotes secretion from the Sertoli cells of the testes and that at least one component of this secretion is estrogen (50). There are varying reports in the literature about the effect of estrogen on Zn^{65} uptake. Kar et al found that estrogen administered to 12 week old rats caused a one-third decrease in Zn^{65} uptake in the dorsolateral prostate gland (26). Mackenzie et al found that zinc was reduced in the canine prostate by the administration of estrogen (51). On the other hand, Gunn and Gould reported that in castrated and in immature animals, estrogen acted like androgen in raising zinc levels, while in 16 week old, hypophysectomized animals, estrogen had no effect on Zn^{65} uptake in the dorsolateral prostate gland (34). It seems as if estrogen reduces zinc uptake only when a functioning testes is present. In those studies where estrogen caused a decrease in Zn^{65} uptake in the prostate gland, there was concomitant organ weight reduction. However, the data reported here do not show any significant weight reduction in the lateral prostate gland as a result of FSH administration. Thus, although increased secretion of estrogen may play a role in the FSH effect on Zn^{65} uptake, there seems to be also an independent action of FSH itself in reducing zinc uptake.

In contrast to FSH, LH has been assigned a major role in the control of the accessory reproductive structures, because it is believed to exert its action by stimulating the Leydig cells of the testes to produce and secrete testosterone (53). In hypophysectomized rats, Gunn and Gould have shown that LH brings the Zn^{65} levels in the dorsolateral prostate up to those of intact animals (52). Since, in castrated rats, Zn^{65} levels are depressed in the dorso - lateral prostate and can be brought up to normal levels by testosterone administration, it has been suggested that LH exerts its action on Zn^{65} uptake in the prostate by promoting the secretion of testoterone (34). in the studies reported here, LH did increase Zn^{65} uptake in all accessory reproductive structures, but the increase is not statistically significant. However, it also had the effect of significantly decreasing the weight of most of the accessory reporductive structures. Since the weight of these structures is supposed to be testosterone dependent, it is difficult to explain the reported effects of LH on the classical basis of stimulation of the Leydig cells (54). It would appear that LH may exert effects other than those of promotion of testosterone secretion. Since LH acts to increase zinc uptake and FSH to reduce it, these two hormones might act as antagonists in maintaining physiological levels of zinc.

HCG (human chorionic gonadotrophin) has been reported to exert predominately LH-like effects with some FSH-like properties (43). These data show that HCG causes a significant increase in weight of all accessory reproductive structures except the preputial gland and a significant increase in Zn^{65} uptake per gram in many of the organs, both reproductive and non-reproductive. The zinc uptake increase in the lateral prostate gland is greater than can be accounted for by the weight increase. FSH alone, LH alone or the combination of FSH and LH failed to yield results which were similar to those obtained by HCG. It has been reported that some target tissues respond differently to HCG than to LH (42). In these studies the Zn^{65} increase was much greater with HCG; moreover, LH caused a weight decrease rather than an increase. HCG is chemically different than LH and does not appear to be subject to the same feedback mechanisms (43). Another consideration is that the actions' of FSH and LH seem to be regulated to some extent by the thymus gland while the thymus plays no role in influencing HCG activity.

Prolactin has been reported to have no effect on Zn^{65} uptake in the dorsolateral prostate gland when it is administered alone to hypophysectomized or castrated rats. When it is administered with LH in the former and with testosterone in the latter, it synergizes with these hormones (39). These authors failed to consider the fact that the surgical procedures, rather than the hormonal changes alone, may have been an important factor in the response.

The studies reported here show that prolactin does not cause an increase in Zn^{65} uptake in the lateral prostate gland in the unoperated animals, but a significant increase occurs in operated rats. It seems as if the expression of the action of prolactin demonstrated here is dependent on surgical stress and prolactin overcomes some effects of this stress. In the animals that did not receive any hormone, surgery alone (thymectomy or sham thymectomy) reduced the Zn^{65} levels in the lateral prostate gland below those of the unoperated, no hormone animals. Prolactin increased Zn^{65} uptake in the lateral prostate gland in both thymectomized and sham thymectomized rats above that observed for the no hormone unoperated animals. In some of the other accessory organs, prolactin raised the zinc uptake in the operated animals to the level of the unoperated. It has been reported in female rats that stress can enhance prolactin secretion and action (55). When prolactin is administered in combination with FSH to the operated animals, it appears to counteract the reduction in Zn^{65} uptake resulting from the administration of FSH alone. Thus, it appears that prolactin exerts little direct effect on Zn^{65} uptake of unstressed rats but is effective in counteracting the reduction observed in stressed rats.

It is interesting to note that even though two weeks elapsed between the time of surgery and the beginning of hormone administration, and four weeks before Zn^{65} was administered and autopsy performed, there still seems to be a stress effect induced by surgery on both Zn^{65} uptake and organ weight. Sininsky and Martin observed that corticosterone levels remained elevated for a long time after surgery. (unpublished observations.) A decrease in weight of the accessory reproductive structures and a decrease in Zn^{65} uptake in the dorsal and lateral prostate and coagulating glands, follows surgery alone in animals receiving no hormones. Another example of the influence of the effects of surgery on the response to hormones may be seen in the data obtained on rats treated with HCG. Operated (thymectomized and sham thymectomized) rats treated with HCG display greater increases in weights of some of the reproductive structures and smaller increases in Zn^{65} uptake than do unoperated, HCG treated rats. Since previous work has been done on hypophysectomized and castrated animals, the effect of surgical stress should not be overlooked in evaluating the results.

The thymus gland modifies the response to FSH and to LH. This is apparent from both organ weight and Zn^{65} data. The ventral prostate gland weights of the FSH treated thymectomized rats were significantly heavier than those of FSH treated sham thymectomized rats, and higher than those of the FSH treated unoperated animals. In fact, all the organs except the dorsal prostate and and prepuptial glands and the testes were heavier in the FSH treated thymectomized than in FSH treated animals with intact thymus glands. In thymectomized rats, weights of all structures except the pre-putial glands were increased by FSH. By contrast, FSH tended to reduce the weight of the organs in the unoperated animals. In the Zn^{65} studies, where the effect of FSH is to reduce zinc uptake, removal of the thymus gland seems to facilitate this response by causing a greater reduction in Zn^{65} uptake in the tissues.

Martin found that the ventral prostate glands and seminal vesicles of thymectomized animals were significantly heavier than those of sham thymectomized animals and as high as or higher than those of unoperated controls, when surgery was performed at six weeks and autopsy at nine weeks. (46). In the present study, where the animals were autopsied at 10 weeks, the uninjected animals did not show the thymectomy effect but the animals receiving FSH did. In animals receiving no hormones, sham thymectomy did reduce the weight of the ventral prostate gland significantly below the unoperated values, but thymectomy did not raise the weight much above that of the sham operated rats. Martin's results and the data reported here both suggest that the thymectomy dependent increase in weight of secondary reproductive structures requires a sufficient level of FSH. It is likely that the animals in the Martin study, since they were one week younger at autopsy, had higher FSH levels than the animals reported in this study and therefore, in these experiments, it was necessary to add FSH to demonstrate the thymectomy effect.

The effect of LH is different from that of FSH, in that it tends to decrease organ weight and increase Zn^{65} uptake. In this case the thymus gland is necessary for the action of LH, because thymectomy results in higher organ weights and lower zinc uptake. It seems probable that the normal growth and zinc content of the accessory reproductive structures is maintained by a balance between FSH and LH, with the thymus gland acting as a kind of fine control over homeostasis. Interrelationships have been shown between the thymus and the thyroid, parathyroid and adrenal glands (47, 56, 57, 58) and therefore, there is precedent for the suggestion that the thymus gland also interacts with the pituitary gland (59).

The experimental conditions of this investigation differ from those of previously reported studies in several respects. Long Evans hooded rats were used, while other workers reported on Sprague Dawley or Wistar rats (26,34,35). The rats in these experiments had intact pituitary glands and testes; by contrast, those described in many of the published studies were hypophysectomized and/or castrated (34, 36). The animals in the earlier studies were either very young (3 weeks) or fully mature (16 weeks) while this study was conducted on animals that were in the period of rapid maturation (8 to 10 weeks) (26, 35). In hooded, intact, 8 to 10 week old animals, some of the conclusions of the other experimenters are confirmed: namely, that the lateral prostate gland is the organ of highest Zn^{65} uptake per gram of tissue, and that this uptake is under hormonal control (24,25,26,27,34). The only other organ that has been reported to have its zinc uptake under hormonal control is the testis (39). The data described here indicate that changing levels of gonadotrophins can affect the zinc uptake in all the reproductive structures as well as in some non-reproductive structures.

In considering the effect of the gonadotrophins on Zn^{65} uptake, the question arises as to whether the action of the hormones is one of changing the amount of Zn^{65} available to the tissues, that is the pool size, or whether the hormones act on the tissues themselves to modify their ability to take up Zn^{65} from the same sized pool. Investigation of this problem presents many difficulties not encountered in similar studies using ions such as Na, K or Ca.

To assay the total body pool, total body counts, blood levels and excretions could be determined. With the equipment we had available, total body counts could not be performed. Although this should be done in the future, it will give only the amount of Zn^{65} remaining in the animal (the total body pool) and not necessarily the quantity available to the tissues (7). The 24 hour urinary excretion is minimal (.2%) and it has been reported that there is no consistent relationship between urinary excretion of Zn^{65} and plasma or kidney levels of the isotope (60,61). In addition, in vitro studies have shown that the Zn^{65} is tightly bound to the plasma proteins and is not readily diffusible (7, 62). Therefore, plasma levels and urinary excretion determinations will not measure the Zn^{65} available to the tissues.

The main pathway of excretion of zinc is through the intestinal tract (4,7,9). Fecal excretion has been shown to be independent of the level of Zn^{65} in the plasma, and probably results from sloughing off of intestinal mucosal cells containing high quantities of Zn^{65} (14,61). In 24 hours, about 10% of the injected dose of Zn^{65} is excreted in the feces of rats. There is no precedent for assuming that gonadotrophins might act on the intestinal mucosa to affect the fecal excretion of Zn^{65}. However, it might be of interest to perform metabolic balance studies of isotopic and stable zinc, since there is a report that in certain disease states in man, estrogen therapy may increase zinc absorption through the gut. (63).

Evidence presented in the literature seems to indicate that the tissue uptake of Zn^{65} takes place fairly quickly, with most tissues reaching a maximum concentration in less than 24 hours and showing slow turnover rates. Skeletal muscle has a Zn^{65} half life of 40 days. (60). The Zn^{65} uptake in the dorsolateral prostate is close to maximum at 24 hours, rises a little to a high point in 5 days and then decreases slowly with a half-life of 28 days. (27,60). In 24 hours, the Zn^{65} blood level is 1/10 that found in the dorsolateral prostate (60). The Zn^{65} blood level continues to decrease at a faster rate than the turnover in the DLP, resulting in an increase in the ratio of Zn^{65} in the DLP to Zn^{65} in the blood between 20 and 30 days after Zn^{65} administration (60). Therefore, the turnover of zinc is very slow in the DLP and the amount of zinc taken up by the tissue is probably determined by the number of zinc binding sites in the lateral prostate gland. It seems most probable that the action of the hormones is on tissue structure: the more mature the gland, the higher the zinc concentration. It has been reported that the Zn^{65} uptake in the DLP is three times as high in animals 12 weeks of age than in those of six weeks (33). The same effect is seen in studies of stable zinc content of the DLP. (64). Therefore, in subsequent studies the histology of the lateral prostate gland as well as that of the other reproductive structures, should be examined in the animals under hormone treatment.

Since there are changing levels of gonadotrophins during the lifetime of an organism, further studies along the lines of the experiments described in this paper might help define factors controlling growth and development of the accessory reproductive structures. Such studies might also help explain the changes that occur in older animals when steroid levels are low and gonadotrophin levels are increased. Hypertrophy of the prostate gland is accompanied by increased zinc content, while carcinoma of the prostate is associated with a decrease in zinc (65). Both diseases occur at the age when gonadotrophin levels are increased in response to declining androgen levels. Further studies of varying amounts of FSH and LH, alone and in combination, administered to animals of different ages, might help to answer some of these questions.

APPENDIX I

DATA TABLES

TABLE Ia

HORMONE - None SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
1	126	240	213	94	127	548	61	2410	149	1675		24	529	350
2	132	234	135	43	137	314	45	2513	74	1645		30	1043	452
3	142	260	163	109	94	458	48	3151	104	2005		37	1019	592
4	142	249	154	81	110	563	66	2321	112	1643		39	572	291
5	142	245	157	49	126	614	83	2413	84	1620		22	293	196
6	135	244	181	41	104	478	41	2370	137	1713		24	658	369
7	120	215	147	26	132	397	39	1851	89	1504		26	212	125
Mean	134.1	241.0	164.3	63.3	118.6	481.7	54.7	2432.7	107.0	1686.4		28.9		
SE ±	3.30	5.29	9.72	11.80	6.05	39.15	6.06	144.59	10.51	58.48		2.55		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE IIa

HORMONE - None   SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
8	139	246	178	97	69	498	30	2436	234	1742	464	40	720	---
9	140	260	170	68	124	440	65	2787	200	1911	401	39	923	328
10	150	243	119	46	131	438	15	2618	61	1800	341	41	---	370
11	148	256	134	143	122	343	61	2483	79	1928	287	36	1158	479
12	155	271	177	42	143	440	70	2677	161	2065	274	40	848	347
13	129	208	99	45	102	236	36	2014	126	1523	275	29	306	344
14	126	213	97	33	84	339	45	2179	97	1698	332	31	425	262
15	128	235	165	90	103	630	72	2631	160	1492	263	27	431	273
16	125	220	157	54	76	635	54	2097	138	1329	241	25	421	290
17	122	228	189	68	98	481	73	2025	71	1548	246	25	554	314
Mean	136.2	238.0	148.5	68.6	105.2	448.0	53.6	2394.7	132.7	1703.6	312.4	33.3		
SE ±	3.74	6.62	10.70	10.57	7.75	39.40	5.44	92.23	18.11	72.78	22.97	2.08		

1 Weight of both organs.   2 Weight of an aliquot.

TABLE IIIa

HORMONE - None SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
18	135	283	226	75	176	595	100	2366	139	2097	627	51	632	416
19	137	243	182	104	135	529	66	2085	101	1891	371	39	772	391
20	144	257	181	83	140	528	60	2619	89	1883	486	36	537	390
21	142	254	242	101	129	634	68	2490	127	2010	342	42	1032	411
22	126	242	269	95	180	529	64	1966	108	1721	427	32	897	272
23	132	228	119	62	107	397	48	1067	156	1770	389	40	428	144
24	135	304	188	62	122	444	36	2218	51	2027	406	38	573	325
25	126	265	258	83	139	671	82	2184	162	1972	385	39	588	493
26	122	228	189	65	125	548	36	1994	74	1629	265	30	541	316
Mean	133.2	256.0	206.0	81.1	139.2	541.7	62.2	2109.9	111.9	1888.9	410.9	38.5		
SE ±	2.49	8.38	15.70	5.46	8.06	28.65	6.92	149.48	12.48	51.89	33.62	2.01		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE IVa

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
27	150	253	469	88	268	1498	146	2906	217	2548		33	772	302
28	140	234	441	93	98	1646	108	2676	323	2054		38	701	478
29	135	256	338	72	106	1010	105	1496	230	2081		47	490	338
30	130	221	485	112	155	1174	141	2362	204	1593		30	510	247
31	120	220	250	124	182	1130	62	1799	151	1901		26	667	369
32	138	238	356	148	242	1243	132	2630	81	2035		41	686	404
33	122	180	397	230	49	1213	95	2194	187	1434		27	491	426
34	124	203	317	157	181	1229	127	2130	175	1760		32	545	214
35	121	203	277	83	206	1016	81	1905	98	1639		34	537	286
36	118	208	172	68	115	503	73	692	195	1664		32	592	453
Mean	129.8	221.6	350.2	117.5	160.2	1166.2	107.0	2079.0	143.8	1870.9		34.0		
SE	3.36	7.61	31.83	15.78	21.75	96.64	9.25	205.82	21.65	102.25		2.03		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE Va

HORMONE - Human Chorionic Gonadotrophin **SURGICAL STATE** - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
37	155	247	443	100	153	1220	142	2470	311	1932	455	42	777	613
38	151	252	303	202	289	1736	109	2614	301	2252	194	41	778	355
39	150	248	524	199	269	1620	216	2418	241	2132	243	23	696	358
40	148	266	591	90	120	1826	122	1990	240	2058	290	31	695	510
41	130	256	368	107	247	1062	150	1923	158	2403	240	37	629	429
42	118	196	485	65	358	1182	181	1589	132	1534	118	19	559	337
43	127	232	267	150	234	693	110	2505	235	1979	258	24	384	324
44	125	204	190	90	250	863	117	1420	161	1572	111	26	501	292
45	123	220	440	119	223	1117	150	2061	153	1811	87	25	351	418
Mean	136.3	235.7	401.2	124.1	238.1	1257.7	144.1	2110.0	214.7	1963.7	221.8	29.8		
SE	4.80	8.09	43.26	16.36	23.45	130.33	11.92	141.12	22.11	96.89	37.84	2.79		

1 Weight of both organs. 2 Weight for an aliquot.

TABLE VIa

HORMONE - Human Chorionic Gonadotrophin **SURGICAL STATE** - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
46	144	260	404	107	199	1226	122	2342	162	1931	238	39	606	156
47	142	254	456	128	212	805	103	1973	170	2144	313	30	513	219
48	150	233	270	108	264	1022	204	1902	184	1714	251	27	668	190
49	138	190	395	98	231	1109	104	2055	91	1752	447	33	623	280
50	136	259	466	185	160	1023	86	2230	151	2063	314	39	951	400
51	127	221	391	108	227	1518	107	2259	153	1877	142	32	379	237
52	122	248	373	111	200	1178	145	2296	119	2030	201	30	731	451
53	123	238	198	75	101	698	75	1394	186	1559	120	27	403	394
54	124	220	393	127	220	1005	91	1923	92	1586	159	29	550	409
55	149	242	354	68	126	1179	144	2484	130	1855	279	34	798	253
Mean	135.5	236.5	370.0	111.5	194.0	1076.3	118.1	2085.8	143.8	1851.1	246.4	32.0		
SE ±	3.43	6.84	25.65	10.20	15.93	72.04	12.00	98.42	10.97	62.71	31.09	1.37		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE VIIa

HORMONE - L.H. SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
56	119	189	192	90	124	328	52	2403	112	1475		25	420	244
57	145	232	228	73	152	530	43	2238	193	1666		41	505	300
58	129	236	162	82	130	441	54	2265	173	1699		46	583	253
59	130	245	102	57	123	323	42	1974	189	1665		23	653	330
60	120	237	114	53	120	343	66	2084	94	1411		36	472	315
61	118	238	87	42	103	290	32	2278	78	1817		32	199	121
62	118	229	125	72	108	386	44	1936	128	1572		27	658	313
Mean	125.6	229.4	144.3	67.0	122.9	377.3	47.6	2168.3	138.1	1615.0		32.9		
SE	3.77	7.00	19.50	6.43	6.03	31.48	4.10	65.49	17.7	52.56		3.24		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE VIIIa

HORMONE - L.H. SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
63	150	260	132	56	123	297	42	1714	93	1659	305	31	503	272
64	127	262	171	38	100	577	42	2113	112	2035	417	25	428	558
65	123	228	149	65	112	164	29	2377	174	1609	335	37	547	246
66	123	200	117	22	38	138	24	1882	28	1439	286	23	205	505
67	136	252	112	48	50	140	18	2234	150	1862	601	32	538	416
68	126	247	215	103	109	327	48	2559	215	1684	149	42	752	140
69	132	259	156	81	62	370	44	2513	50	2031	303	37	122	117
70	119	266	136	74	98	334	37	2438	42	1878	485	30	279	169
71	133	239	122	61	123	317	67	2046	108	1770	440	39	351	260
Mean	129.9	245.9	145.6	60.9	90.6	296.0	39.0	2208.4	104.9	1774.1	369.0	32.9		
SE	3.10	7.02	10.78	7.99	10.72	46.25	4.83	97.46	22.70	65.99	44.02	2.13		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE IXa

HORMONE - L.H. SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
72	144	250	153	97	80	252	44	2317	45	1898	360	26	895	314
73	125	222	199	63	109	288	54	1871	91	1722	353	24	740	288
74	120	210	187	56	95	213	39	1885	114	1509	315	29	517	522
75	123	244	221	51	87	343	28	2067	163	1751	397	21	272	229
76	142	255	151	64	95	349	51	2328	148	1928	453	39	498	386
77	126	256	153	57	84	385	40	2595	142	1840	362	23	202	206
78	131	264	116	81	71	221	36	2798	108	1757	407	41	535	117
79	120	240	203	78	94	596	30	2335	194	1846	548	40	278	695
80	118	192	142	38	140	267	50	2181	89	1190	247	31	492	239
81	129	262	147	37	113	329	60	2368	58	2033	378	35	176	267
Mean	127.8	239.5	167.2	62.2	96.8	324.3	43.2	2274.5	115.2	1747.4	382.0	30.9		
SE	2.84	7.59	10.49	5.99	6.24	35.18	3.32	91.90	14.84	76.26	25.36	2.36		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE Xa

HORMONE - Prolactin SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Adr.	Liver[2]	Sk. Mu.[2]
82	128	235	187	73	145	610	53	2284	207	2013	37	514	198
83	125	272	198	40	105	628	40	2623	80	1939	32	470	272
84	135	239	154	120	140	650	51	2350	37	1697	29	295	207
85	144	312	181	102	124	487	60	2561	71	1918	46	533	299
86	123	239	86	56	84	437	34	2041	113	1522	27	146	231
87	133	283	188	78	134	500	52	1459	195	1765	51	821	317
88	125	256	183	87	198	436	42	2584	77	1827	38	330	311
89	146	224	199	80	141	574	96	2402	102	1453	36	518	287
Mean	132.4	257.5	173.3	79.5	133.9	540.3	53.5	2413.0	110.3	1766.8	37.0		
SE	3.12	10.48	12.08	8.82	11.76	30.39	6.75	67.68	21.36	70.71	2.89		

1 Weight of Both Organs 2 Weight of an aliquot

TABLE XIa

HORMONE - Prolactin SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu[2]
90	135	222	174	46	67	507	46	2481	163	1465	216	26	650	324
91	139	237	170	98	152	492	58	2668	123	1570	369	34	200	205
92	141	306	201	97	132	440	64	2421	173	1897	362	36	288	144
93	125	242	122	55	92	444	35	2093	94	1735	492	21	532	361
94	138	220	208	119	130	399	48	2484	141	1619	200	32	476	398
95	117	240	200	74	149	755	56	2109	89	1413	287	33	441	350
96	110	222	146	92	120	570	82	2355	195	1646	493	25	894	---
97	133	225	148	62	147	416	43	2278	76	1430	304	49	488	535
98	154	268	243	77	165	841	59	2715	164	1890	385	51	510	241
99	119	221	141	52	84	442	29	1688	44	1559	399	24	165	131
100	150	254	126	40	107	387	55	2197	163	1695	435	31	180	210
Mean	132.8	257.5	170.8	73.8	122.3	517.5	52.3	2317.2	129.4	1629.0	358.4	33.4		
SE	4.16	7.95	11.59	7.62	9.47	45.03	4.37	88.09	14.38	50.22	29.81	2.81		

1 Weight of both organs. 2 weight of an aliquot.

TABLE XIIa

HORMONE - Prolactin **SURGICAL STATE** - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
101	136	273	128	78	130	679	50	2086	187	1671	355	38	497	239
102	144	269	152	84	202	608	66	2304	185	2022	531	37	466	321
103	122	223	110	68	94	660	76	1934	86	1285	248	21	244	287
104	134	278	196	67	125	440	54	2278	161	1898	272	43	624	252
105	140	254	136	92	136	466	76	3006	76	1755	319	35	660	157
106	150	235	183	78	111	482	52	2595	193	1718	323	43	685	222
107	112	192	86	48	109	460	79	1975	87	1513	170	23	325	155
108	119	232	175	88	101	437	44	2415	47	1519	338	34	236	203
109	116	238	184	100	235	538	51	2592	92	1947	343	40	550	204
110	112	223	137	60	90	408	43	2339	54	1585	324	28	141	172
Mean	128.5	241.7	148.7	76.3	133.3	517.8	59.0	2352.4	116.8	1691.3	322.3	34.2		
SE	4.42	8.51	11.31	4.98	15.17	31.04	4.40	102.41	18.34	71.53	29.17	2.47		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XIIIa

HORMONE - FSH SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt. (g) Init.	Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
111	126	262	167	79	151	665	73	2277	131	1758		36	465	279
112	134	231	198	58	146	460	66	2023	95	1947		35	308	304
113	139	296	226	63	137	568	78	1860	93	2150		37	395	384
Mean	133.0	263.0	197.0	66.7	144.7	564.3	72.3	2053.3	106.3	1951.7		36.0		
SE ±	3.79	18.77	17.04	6.33	4.10	59.20	3.48	121.33	12.35	133.18		.57		
138	137	228	251	66	163	556	76	2702	82	1631		54	273	309
139	140	219	265	90	204	1071	115	1998	82	1507		41	425	172
140	142	255	302	60	136	465	53	2298	110	1813		46	535	304
141	133	285	327	115	184	812	73	2730	155	2280		38	414	319
Mean	138.0	246.8	286.3	82.8	171.8	726.0	79.3	2432.0	107.3	1807.8		44.8		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XIVa

HORMONE - FSH   SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
114	122	213	137	65	131	496	61	2394	83	1433	285	40	273	326
115	132	257	135	70	87	545	85	1740	96	1902	346	32	462	392
116	130	227	67	29	65	160	17	513	107	1457	377	36	467	268
117	120	200	88	88	186	598	64	1931	88	1454	329	33	384	351
118	146	254	125	48	91	608	58	2243	162	1665	391	31	348	130
Mean	130.0	230.2	110.4	60.0	112.0	481.4	57.0	1764.2	107.2	1582.2	345.6	34.4		
SE ±	4.60	11.19	13.98	10.03	21.34	82.82	11.07	333.15	14.29	90.42	18.70	1.63		
142	129	195	235	86	162	550	73	2122	53	1642	225	39	370	268
143	138	235	234	80	195	707	60	2805	93	1705	305	43	293	352
144	132	217	235	57	140	663	72	2538	103	1458	370	33	439	357
Mean	132.8	215.5	234.4	74.3	165.5	639.4	68.3	2486.0	82.9	1600.0	300.0	38.3		

1 Weight of both organs.   2 Weight of an aliquot.

TABLE XVa

HORMONE - FSH SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt. (g) Init.	Body Wt. (g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
119	124	196	168	63	155	522	41	2701	146	1488	186	28	376	304
120	138	248	233	85	202	616	75	2551	233	1820	403	32	377	341
121	135	238	181	80	77	506	46	2470	127	1696	271	35	260	353
122	128	225	161	73	102	471	79	2215	112	1317	227	30	422	242
123	144	210	141	75	110	318	57	2321	95	1469	397	19	405	320
Mean	133.8	223.4	176.8	75.2	129.2	486.6	59.6	2451.6	142.6	1558.0	296.8	28.8		
SE ±	3.56	9.36	15.47	3.69	22.13	48.50	7.59	82.28	24.11	89.05	44.24	2.71		

1 Weight of both organs.   2 Weight of an aliquot.

TABLE XVIa

HORMONE - FSH + Prolactin SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
124	120	230	178	95	159	483	42	2272	128	1435		42	456	177
125	128	231	76	36	118	535	29	2233	119	1558		28	560	144
126	133	204	148	60	125	397	48	2172	158	1619		25	161	206
127	140	241	189	74	149	806	51	2269	73	1513		49	526	218
Mean	130.3	276.5	147.8	66.3	137.8	555.3	42.5	2236.5	119.5	1531.3		36.0		
SE ±	4.21	7.90	25.44	12.39	9.71	88.29	4.87	23.25	17.60	38.74		5.70		
145	120	209	221	110	136	662	54	2469	157	1492		33	228	276
146	128	242	261	152	113	841	87	2982	119	1623		36	446	220
Mean	124.0	225.5	241.0	131.0	124.5	751.5	70.5	2725.5	138.0	1557.5		34.5		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XVIIa

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
128	129	226	197	151	130	784	61	1681	87	1418	208	43	241	254
129	120	208	216	64	86	492	59	2310	40	1525	276	43	326	188
130	121	204	188	76	106	328	36	2426	121	1491	277	33	220	160
131	130	210	140	82	110	311	48	2261	102	1525	279	27	650	193
132	140	241	214	71	103	478	39	2603	136	1548	277	29	321	110
Mean	128.0	217.8	191.0	88.8	107.0	478.6	48.6	2256.2	97.2	1501.4	263.4	35.0		
SE ±	3.62	6.90	13.78	15.82	7.06	84.91	5.07	155.38	16.54	22.75	13.86	3.41		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XVIIa (Cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt. (g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
147	129	204	198	60	129	611	83	2055	164	1452	241	33	401	348
148	129	276	168	70	138	523	57	2550	153	1907	387	34	229	506
149	122	218	198	81	153	762	77	2588	75	1452	233	37	292	323
150	127	247	197	103	152	685	65	2449	89	1896	483	43	449	358
151	129	222	323	90	149	756	72	2880	87	1571	303	35	511	228
Mean	127.2	233.4	216.8	101.0	144.2	667.4	70.8	2344.4	113.6	1655.6	329.4	36.4		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XVIIIa

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
133	138	261	134	107	132	556	67	2787	93	1872	363	18	304	198
134	122	218	208	62	80	731	39	2120	43	1420	292	30	190	235
135	130	186	124	47	145	375	33	2033	67	1247	275	24	602	329
136	136	263	162	79	145	748	31	2493	140	2007	374	42	310	533
137	142	240	160	49	145	482	62	2267	146	2029	290	31	480	---
Mean	133.6	233.6	157.6	68.8	129.4	578.4	52.6	2340.0	97.8	1715.0	318.8	29.0		
SE ±	3.49	14.43	14.58	11.13	12.60	71.84	6.90	136.23	20.10	160.40	20.58	4.00		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XVIIIa (Cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	-Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
152	133	250	260	135	146	906	96	2851	246	2098	351	40	462	256
153	125	224	203	112	129	673	103	2538	175	1648	240	43	367	323
154	127	230	131	82	156	468	41	2538	92	1746	253	45	464	274
155	117	235	207	129	124	848	63	3075	106	1897	345	41	364	203
156	125	280	277	83	174	778	79	3083	116	2306	375	45	493	347
Mean	125.4	243.8	215.6	108.2	145.8	734.6	80.4	2817.0	147.0	1939.0	312.8	42.8		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XIXa

HORMONE - FSH (double dose)

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
Thymectomy														
157	127	226	192	77	154	699	70	2036	106	1655		71	425	405
158	128	240	226	52	112	703	64	2835	78	1691		41	450	415
Sham Thymectomy														
159	139	267	205	100	107	797	91	2400	100	2215	361	46	380	426
160	131	232	200	80	78	642	93	2456	137	1852	403	52	361	368
Unoperated														
161	126	261	260	81	200	750	77	2330	70	2035	320	43	403	425
162	125	244	199	52	92	436	109	2826	100	1654	337	46	229	249
163	126	254	154	55	132	510	41	2346	88	2040	377	48	562	298
164	124	271	210	74	165	770	60	2741	77	2171	340	29	193	279

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE XXa

HORMONE - FSH + LH SURGICAL STATE - Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
165	135	249	231	98	107	640	61	2561	143	1932		37	232	570
166	134	195	97	96	78	230	39	2174	87	1621		31	306	327
167	125	212	148	73	150	401	66	2341	83	1676		40	637	230
168	124	204	200	63	112	551	57	1846	66	1566		39	827	246
169	144	244	232	64	115	391	64	2128	69	1657		29	316	256
Mean	132.4	220.8	181.6	78.8	112.4	442.6	57.4	2210.0	89.6	1690.4		35.2		

1 Weight of both organs. 2 Weight of an aliquot.

TABLE XXIa

HORMONE - FSH + LH   SURGICAL STATE - Sham Thymectomy

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g) Init.	Body Wt.(g) Final	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
170	133	216	142	70	104	330	46	3136	220	1573	435	33	599	363
171	122	221	159	90	150	374	42	2206	74	1672	360	33	324	389
172	124	221	124	69	107	303	29	2412	72	1627	443	45	785	287
173	122	208	194	78	135	535	52	2373	159	1674	289	53	921	357
Mean	125.3	216.5	154.7	76.8	124.0	385.5	42.3	2531.8	131.3	1636.5	381.8	41.0		

1 Weight of both organs.   2 Weight of an aliquot.

TABLE XXIIa

HORMONE - FSH + LH   SURGICAL STATE - Unoperated

Organ or Tissue Weights (mg)

Rat #	Body Wt.(g)		V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testes[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk.Mu.[2]
	Init.	Final												
174	130	215	159	72	76	227	53	1867	105	1414	313	34	564	199
175	122	245	188	74	80	375	92	2129	131	1769	295	44	159	386
176	127	233	131	89	105	286	38	910	123	1625	457	35	868	183
177	121	225	156	45	62	221	16	1615	113	1619	323	41	364	216
Mean	125.0	165.6	158.5	70.0	80.8	277.3	49.8	1630.3	118.0	1606.8	347.0	38.5		

1 Weight of both organs.   2 Weight of an aliquot.

TABLE Ib

HORMONE - None SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
1	3099	2693	10637	3633	580	10217	1108	27799		684	18341	1294
2	3574	3214	11277	8372	973	15397	1041	34745		1092	65208	2751
3	3220	8699	9925	8663	1231	14987	1957	41699		1042	46793	2866
4	1397	1764	3361	2783	437	6355	968	18756		655	13470	779
5	1854	1383	6722	11049	1391	9054	975	23834		509	8827	836
6	3049	967	4808	3871	777	8975	1625	25461		581	23672	1457
7	1589	655	5362	3954	526	---	2794	21202		717	7071	495

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE IIb

HORMONE - None **SURGICAL STATE** - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
8	7060	6498	8115	8341	792	20365	3057	53591	11441	1482	51944	---
9	2914	2570	7741	11504	901	13638	1625	35393	8138	906	37509	1822
10	2243	1418	5915	4788	309	12052	857	39807	6534	922	42344	1957
11	2244	8805	6477	4415	804	9607	1360	26758	4082	638	38477	1703
12	1788	1556	13920	3379	736	12405	1109	32186	4083	819	29315	1272
13	1480	1489	2279	4726	574	8441	914	27422	5192	795	15161	950
14	1287	1326	3545	2705	411	2690	825	22985	4639	553	10515	1387
15	3263	2551	7534	4850	625	11006	1157	23432	4567	972	14080	1023
16	2767	2388	7480	4782	750	10873	1752	26741	4827	785	16136	1371
17	3124	2451	8205	8509	1433	8481	772	24237	4737	629	19834	1109

TABLE IIIb

HORMONE - None SURGICAL STATE - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
18	4441	2964	17138	5515	1625	12512	1667	33838	10380	906	24362	2547
19	3197	7286	18553	7833	1309	12252	1124	32793	7353	760	29650	1839
20	2928	3084	13424	5149	1165	11717	884	31937	7213	765	23658	1980
21	5061	8218	14159	7712	1636	13954	1824	45321	8393	1022	50194	2728
22	5508	4801	17895	7319	995	13029	1366	28907	7505	933	36646	1677
23	1710	1032	4829	5510	591	8725	1463	20845	5584	704	12250	539
24	---	1553	5436	3497	535	8581	740	25861	5957	---	18330	1086
25	2244	2272	6356	5906	732	8677	1369	20355	5348	867	15679	1714
26	3679	1776	9301	5054	872	8646	964	24781	4840	623	19319	1246

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE IVb

HORMONE - Human Chorionic Gonadotrophin   SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
27	7871	3220	31237	9910	2300	11647	3491	37532		787	31479	1444
28	11194	7359	11305	56039	3501	17883	6096	51924		1292	51907	2745
29	7307	3742	8261	12348	1778	9218	4079	44521		1210	25600	1763
30	8741	7536	30636	9308	2622	12696	3401	34025		798	29536	1041
31	5450	6431	30207	9056	1337	8841	1976	25660		757	21817	1511
32	8700	8242	29739	5919	2586	14383	2997	21011		1026	18609	1880
33	12258	3652	36314	13842	---	15151	1226	29403		767	24151	2212
34	6441	907	17230	15014	1727	9771	2148	25483		720	21037	710
35	5775	4260	15932	17669	1409	9200	1067	25736		648	18893	929
36	2694	1506	4879	5744	991	7003	2152	25421		772	25304	584

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE Vb

HORMONE - Human Chorionic Gonadotrophin   SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
37	7644	6908	30549	15933	2986	15604	4899	56339	7963	719	51453	3292
38	6778	12272	40435	26586	1800	15941	4115	49348	4899	1403	41996	2019
39	8035	20258	78941	10338	3351	13618	3924	42121	4253	670	35023	1791
40	10660	3620	16320	12781	785	13430	4856	53466	8039	1240	48040	2678
41	5991	5155	29775	5975	2954	11244	2350	37965	4909	1218	27876	1578
42	7402	4453	35876	9676	3793	9408	2365	29462	3223	510	27222	1848
43	6767	9140	24556	12192	2490	15778	4431	39045	3285	717	17883	1466
44	3920	6315	22174	8287	1344	10596	2270	30807	2632	770	21670	1426
45	2621	2049	26166	4799	3476	12384	---	24684	1757	513	12241	1883

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE VIb

HORMONE - Human Chorionic Gonadotrophin **SURGICAL STATE** - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
46	8359	5518	41351	9978	2019	10735	2346	39026	5205	726	27254	875
47	6305	4798	35812	6891	1715	9127	2433	48371	5735	735	18890	1145
48	10811	9402	39238	7527	3664	12879	2086	38102	5128	868	28433	1182
49	5831	4168	26487	11630	1571	15337	1707	56192	10758	1364	55860	1834
50	10118	11260	43614	12729	2141	15316	2789	42845	8139	891	49082	2199
51	6550	6216	30735	17056	2413	13077	2598	30679	3283	1020	21714	1154
52	4190	4133	29648	4193	3132	9628	1289	28382	3977	777	25547	1496
53	7140	9143	33002	10652	3206	10158	2321	30741	3564	1238	19214	2016
54	4532	5206	21191	9838	1010	8632	1229	21581	2864	759	21507	1402
55	5362	3596	15150	9532	2496	11431	2080	27860	4968	635	30318	987

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE VIIb

HORMONE - L.H. SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
56	4390	3071	23516	1222	6507	11058	1781	32436		741	23512	956
57	3755	1645	13364	3794	731	10151	1709	22916		704	18214	1104
58	1901	2039	4658	4274	804	8970	716	22903		530	15575	894
59	1439	1637	4307	2912	405	7032	1341	20413		503	22427	921
60	2077	896	3685	3455	438	7128	1043	15799		683	12301	1289
61	851	967	5448	1991	307	3707	333	16463		421	4672	318
62	2174	1660	2748	5495	517	8735	1274	19157		570	25524	1138

TABLE VIIIb

HORMONE - L.H.   SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
63	2820	1785	10018	3196	526	11552	1527	24437	5751	564	16517	1025
64	3223	1612	17590	3752	720	7544	1459	28826	6470	538	12741	1922
65	2279	2263	9454	2428	474	10727	1345	23968	6557	797	18469	1043
66	2256	918	6198	2586	862	8422	518	19140	5362	572	8737	2117
67	1223	1219	3277	1315	231	6284	1327	20268	7107	482	15672	1187
68	2263	3583	4536	3504	600	8330	541	27644	2181	747	27232	634
69	1704	1738	3062	2526	448	6349	428	19568	3028	425	2899	300
70	916	1231	3001	1613	293	4830	237	15341	3697	334	6926	325
71	1803	1719	6637	2656	715	6142	1063	20452	5038	581	10653	1579

TABLE IXb

HORMONE - L.H. SURGICAL STATE - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
72	2185	3517	5283	3040	553	9325	559	25982	6511	686	26802	1359
73	4809	3227	13912	5035	896	9428	1562	25819	6640	787	27985	1222
74	2861	1554	8270	2698	615	8974	1036	28872	7440	600	21762	1934
75	1764	910	5334	2420	487	7078	2026	21037	6153	328	8902	628
76	2082	2254	6221	2593	784	7169	1845	20826	6262	558	13237	1134
77	2632	2095	9679	4404	539	8912	1579	23482	4536	377	5165	712
78	1161	1615	9679	1338	292	7964	894	21151	4704	455	17013	325
79	2586	1129	2581	2081	266	5362	819	16434	5253	430	5705	1418
80	3491	1453	5517	6667	1130	10814	---	22823	4308	971	10962	1175
81	4510	1309	6042	6840	972	7212	461	22616	4494	496	4712	1815

1 Value for one testis and one kidney 2 Value for an aliquot.

TABLE Xb

HORMONE - Prolactin SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
82	2407	2085	12699	3599	764	7197	1423	26562		789	16943	775
83	2067	2591	11127	4525	694	10807	1004	26588		655	15062	1019
84	3113	3752	11310	4460	1243	9333	507	23536		617	11587	715
85	2586	2799	6432	3771	414	5787	361	16617		442	9025	615
86	998	1330	3027	3382	318	6407	955	17565		565	4191	668
87	2525	1650	22984	2581	864	8585	1626	25921		686	36177	736
88	2224	1478	15391	3117	4695	8494	---	26496		576	12005	1094
89	3594	2864	7544	6123	698	7521	855	14706		538	14329	685

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIb

HORMONE - Prolactin   SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
90	3080	4440	19160	5096	1698	10864	1625	4508	4114	616	24641	1904
91	1731	3077	8959	3518	603	7360	570	18467	4528	523	5400	577
92	2856	3065	7529	7747	1028	8014	1425	21864	4517	691	9064	583
93	2372	1686	8778	7431	653	8559	1404	22265	7636	468	19410	1385
94	4983	3033	30571	3886	801	10665	1415	31796	4274	727	23977	1658
95	4315	2631	7393	14604	943	10251	1157	20529	4699	874	17942	1534
96	1936	3171	6594	4007	1128	5769	836	15433	6268	379	21157	---
97	2279	1298	4484	3180	2833	6913	433	16630	3440	661	12785	1223
98	5088	2861	11521	6051	696	8115	1440	24707	5482	824	17132	697
99	2621	2292	5538	4360	480	7834	445	24743	6793	631	6164	512
100	2697	1843	8434	4178	588	9745	929	28982	7342	680	7474	730

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE XIIb

HORMONE - Prolactin **SURGICAL STATE** - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
101	1969	2466	9254	4281	689	6237	1003	18398	3941	463	12755	519
102	1996	2328	16177	8871	1229	7786	1714	12612	6889	612	13497	1927
103	1863	2917	5627	6524	805	7719	905	18187	3513	607	7896	1229
104	3773	2175	14473	8038	1104	9422	1233	28161	4169	414	17664	844
105	2469	2731	6825	4150	---	7865	548	21445	3848	455	21281	407
106	3168	2653	8778	3277	650	7738	1059	15746	3814	661	17933	494
107	2689	1928	6364	4392	933	10322	836	30320	3797	503	12958	673
108	2244	2087	4862	2762	374	7066	397	18000	3875	518	6203	542
109	2615	3365	12605	4060	555	9252	647	27678	5605	674	16762	686
110	1256	2073	4492	3033	323	6101	497	15037	3646	408	3567	379

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIIIb

HORMONE - FSH SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
111	1116	941	1713	3190	305	4956	685	11697		394	9152	582
112	1768	517	8099	2284	1148	5385	489	18660		347	5076	567
113	2158	1155	3539	4019	643	4488	591	16931		376	7122	760
138	5130	1767	27139	5688	1308	12345	1594	31823		1458	16849	1201
139	4134	3356	13987	8621	1525	9535	949	28782		959	19140	1436
140	3125	1210	7219	3231	658	9004	1407	30513		1179	21148	1492
141	3886	3214	11863	5299	810	8917	2709	34690		794	16949	1442

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIVb

HORMONE - FSH SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
114	951	998	3577	1915	Bkg.	6085	407	14293	2909	516	7256	858
115	2817	1457	3463	5523	906	7430	735	19309	3761	407	12665	916
116	1105	396	1735	1990	1922	3498	521	15282	4587	545	23067	660
117	1259	3229	7353	4426	848	8009	404	20750	5158	484	15053	1090
118	1446	854	6083	3277	410	6276	735	18227	4288	440	10167	338
142	1719	778	2781	3507	566	5180	962	31684	3503	1400	33969	974
143	3300	144	13331	3671	553	8885	1400	29572	4631	787	12517	1476
144	5392	2907	9217	4555	871	12734	1266	31642	8003	1096	26060	1837

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVb

HORMONE - FSH SURGICAL STATE - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
119	2045	1493	4867	4891	380	6945	790	14379	2028	423	---	637
120	2954	1937	9888	4540	719	7244	1552	20974	4113	434	23920	830
121	2002	1678	4277	3160	391	6594	820	14059	3053	367	5713	355
122	1625	1642	3483	6606	807	7668	997	16935	2965	441	12637	742
123	1359	1946	6591	2449	817	8042	741	17725	5848	400	13200	1211

1 Value for one testis and one kidney. 2 value for an aliquot.

TABLE XVIb

HORMONE - FSH + Prolactin SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
124	2129	1846	5591	2424	303	7870	855	17634		631	13021	543
125	2206	919	6897	4152	362	7616	956	17415		452	15962	959
126	2225	2038	9565	3421	552	7862	930	20654		486	5238	699
127	2812	3350	14344	4074	2300	7186	504	18232		658	17650	759
145	9709	3888	37807	6701	1163	12720	1999	32887		962	11291	1559
146	3640	3013	20056	3480	797	8066	1592	26742		750	16770	1004

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVIIb

HORMONE - FSH + Prolactin   SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
128	1813	3187	4674	4070	353	6551	438	10184	1667	417	4629	455
129	3691	2086	9054	3483	886	7969	386	20118	4670	690	9872	661
130	1803	2493	5672	3157	470	8143	999	21587	4325	519	7943	445
131	2318	2244	7929	2761	442	6211	415	15048	3545	377	15025	433
132	2638	1955	6438	2757	324	6155	1038	14653	3079	337	7277	228
147	3142	2220	15484	4216	1204	9288	1081	30973	5290	876	20261	1777
148	2092	1322	15418	4072	809	8564	1399	28907	6498	729	9083	2027
149	3109	2126	27342	6907	1510	11223	1408	32266	5117	784	16349	1811
150	3774	3234	37394	5688	993	10872	1177	27381	9246	821	19562	1464
151	5139	2413	15761	6956	934	10308	1675	37572	6755	1109	24542	1572

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE XVIIIb

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
133	1186	2467	6414	2814	409	5745	347	14887	2742	Bkg.	5553	351
134	2731	2479	12933	3980	469	7713	299	19361	3968	435	6107	818
135	2179	1216	5474	5915	384	8833	775	18717	5117	258	22495	1158
136	1278	1701	7631	2343	265	5884	621	16625	3392	356	10638	793
137	2402	1467	7423	3061	776	7014	704	19178	3978	439	14932	---
152	2903	1518	28398	5602	1315	11031	2416	34433	7259	896	19461	1068
153	3130	2835	13006	6050	1714	12658	2071	28142	5324	1075	15944	2390
154	2198	2895	37733	5148	710	10789	987	29088	5993	1179	22778	1109
155	1584	3723	14028	3774	660	6682	743	19866	3645	464	9790	535
156	4742	1759	19686	5398	1060	9788	1415	36472	5825	885	17434	1232

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIXb

HORMONE - FSH (double dose)

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
					Thymectomy							
157	4086	2576	34776	5208	1324	9304	1884	26234		1105	20887	2170
158	3156	1031	6594	4815	932	11734	1367	32654		1146	25941	1864
					Sham Thymectomy							
159	2664	2605	16288	5792	1273	9819	1257	33373	6174	809	16455	1437
160	3578	3263	5379	5491	1230	10351	2528	34629	8177	1350	20059	1948
					Unoperated							
161	3943	2153	20967	4852	1119	9880	967	28999	6214	903	15882	1862
162	2970	2492	4625	3221	1772	12728	1505	28531	7141	1090	11201	1067
163	2474	1308	10611	3816	580	8470	1386	41267	6755	1055	26089	1271
164	3046	1479	13074	5021	792	11634	1091	35458	6194	618	9185	1396

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXb

HORMONE - FSH + LH SURGICAL STATE - Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
165	3137	1326	11195	2947	566	7177	1762	27295		625	8183	2032
166	1479	3581	8908	3385	766	13256	2225	43362		1121	21035	1812
167	2758	2068	17046	3424	2195	10923	838	31516		913	29981	1300
168	4020	2449	9020	5059	922	9259	1275	33477		1155	41124	1289
169	4093	1621	6355	2930	733	10272	980	30767		834	14929	1179

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXIb

HORMONE - FSH + LH SURGICAL STATE - Sham Thymectomy

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
170	1242	1931	5907	2819	583	10450	1852	28638	6935	833	27890	1859
171	2222	2333	13888	3497	838	8305	881	28958	6067	550	19375	1452
172	1769	1791	7277	3285	529	11630	1128	30873	8247	968	39702	1260
173	3305	1858	10011	5746	704	12743	2003	30400	5570	1575	50801	2237

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXIIb

HORMONE - FSH + LH   SURGICAL STATE - Unoperated

Counts per Minute (per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
174	1795	2307	4116	3909	773	11338	1342	25508	6390	926	25821	1305
175	2332	1327	4899	2840	426	10415	1691	39433	5587	1307	9685	1676
176	1738	1960	11672	3141	780	4957	2046	26654	7610	768	14203	689
177	2875	3698	435	2565	1202	9917	1680	33178	7101	1102	20334	1524

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE Ic

HORMONE - None SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
1	.103	.066	.263	.121	.021	.339	.039	.922		.018	.608	.043
2	.100	.083	.168	.242	.027	.536	.035	1.15		.032	1.83	.075
3	.093	.215	.246	.225	.032	.432	.053	1.14		.027	1.35	.074
4	.077	.090	.163	.153	.024	.350	.053	1.03		.036	.430	.041
5	.090	.067	.327	.538	.068	.441	.048	1.16		.025	.742	.043
6	.167	.054	.263	.212	.043	.472	.089	1.39		.034	1.30	.079
7	.087	.036	.237	.216	.029	---	.153	1.16		.039	.387	.027
Mean	.1024	.0872	.2380	.2438	.0348	.3528	.0671	1.136		.0301		
SE $\pm$	.0112	.0223	.0217	.0516	.0061	.0689	.0158	.0544		.0027		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE IIc

HORMONE - None **SURGICAL STATE** - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
8	.170	.160	.190	.200	.019	.488	.073	1.28	.274	.035	1.24	---
9	.103	.064	.192	.382	.030	.483	.054	1.17	.270	.031	1.24	.060
10	.074	.037	.150	.159	.016	.427	.028	1.09	.233	.032	1.50	.065
11	.108	.229	.168	.146	.029	.342	.045	.950	.145	.023	1.37	.061
12	.059	.040	.362	.112	.024	.434	.037	1.07	.135	.027	.972	.045
13	.071	.065	.174	.225	.027	.402	.044	1.31	.247	.038	.722	.045
14	.063	.070	.106	.132	.020	.131	.040	1.12	.226	.027	.512	.068
15	.175	.138	.381	.246	.034	.592	.062	1.26	.246	.037	.757	.055
16	.154	.133	.330	.267	.042	.606	.098	1.49	.269	.044	.900	.076
17	.178	.138	.362	.459	.080	.483	.043	1.38	.266	.036	1.13	.062
Mean	.1155	.1074	.2415	.2328	.0326	.4388	.0524	1.212	.2311	.0330		
SE ±	.0156	.0196	.0330	.0355	.0058	.0369	.0065	.0512	.0160	.0020		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE IIIc

HORMONE - None SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or aliquot)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
18	.121	.079	.456	.159	.043	.360	.044	.902	.283	.026	.702	.068
19	.085	.194	.494	.209	.035	.327	.030	.874	.196	.021	.790	.050
20	.102	.250	.357	.179	.033	.408	.031	1.11	.251	.027	.824	.056
21	.138	.219	.377	.208	.045	.486	.050	1.29	.242	.028	1.37	.072
22	.146	.128	.477	.211	.029	.356	.037	.833	.205	.025	1.00	.045
23	.081	.049	.230	.262	.028	.415	.070	.993	.266	.034	.583	.026
24	---	.085	.297	.191	.030	.469	.040	1.41	.325	Bkg.	1.00	.059
25	.123	.126	.348	.330	.040	.475	.075	1.11	.293	.047	.858	.094
26	.201	.096	.508	.271	.052	.465	---	1.33	.264	.034	1.06	.034
Means	.1107	.1362	.3646	.2244	.0372	.4178	.0418	.9383	.2583	.0268		
SE ±	.0184	.0231	.0377	.0178	.0028	.0198	.0075	.1311	.0136	.0042		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE IVc

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
27	.279	.081	.783	.351	.081	.406	.122	1.33		.028	1.11	.051
28	.260	.174	.270	---	.083	.429	.144	1.23		.031	1.23	.065
29	.178	.115	.594	.300	.043	.224	.099	1.08		.029	.622	.043
30	.397	.342	1.39	.424	.119	.622	.155	1.55		---	1.34	.046
31	.285	.357	1.40	.505	.075	.493	.110	1.43		.042	1.22	.084
32	.404	.375	1.35	.520	.114	.666	.132	.974		.048	1.33	.087
33	.685	.203	1.68	.774	---	.847	.069	1.69		.043	1.35	.124
34	.314	.454	.862	.732	.084	.477	.105	1.24		.035	1.03	.035
35	.282	.213	.812	.862	.069	.449	.052	1.26		.032	.922	.045
36	.131	.077	.249	.280	.048	.342	.105	1.24		.038	1.23	.029
Mean	.3215	.2391	.9397	.6068	.0716	.4955	.1093	1.302		.0326		
SE ±	.0483	.0424	.1575	.1019	.0110	.0559	.0100	.0665		.0041		

1 Value for one testis and one kidney. 2 Value for an aliquot

TABLE Vc

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
37	.190	.170	.770	.403	.076	.395	.124	1.43	.023	.018	1.30	.083
38	.173	.310	1.03	.677	.046	.384	.047	1.21	.125	.028	1.35	.050
39	.284	.500	1.97	.368	.119	.546	.139	1.49	.151	.024	1.24	.063
40	.268	.093	.420	.322	.076	.366	.124	1.37	.200	.025	1.23	.068
41	.273	.234	1.35	.544	.137	.494	.109	1.67	.216	.055	1.27	.072
42	.421	.254	1.56	.550	.216	.536	.135	1.68	.183	.057	1.55	.105
43	.298	.415	1.12	.536	.109	.732	.205	1.81	.187	.032	1.02	.058
44	.223	.293	1.03	.472	.077	.603	.129	1.75	.150	.044	1.23	.081
45	.147	.115	1.22	.538	.195	.695	---	1.38	.099	.029	.687	.106
Mean	.2530	.2648	1.163	.4900	.1167	.5278	.1124	1.532	.1482	.0346		
SE ±	.0275	.0445	.1488	.0367	.0191	.0443	.0195	.0678	.0199	.0047		

1Value for one testis and one kidney. 2 Value for an aliquot.

TABLE VIc

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
46	.291	.147	1.10	.348	.070	.374	.067	1.36	.148	.026	.950	.025
47	.220	.128	.954	.240	.049	.318	.085	1.29	.200	.026	.658	.033
48	.307	.082	1.05	.262	.100	.366	.073	1.10	.148	.030	.807	.041
49	.159	.111	.705	.318	.043	.419	.413	1.54	.294	.037	1.53	.050
50	.276	.300	1.16	.348	.058	.418	.076	1.17	.222	.024	1.34	.060
51	.304	.282	1.40	.790	.106	.605	.114	1.42	.187	.041	1.01	.051
52	.238	.235	1.37	.478	.178	.548	.073	1.62	.226	.044	1.45	.085
53	.314	.415	1.50	.936	.141	.447	.102	1.35	.157	.040	.845	.089
54	.258	.190	.983	.560	.058	.491	.070	1.23	.163	.043	1.22	.080
55	.299	.200	.702	.532	.139	.638	.116	1.55	.277	.035	1.69	.055
Mean	.2666	.2090	1.092	.4812	.0942	.4624	.0823	1.362	.2022	.0346		
SE ±	.0155	.0322	.0867	.0730	.0146	.0336	.0070	.0542	.0166	.0024		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE VIIc

HORMONE - LH SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
56	.204	.173	1.04	.364	.122	.655	.083	1.50		.019	1.09	.054
57	.211	.092	.587	.213	.041	.471	.096	1.29		.023	1.02	.062
58	.063	.086	.320	.142	.027	.298	.024	.761		.018	.517	.030
59	.054	.078	.193	.108	.015	---	.050	.891		.034	.833	.034
60	.069	.038	.156	.115	.015	.237	.035	.425		.040	.409	.043
61	.040	.050	.254	.093	.014	.172	.016	.766		.020	.217	.015
62	.072	.070	.117	.182	.017	.290	.042	.636		.019	.848	.038
Mean	.1018	.0838	.2472	.1738	.0358	.3032	.0494	.8908		.0247		
SE ±	.0276	.0165	.0635	.0356	.0148	.0795	.0113	.1362		.0033		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE VIIIc

HORMONE - LH   SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
63	.158	.100	.442	.175	.029	.646	.085	1.37	.321	.032	.923	.057
64	.181	.091	.775	.211	.040	.424	.082	1.62	.364	.030	.716	.108
65	.127	.126	.415	.136	.026	.600	.075	1.34	.367	.045	1.03	.058
66	.127	.090	.335	.139	.033	.453	.028	1.03	.301	.031	.470	.114
67	.069	.068	.144	.074	.013	.353	.075	1.14	.399	.027	.881	.067
68	.078	.159	.197	.121	.021	.289	.019	.958	.076	.026	.944	.022
69	.074	.089	.139	.110	.020	.276	.019	.850	.131	.018	.126	.013
70	.040	.063	.136	.070	.013	.210	.010	.666	.161	.015	.301	.014
71	.080	.088	.322	.115	.032	.273	.047	.888	.219	.025	.463	.069
Mean	.1037	.0971	.3227	.1278	.0252	.3915	.0488	1.096	.2598	.0276		
SE ±	.0155	.0098	.0691	.0156	.0031	.0507	.0102	.1002	.0931	.0029		

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE IXc

HORMONE - LH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
72	.122	.195	.233	.170	.030	.521	.031	1.45	.356	.038	1.50	.076
73	.269	.179	.613	.231	.050	.527	.087	1.44	.371	.044	1.56	.068
74	.161	.089	.386	.152	.035	.504	.058	1.62	---	.034	1.17	.109
75	.099	.051	.235	.136	.027	.398	.114	1.18	.346	.018	.500	.035
76	.097	.099	.273	.146	.036	.403	.104	1.17	.352	.032	.744	.064
77	.114	.107	.459	.191	.023	.386	.068	1.02	.196	.016	.224	.031
78	.050	.083	.115	.058	.016	.346	.039	.918	.204	.020	.739	.014
79	.115	.058	.177	.092	.012	.238	.036	.730	.233	.019	.253	.063
80	.116	.232	.232	.222	.038	.360	.044	.759	.143	.032	.365	.039
81	.170	.064	.297	.255	.036	.269	.017	.844	.168	.019	.176	.068
Mean	.1313	.1157	.3020	.1653	.0303	.3952	.0598	1.113	.2369	.0272		
SE ±	.0186	.0200	.0464	.0196	.0036	.0315	.0103	.0987	.0380	.0031		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE Xc

HORMONE - PROLACTIN SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
82	.134	.116	.708	.201	.043	.401	.079	1.48		.044	.945	.044
83	.116	.128	.490	.254	.039	---	.056	1.23		.037	.845	.057
84	.143	.172	.519	.205	.057	.428	.023	1.08		.028	.531	.033
85	.140	.144	.318	.204	.022	.313	.020	.773		.024	.489	.033
86	.055	.068	.147	.186	.018	.353	.052	.970		.031	.231	.037
87	.123	.075	.717	.126	.032	.323	.061	.975		.033	1.36	.036
88	.102	.068	.714	.143	.215	.340	---	1.22		.037	.551	.050
89	.118	.094	.248	.202	.023	.248	.028	.488		.018	.476	. 023
Mean	.1163	.1046	.4350	.1901	.0561	.3070	.0468	1.027		.0268		
SE ±	.0100	.0115	.0901	.0141	.0231	.0483	.0074	.1075		.0047		

1 Value for one testis and one kidney. 2 Value for an aliquot

TABLE XIc

HORMONE - PROLACTIN SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
90	.168	.242	.845	.278	.093	.593	.089	.246	.225	.034	1.33	.102
91	.094	.158	.434	.191	.033	.399	.031	1.00	.245	.028	.293	.031
92	.121	.130	.319	.329	.044	.340	.060	.293	.192	.029	.384	.025
93	.100	.077	.380	.313	.028	.361	.059	.938	.322	.020	.818	.058
94	.280	.170	.953	.218	.050	.599	.080	1.79	.240	.041	1.35	.093
95	.182	.111	.311	.615	.040	.431	.049	.864	.198	.037	.755	.065
96	.086	.135	.263	.179	.050	.257	.037	.688	.280	.017	.944	---
97	.100	.055	.179	.138	.012	.300	.019	.720	.149	.029	.555	.053
98	.185	.102	.419	.220	.025	.295	.052	.901	.199	.030	.623	.025
99	.091	.079	.190	.151	.017	.271	.015	.857	.235	.026	.214	.018
100	.089	.061	.267	.138	.019	.321	.031	.954	.242	.022	.246	.024
Mean	.1360	.1200	.4145	.2518	.0373	.3788	.0474	.8410	.2297	.0280		
SE*	.0185	.0167	.0767	.0415	.0068	.0360	.0071	.1223	.0140	.0022		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIIc

HORMONE - Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
101	.108	.127	.449	.236	.038	.343	.055	1.01	.217	.025	.702	.029
102	.092	.107	.742	.407	.056	.357	.079	.579	.316	.028	.619	.088
103	.091	.146	.281	.318	.039	.377	.044	.887	.171	.030	.385	.060
104	.212	.101	.451	.452	.062	.530	.069	1.58	.234	.023	.993	.047
105	.091	.098	.252	.153	---	.290	.020	.792	.142	.168	.786	.015
106	.138	.112	.350	.142	.028	.336	.046	.675	.166	.029	.779	.022
107	.089	.063	.210	.145	.031	.340	.028	.998	.122	.017	.427	.022
108	.097	.089	.194	.120	.016	.306	.017	.780	.171	.022	.273	.024
109	.091	.116	.437	.141	.019	.321	.022	.959	.194	.023	.558	.024
110	.058	.088	.218	.141	.015	.284	.023	.699	.170	.019	.166	.018
Mean	.1067	.1047	.3584	.2255	.0320	.3483	.0403	.7537	.1903	.0384		
SE ±	.0133	.0072	.0534	.0390	.0053	.0222	.0069	.0804	.0174	.0145		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIIIc

HORMONE - FSH SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
111	.039	.032	.059	.111	.011	.172	.024	.405		.014	.317	.020
112	.079	.022	.323	.101	.051	.239	.022	.808		.015	.226	.025
113	.082	.044	.135	.154	.025	.171	.023	.647		.014	.272	.029
Mean	.0666	.0326	.1723	.1220	.0290	.1940	.0230	.6200		.0143		
SE ±	.0139	.0064	.0785	.0163	.0117	.0225	.0006	.1171		.0003		
138	.168	.058	.887	.186	.048	.404	.052	1.04		.048	.656	.039
139	.140	.113	.438	.291	.051	.322	.032	.971		.033	.646	.048
140	.349	.041	.244	.109	.022	.304	.048	1.03		.040	.714	.050
141	.131	.108	.400	.179	.027	.301	.091	1.17		.027	.572	.049
Mean	.1970	.0800	.4922	.1913	.0370	.3327	.0558	1.053		.0368		

1 Value for one testis and one kidney.   2 Value for an aliquot.

TABLE XIVc

HORMONE - FSH SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
114	.043	.042	.143	.085	Bkg.	.270	.018	.635	.129	.023	.322	.038
115	.104	.052	.127	.204	.033	.270	.027	.713	.139	.015	.468	.034
116	.027	.014	.060	.057	.066	.121	.018	.530	.142	.019	.799	.023
117	.043	.111	.252	.152	.029	.278	.014	.719	.177	.017	.522	.038
118	.060	.035	.252	.136	.016	.260	.028	.696	.164	.017	.388	.013
Mean	.0554	.0508	.1668	.1268	.0288	.2398	.0210	.6856	.1502	.0182		
SE ±	.0132	.0163	.0375	.0258	.0109	.0298	.0028	.0354	.0088	.0014		
142	.058	.026	.094	.118	.019	.175	.032	1.07	.118	.047	1.15	.032
143	.111	.041	.450	.124	.019	.300	.047	.998	.156	.027	.422	.050
144	.176	.095	.301	.149	.028	.416	.041	1.04	.262	.036	.852	.060
Mean	.1149	.0539	.2814	.1302	.0220	.2967	.0400	1.035	.1784	.0366		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVc

HORMONE - FSH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
119	.078	.062	.186	.187	.015	.265	.030	.549	.078	.016	---	.024
120	.101	.066	.338	.156	.025	.248	.053	.719	.141	.015	.820	.028
121	.089	.071	.170	.140	.017	.293	.036	.625	.136	.016	.254	.016
122	.062	.068	.133	.252	.031	.293	.038	.647	.113	.017	.483	.028
123	.046	.067	.218	.084	.028	.276	.025	.608	.201	.014	.464	.042
Mean	.0752	.0668	.2090	.1638	.0232	.2750	.0364	.6296	.1338	.0156		
SE ±	.0097	.0015	.0350	.0277	.0031	.0086	.0047	.0276	.0201	.0005		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVIc

HORMONE - FSH + Prolactin SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
124	.071	.061	.173	.081	.010	.264	.029	.592		.021	.437	.018
125	.074	.030	.228	.139	.012	.256	.032	.584		.015	.536	.032
126	.075	.068	.317	.115	.019	.264	.031	.693		.016	.176	.024
127	.097	.116	.497	.141	.080	.249	.018	.632		.023	.612	.026
Mean	.0792	.0687	.3037	.1190	.0302	.2582	.0275	.6252		.0274		
SE ±	.0060	.0178	.0709	.0140	.0167	.0036	.0032	.0249		.0019		
145	.335	.134	1.30	.231	.040	.439	.069	1.14		.033	.390	.054
146	.126	.104	.692	.120	.028	.278	.055	.923		.026	.579	.035
Mean	.2305	.1190	.9960	.1755	.0340	.3585	.062	1.031		.0295		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVIIc

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
128	.079	.127	.186	.177	.015	.284	.019	.444	.072	.018	.201	.020
129	.123	.069	.301	.116	.030	.265	.013	.669	.155	.023	.328	.022
130	.064	.086	.195	.112	.017	.290	.028	.769	.154	.018	.283	.016
131	.101	.087	.316	.120	.019	.270	.018	.653	.154	.016	.652	.019
132	.123	.083	.257	.128	.015	.286	.048	.680	.143	.016	.338	.011
Mean	.0980	.0904	.2510	.1306	.0192	.2790	.0252	.6426	.1356	.0182		
SE ±	.0087	.0110	.0427	.0184	.0028	.0104	.0033	.0145	.0092	.0157		

1 Value for one testis and one kidney. 2 Value for an aliquot

TABLE XVIIc (cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
147	.108	.077	.534	.145	.042	.321	.037	1.07	.183	.030	.699	.061
148	.072	.046	.532	.141	.028	.296	.048	.998	.224	.025	.313	.070
149	.107	.073	.944	.238	.052	.387	.049	1.11	.177	.027	.564	.063
150	.130	.112	1.29	.196	.034	.375	.041	.945	.319	.028	.675	.051
151	.177	.083	.544	.241	.032	.356	.058	1.30	.233	.038	.847	.054
Mean	.1188	.0782	.7688	.1922	.0376	.3470	.0466	1.085	.2272	.0296		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XVIIIc

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
133	.052	.098	.256	.122	.018	.250	.015	.647	.119	---	.241	.016
134	.097	.086	.446	.142	.017	.275	.011	.689	.141	.016	.217	.029
135	.076	.042	.188	.205	.013	.306	.026	.649	.177	.089	.779	.040
136	.056	.064	.304	.102	.012	.255	.027	.722	.147	.016	.462	.034
137	.087	.045	.269	.111	.028	.255	.026	.698	.145	.016	.543	---
Mean	.0736	.0670	.2926	.1364	.0176	.2682	.0210	.6810	.1458	.0274		
SE ±	.0118	.0097	.0266	.0119	.0028	.0049	.0062	.0540	.0161	.0013		

1 Value for one testis and one kidney. 2 Value for and aliquot.

TABLE XVIIIc (cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
152	.100	.052	.980	.193	.045	.381	.083	1.19	.251	.031	.672	.037
153	.108	.098	.449	.210	.059	.437	.072	.971	.184	.037	.550	.083
154	.076	.100	1.30	.178	.025	.372	.034	1.00	.207	.041	.786	.038
155	.055	.128	.484	.130	.023	.231	.026	.686	.126	.016	.338	.019
156	.164	.061	.679	.186	.037	.338	.049	1.26	.201	.031	.602	.043
Mean	.1006	.0878	.7784	.1794	.0378	.3518	.0528	1.021	.1938	.0312		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XIXc

HORMONE - FSH (double dose)

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
					Thymectomy							
157	.138	.087	1.17	.176	.045	.314	.064	.885		.037	.704	.073
158	.103	.034	.216	.157	.030	.384	.045	1.07		.037	.848	.061
					Sham Thymectomy							
159	.090	.088	.550	.195	.043	.331	.042	1.13	.208	.027	.555	.048
160	.117	.107	.176	.180	.040	.338	.083	1.13	.267	.044	.656	.064
					Unoperated							
161	.129	.070	.686	.159	.037	.323	.032	.948	.203	.030	.519	.061
162	.097	.082	.151	.105	.058	.416	.049	.933	.234	.036	.366	.035
163	.084	.044	.358	.129	.020	.286	.047	1.39	.228	.036	.880	.043
164	.103	.050	.441	.169	.027	.392	.037	1.20	.209	.021	.310	.047

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXc

HORMONE - FSH + LH SURGICAL STATE -Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.
165	.108	.046	.385	.101	.020	.246	.061	.939		.022	.282	.070
166	.043	.104	.258	.098	.022	.384	.065	1.26		.033	.609	.053
167	.095	.071	.587	.118	.076	.376	.029	1.09		.031	1.03	.045
168	.116	.071	.261	.147	.027	.268	.037	.970		.034	1.19	.037
169	.141	.056	.219	.101	.025	.354	.038	1.06		.029	.514	.041
Mean	.1006	.0696	.3420	.1130	.0340	.3256	.0460	1.064		.0298		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXIc

HORMONE - FSH + LH SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
170	.043	.067	.205	.097	.020	.360	.064	.986	.239	.029	.960	.064
171	.077	.080	.478	.120	.029	.286	.030	.997	.209	.019	.667	.050
172	.061	.062	.250	.113	.018	.400	.039	1.06	.284	.033	1.37	.043
173	.096	.054	.290	.166	.020	.369	.058	.881	.161	.046	1.47	.065
Mean	.0693	.0658	.3058	.1240	.0218	.3538	.0478	.9810	.2232	.0318		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE XXIIc

HORMONE - FSH + LH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per organ or tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis[1]	Prepu.	Kidney[1]	Thymus	Adr.	Liver[2]	Sk. Mu.[2]
174	.062	.079	.142	.135	.027	.390	.047	.878	.220	.032	.889	.045
175	.068	.038	.142	.082	.012	.302	.049	1.14	.162	.038	.281	.049
176	.060	.068	.402	.108	.027	.171	.070	.917	.262	.026	.917	.024
177	.099	.127	.015	.088	.041	.341	.058	1.14	.244	.038	.700	.053
Mean	.0723	.050	.2033	.1033	.0268	.3010	.0560	1.019	.2220	.0335		

1 Value for one testis and one kidney. 2 Value for an aliquot.

TABLE Id

HORMONE - None SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat#	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
1	.484	.700	2.07	.221	.336	.246	.263	1.15		.729	1.15	.123
2	.722	1.93	2.14	.771	.589	.432	.466	1.45		1.05	1.80	.167
3	.203	1.97	2.62	.694	.661	.280	.513	1.15		.730	1.32	.125
4	.500	1.11	1.29	.272	.364	.301	.473	1.25		.923	1.30	.148
5	.573	1.37	2.60	.876	.819	.371	.565	1.40		1.13	1.47	.209
6	.923	1.31	2.53	.444	1.04	.392	.650	1.65		1.33	1.97	.214
7	.591	1.40	1.81	.544	738	---	1.72	1.44		1.51	1.83	.216
Mean	.5708	1.399	2.151	.5460	.6451	.2888	.6642	1.355		1.057	1.549	.1717
SE ±	.0838	.1682	.1845	.0942	.0939	.0942	.1816	.0698		.1110	.1194	.0156

TABLE IId

HORMONE - None   SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat#	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
8	.960	1.65	2.75	.408	.633	.378	.311	1.47	.591	.875	1.61	---
9	.606	.940	1.55	.868	.460	.350	---	1.17	.673	.792	1.35	.184
10	.625	.800	1.15	.363	.561	.336	.459	1.17	.683	.782	---	.175
11	.596	1.38	1.60	.256	.468	.283	.571	1.01	.505	.631	1.18	.127
12	.335	.560	2.53	.255	.349	.307	.229	1.05	.493	.426	1.15	.131
13	.727	1.44	1.71	.664	.607	.372	.448	1.56	.744	1.22	1.70	.172
14	.632	2.12	1.27	.559	.556	.134	.319	1.44	.822	.928	1.67	.198
15	1.06	1.53	3.70	.390	.472	.455	.388	1.69	.935	1.37	1.76	.201
16	.981	2.46	4.34	.420	.778	.561	.708	2.15	1.12	1.76	2.14	.262
17	.942	2.03	3.69	.954	1.10	.470	.610	1.74	1.08	1.43	2.04	.198
Mean	.7464	1.491	2.429	.5137	.5984	.3646	.4043	1.445	.7646	1.021	1.460	.1648
SE ±	.0728	.1919	.3640	.0771	.0669	.0426	.0648	.1133	.0703	.1300	.1924	.0219

TABLE IIId

HORMONE - None SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat#	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
18	.535	1.05	2.79	.267	.433	.342	.319	.858	.451	.512	1.11	.163
19	.468	1.87	3.66	.395	.529	.319	.398	.921	.528	.531	1.02	.128
20	.564	2.32	2.55	.339	.552	.311	.346	1.18	.516	.742	1.53	.144
21	.570	2.17	2.92	.333	.662	.290	.394	1.23	.708	.664	1.33	.175
22	.543	1.35	2.65	.393	.448	.360	.345	.971	.480	.781	1.12	.164
23	.684	.790	2.15	.660	.669	.389	.449	1.21	.684	.850	1.36	.178
24	---	1.37	2.43	.430	.831	.410	.792	1.36	.800	Bkg.	1.75	.183
25	.477	1.52	2.50	.492	.488	.428	.463	1.06	.761	1.22	1.46	.190
26	1.06	1.48	4.06	.495	1.44	.409	---	1.68	.996	1.13	1.95	.215
Mean	.5445	1.547	2.754	.4226	.6724	.3620	.3840	1.013	.6582	.7144	1.404	.1711
SE ±	.0908	.1661	.2334	.0386	.1048	.0165	.0680	.1501	.0601	.1202	.1025	.0085

TABLE IVd

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
27	.595	.920	2.92	.558	.558	.285	.562	1.10		.845	1.44	.169
28	.590	1.87	2.76	---	.769	.323	.446	1.19		.805	1.75	.136
29	.527	1.35	1.90	.297	.411	.303	.387	1.03		.626	1.27	.127
30	.819	3.05	8.98	.381	.844	.533	.760	1.92		---	2.26	.186
31	1.14	2.88	7.70	.447	1.20	.527	.728	1.53		1.62	1.83	.228
32	1.14	2.53	5.58	.408	.863	.545	.706	.981		1.16	1.94	.216
33	1.73	.880	7.33	.645	---	.787	.846	2.27		1.59	2.75	.291
34	.991	2.88	4.76	.596	.661	.469	.600	1.48		1.09	1.88	.162
35	1.02	2.57	3.99	.848	.848	.472	.531	1.48		.941	1.72	.157
36	.762	1.13	2.17	.557	.662	.494	.538	1.58		1.31	2.46	.063
Mean	.9307	2.006	4.809	.6187	.6816	.4738	.6104	1.456		.9987	1.930	.1735
SE ±	.1139	.2764	.7928	.1047	.1010	.0468	.0461	.1295		.1516	.1425	.0197

TABLE Vd

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
37	.430	1.70	9.38	.330	.535	.333	.399	1.41	.790	.429	1.67	.135
38	.571	1.53	3.60	.769	.420	.295	.512	1.10	.644	.685	1.35	.141
39	.542	2.51	7.32	.454	.551	.416	.577	1.71	.621	1.03	1.78	.177
40	.453	1.03	3.50	.176	.624	.337	.517	1.31	.690	.819	1.77	.134
41	.741	2.19	5.48	.493	.913	.494	.690	1.36	.900	1.49	2.01	.167
42	.868	3.91	4.37	.458	1.19	.686	1.02	2.08	1.55	3.00	2.77	.312
43	1.12	2.77	4.77	.600	.990	.567	.915	1.73	1.32	1.33	2.66	.202
44	1.17	3.26	4.12	.545	.654	.914	.801	2.24	1.35	1.68	2.46	.280
45	.334	.966	5.47	.459	1.30	.635	---	1.50	1.14	1.15	1.96	.254
Mean	.6921	2.207	5.334	.4760	.7974	.5196	.6034	1.604	1.001	1.290	2.048	.2002
SE ±	.1011	.3346	.6395	.0551	.1041	.0676	.1014	.1241	.1159	.2509	.1605	.0222

TABLE VId

HORMONE - Human Chorionic Gonadotrophin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
46	.720	1.37	5.53	.284	.576	.340	.411	1.41	.622	.656	1.57	.162
47	.482	1.00	4.50	.298	.473	.305	.499	1.24	.638	.853	1.28	.148
48	1.14	2.32	3.96	.256	.490	.406	.395	1.38	.590	1.12	1.21	.217
49	.403	1.13	3.05	.287	.413	.383	.512	1.80	.658	1.13	2.45	.179
50	.592	1.62	7.27	.340	.674	.368	.505	1.17	.707	.623	1.41	.150
51	.777	2.61	6.15	.513	.991	.525	.745	1.47	1.32	1.48	2.66	.215
52	.638	2.12	6.85	.391	1.23	.505	.617	1.59	1.12	1.47	1.98	.189
53	1.59	5.53	14.85	.670	1.88	.602	.548	1.79	1.31	1.48	2.10	.225
54	.656	1.50	4.47	.557	.632	.453	.761	1.58	1.03	1.49	2.23	.195
55	.845	2.94	5.57	.434	.965	.537	.892	1.71	.993	1.04	2.12	.217
Mean	.7840	2.214	6.220	.4030	.8324	.4424	.5885	1.515	.8983	1.134	1.901	.1897
SE ±	.1102	.4207	1.044	.0438	.1434	.0307	.0515	.0691	.0916	.1084	.1596	.0092

TABLE VIId

HORMONE - LH SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk.Mu.
56	1.06	1.92	8.24	1.11	2.34	.543	.738	1.98		1.38	2.60	.220
57	.925	1.26	3.86	.400	.953	.424	.497	1.63		.975	2.02	.207
58	.389	1.05	2.46	.322	.494	.267	.137	.838		.383	.887	.117
59	.525	1.37	1.56	.334	.357	---	.263	.940		.826	1.28	.104
60	.605	.717	1.30	.335	.220	.249	.368	.789		.631	.867	.136
61	.460	1.19	2.47	.321	.447	1.47	.199	1.04		.613	1.09	.124
62	.578	.970	1.08	.472	.391	.263	.330	.783		.700	1.29	.121
Mean	.6488	1.211	2.996	.4708	.7431	.2704	.3617	1.143		.7868	1.433	.1470
SE ±	.0940	.1430	.9439	.1086	.2799	.0669	.0768	.1785		.1209	.2433	.0176

TABLE VIIId

HORMONE - LH SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
63	1.20	1.79	3.58	.589	.700	.492	.914	1.65	1.05	.997	1.83	.210
64	1.06	2.39	7.75	.366	.952	.400	.732	1.70	.873	1.20	1.67	.194
65	.852	1.93	3.71	.829	.893	.487	.431	1.66	1.10	1.21	1.88	.237
66	1.09	4.09	8.81	1.01	1.37	.483	1.00	1.45	1.05	1.35	2.29	.226
67	.613	1.42	2.87	.528	.722	.324	.497	1.22	.664	.844	1.64	.160
68	.365	1.54	1.44	.202	.325	.227	.243	1.12	.507	.617	1.26	.157
69	.474	1.09	2.24	.296	.443	.218	.372	.800	.432	.497	1.03	.111
70	.293	.850	1.39	.210	.343	.185	.245	.710	.332	.483	1.08	.083
71	.657	1.44	2.62	.363	.475	.269	.437	1.04	.448	.641	1.32	.264
Mean	.7337	1.838	3.823	.4882	.6914	.3427	.5412	1.261	.6625	.8287	1.556	.1824
SE ±	.1107	.3194	.8884	.0933	.1139	.0418	.0925	.1250	.0931	.1124	.1387	.0199

TABLE IXd

HORMONE - LH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
72	.797	2.01	2.91	.675	.686	.443	.693	1.55	.967	1.46	1.68	.242
73	1.35	2.84	5.61	.829	.928	.525	.959	1.85	1.83	1.05	2.11	.237
74	.861	1.59	3.86	.714	.885	.545	.509	2.10	---	1.16	2.26	.209
75	.449	1.00	2.68	.397	.979	.402	.699	1.34	.872	.876	1.83	.154
76	.640	1.55	2.87	.418	.720	.333	.703	1.20	.777	.821	1.49	.116
77	.745	1.88	5.46	.496	.583	.292	.479	1.11	.541	.696	1.11	.150
78	.434	1.02	1.62	.262	.369	.256	.359	1.06	.507	.483	1.38	.120
79	.567	.740	1.88	.154	.400	.210	.186	.756	.425	.528	.910	.091
80	.817	1.66	1.66	.831	.756	.329	.489	1.25	.579	1.04	.742	.164
81	1.16	1.73	2.63	.775	.600	.228	.298	.828	.444	.529	1.00	.254
Mean	.7820	1.602	3.118	.5551	.6906	.3563	.5374	1.304	.6156	.9423	1.451	.1787
SE ±	.0927	.1898	.4556	.0770	.0658	.0376	.0762	.1346	.0982	.1393	.1635	.0173

TABLE Xd

HORMONE - Prolactin SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
82	.717	1.59	4.66	.330	.811	.364	.382	1.47		1.19	1.84	.217
83	.586	1.97	4.28	.404	.973	---	.366	1.28		1.16	1.80	.210
84	.929	1.43	3.70	.315	1.12	.354	.630	1.28		.975	1.80	.164
85	.773	1.41	2.57	.419	.367	.238	.282	.834		.522	.920	.110
86	.573	1.21	1.75	.426	.529	.328	.462	1.26		1.15	1.58	.160
87	.654	.962	5.35	.252	.615	.257	.313	1.14		.655	1.66	.113
88	.557	.782	3.60	.328	5.12	.316	---	1.35		1.16	1.67	.161
89	.593	1.18	1.76	.704	.242	.205	.275	.686		.497	.919	.160
Mean	.6727	1.317	3.459	.3972	1.222	.2577	.3845	1.163		.9136	1.524	.1618
SE ±	.0454	.1313	.4700	.0487	.5666	.0419	.0411	.0947		.1078	.1354	.0137

TABLE XId

HORMONE - Prolactin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
90	.996	2.52	12.61	.548	2.02	.482	.544	.246	1.04	1.31	2.04	.315
91	.552	1.61	2.86	.388	.564	.292	.250	1.21	.664	.824	1.47	.153
92	.602	1.34	2.42	.748	.681	.270	.349	1.02	.530	.814	1.33	.172
93	.819	1.39	4.13	.705	.786	.337	.397	1.08	.654	.938	1.54	.161
94	1.35	1.43	7.33	.546	1.04	.483	.564	2.17	1.20	1.28	2.84	.234
95	.910	1.50	2.07	.815	.709	.402	.547	1.18	.690	1.12	1.71	.185
96	.589	1.47	2.19	.314	.610	.221	.190	.834	.568	.680	1.06	---
97	.670	.890	1.22	.248	.184	.254	.247	1.01	.490	.586	1.14	.100
98	.761	1.32	2.54	.261	.429	.221	.320	.943	.517	.588	1.22	.105
99	.645	1.52	2.26	.342	.572	.333	.350	1.07	.589	.755	1.30	.135
100	.705	1.53	2.50	.357	.353	.291	.190	1.12	.556	.723	1.37	.114
Mean	.7817	1.502	3.830	.4792	.7225	.3260	.3589	1.088	.6816	.8743	1.547	.1521
SE $\pm$	.0705	.1168	1.004	.0615	.1466	.0282	.0422	.1298	.0689	.0778	.1536	.0242

TABLE XIId

HORMONE - Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
101	.844	1.63	3.45	.348	.760	.361	.294	1.24	.611	.658	1.41	.079
102	.605	1.27	3.67	.669	.854	.313	.425	.557	.595	.759	1.33	.274
103	.825	2.15	2.99	.482	.513	.399	.512	1.29	.690	1.41	1.58	.209
104	1.08	1.51	3.61	1.03	1.15	.465	.428	1.57	.860	.535	1.59	.187
105	.696	1.07	1.85	.328	---	.192	.266	.855	.445	.480	1.19	.096
106	.754	1.44	3.15	.295	.549	.253	.238	.829	.514	.667	1.14	.097
107	1.03	1.31	1.93	.315	.389	.350	.316	1.25	.717	.722	1.31	.143
108	.555	1.01	1.92	.275	.373	.250	.366	1.08	.506	.659	1.16	.117
109	.495	1.16	1.86	.262	.376	.248	.243	1.07	.566	.585	1.01	.117
110	.423	1.47	2.42	.346	.349	.243	.426	.922	.525	.679	1.17	.102
Mean	.7307	1.402	2.685	.4350	.5686	.3074	.3514	1.066	.6029	.7154	1.130	.1234
SE $\pm$	.0693	.1042	.2432	.0766	.0852	.0269	.0297	.0912	.0389	.0816	.1354	.0235

TABLE XIIId

HORMONE - FSH SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
111	.232	.405	.390	.167	.151	.148	.181	.468		.381	.682	.072
112	.399	.380	2.21	.220	.733	.228	.232	.787		.440	.733	.083
113	.363	.698	.985	.271	.321	.195	.247	.610		.378	.689	.076
Mean	.3313	.4943	1.197	.2193	.4016	.1903	.2200	.6216		.3996	.7013	.0770
SE ±	.0507	.1021	.5355	.0300	.1728	.0232	.0200	.0923		.0202	.0160	.0032
138	.668	.876	5.44	.335	.563	.300	.636	1.34		.883	2.02	.127
139	.526	1.26	2.15	.272	.447	.324	.391	1.30		.789	1.52	.282
140	.105	.680	1.79	.234	.419	.266	.432	1.11		.865	1.34	.166
141	.401	.943	2.18	.220	.374	.215	.590	1.03		.705	1.38	.153
Mean	.4250	.9398	2.890	.2653	.4508	.2763	.5123	1.200		.8105	1.565	.1820

TABLE XIVd

HORMONE - FSH SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
114	.328	.650	1.09	.177	Bkg.	.222	.217	.910	.453	.573	1.18	.116
115	.720	.743	1.46	.374	.393	.188	.281	.751	.402	.469	1.01	.087
116	.248	.472	.929	.358	.388	.235	.168	.740	.376	.525	1.71	.085
117	.491	1.26	1.35	.254	.455	.292	.278	.999	.538	.509	1.36	.108
118	.480	.729	2.77	.224	.271	.241	.172	.853	.419	.542	1.12	.100
Mean	.4534	.7708	1.520	.2762	.3014	.2356	.2232	.8506	.4376	.5236	1.276	.0992
SE $\pm$	.0810	.1315	.3262	.0391	.0811	.0168	.0245	.0488	.0280	.0173	.1224	.0060
142	.247	.305	.579	.215	.262	.165	.613	1.29	.525	1.21	3.10	.123
143	.476	.512	2.31	.175	.311	.217	.508	1.11	.512	.618	1.44	.142
144	.750	1.67	2.15	.225	.396	.323	.402	1.37	.707	1.09	1.94	.168
Mean	.4905	.8282	1.678	.2048	.3227	.2340	.5072	1.255	.5807	.9716	2.160	.1443

TABLE XVd

HORMONE - FSH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
119	.465	.980	1.20	.358	.366	.190	.207	.754	.417	.579	---	.080
120	.433	.770	1.67	.253	.329	.191	.274	.790	.350	.466	2.18	.083
121	.491	.890	2.21	.277	.378	.266	.283	.749	.502	.466	.980	.045
122	.385	.931	1.30	.535	.390	.257	.339	.945	.498	.563	1.14	.117
123	.323	.893	1.98	.264	.491	.234	.262	.840	.506	.721	1.15	.130
Mean	.4194	.8928	1.672	.3374	.3908	.2276	.2630	.8156	.4546	.5590	1.090	.0910
SE ±	.0299	.0347	.1931	.0271	.0527	.0160	.0223	.0362	.0309	.0469	.3460	.0150

TABLE XVId

HORMONE - FSH + Prolactin SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
124	.401	.640	1.09	.168	.243	.234	.224	.822		.505	.958	.103
125	.967	.833	1.92	.260	.417	.236	.269	.755		.543	.957	.224
126	.504	1.13	2.54	.290	.385	.248	.196	.829		.652	1.09	.114
127	.515	1.57	3.33	.175	1.57	.217	.240	.850		.465	1.16	.121
Mean	.5967	1.043	2.220	.2232	.6537	.2337	.2322	.8140		.5412	1.042	.1405
SE ±	.1261	.2024	.4744	.0305	.3077	.0064	.0153	.0205		.0402	.0507	.0281
145	1.52	1.22	9.56	.349	.743	.353	.439	1.48		1.01	1.71	.195
146	.483	.684	6.12	.143	.316	.188	.461	1.11		.719	1.30	.157
Mean	1.002	.9520	7.84	.246	.5295	.2705	.4500	1.295		.8645	1.505	.1760

TABLE XVIId

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
128	.401	.840	1.43	.226	.246	.169	.218	.607	.346	.419	.834	.079
129	.569	1.08	3.50	.236	.500	.223	.320	.887	.562	.532	1.01	.117
130	.340	1.32	1.04	.341	.464	.241	.231	.985	.556	.558	1.29	.099
131	.721	1.06	2.87	.385	.400	.348	.176	.563	.552	.593	1.00	.097
132	.575	1.17	2.50	.268	.385	.222	.615	.927	.516	.552	1.05	.100
Mean	.5212	1.094	2.428	.2912	.3990	.2406	.3120	.7938	.5064	.5308	1.037	.0948
SE ±	.0680	.0783	.3668	.0309	.0436	.0294	.0793	.0869	.0409	.0296	.0733	.0060

TABLE XVIId (Cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
147	.545	1.28	4.14	.237	.501	.308	.227	1.46	.759	.915	1.74	.176
148	.430	.651	3.86	.270	.489	.235	.316	1.05	.579	.741	1.37	.138
149	.540	.906	6.17	.312	.677	.304	.648	1.43	.760	.732	1.93	.193
150	.660	1.09	8.49	.286	.528	.297	.456	.998	.660	.658	1.50	.142
151	.548	.926	3.65	.319	.447	.343	.664	1.64	.769	1.09	1.66	.238
Mean	.5446	.9706	5.262	.2848	.5284	.2974	.4622	1.316	.7054	.8280	1.642	.1774

TABLE XVIIId

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
133	.388	.920	1.94	.219	.266	.178	.161	.678	.328	---	.793	.081
134	.468	1.38	1.62	.194	.428	.264	.246	.973	.483	.517	1.14	.124
135	.609	.894	1.29	.547	.403	.307	.401	1.08	.644	.742	1.29	.122
136	.343	.810	2.10	.136	.371	.206	.193	.698	.393	.369	.867	.111
137	.546	.908	1.86	.230	.455	.220	.175	.651	.500	.516	1.13	---
Mean	.4708	.9824	1.762	.2652	.3846	.2350	.2352	.8160	.4692	.4288	1.044	.0876
SE ±	.0490	.1412	.1012	.0723	.0327	.0227	.0439	.0879	.0536	.1227	.0926	.0232

TABLE XVIIId (cont.)

HORMONE - FSH + Prolactin SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
152	.385	.388	6.71	.243	.473	.268	.339	1.12	.715	.773	1.45	.144
153	.532	.873	3.48	.312	.575	.359	.409	1.16	.767	.863	1.50	.255
154	.579	1.22	8.33	.380	.598	.291	.371	1.26	.818	.904	1.69	.140
155	.264	.992	3.90	.153	.362	.150	.242	.716	.365	.390	.929	.091
156	.592	.731	3.90	.239	.463	.221	.421	1.08	.536	.678	1.22	.122
Mean	.4704	.8408	5.264	.2654	.4942	.2574	.3564	1.067	.6402	.7216	1.358	.1504

TABLE XIXd

HORMONE - FSH (double dose)

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
					Thymectomy							
157	.718	1.13	7.62	.251	.638	.339	.600	1.06		.525	1.66	.181
158	.317	.134	1.93	.224	.476	.268	.573	1.24		.914	1.89	.238
					Sham Thymectomy							
159	.438	.879	5.14	.245	.472	.273	.424	1.07	.577	.594	1.46	.114
160	.574	1.33	2.26	.280	.433	.283	.603	1.17	.664	.849	1.82	.173
					Unoperated							
161	.496	.869	3.43	.212	.475	.285	.452	.917	.635	.687	1.29	.143
162	.488	1.57	1.64	.414	.532	.296	.492	1.12	.693	.775	1.60	.140
163	.542	.803	2.71	.253	.477	.243	.531	1.33	.605	.742	1.57	.144
164	.490	.674	2.67	.220	.445	.284	.478	1.10	.615	.719	1.61	.169

TABLE XXd

HORMONE - FSH + LH SURGICAL STATE - Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
165	.468	.465	3.60	.158	.320	.198	.424	.953		.581	1.22	.123
166	.441	1.08	3.31	.427	.569	.339	.741	1.51		1.05	1.99	.161
167	.641	.975	3.91	.294	1.15	.319	.347	1.27		.785	1.62	.194
168	.580	1.14	2.33	.267	.468	.295	.559	1.21		.859	1.44	.152
169	.608	.872	1.90	.258	.394	.330	.488	1.33		.990	1.63	.159
Mean	.6691	.9064	3.010	.2808	.5802	.2962	.5118	1.255		.8530	1.580	.1564

TABLE XXId

HORMONE - FSH + LH SURGICAL STATE - Sham Thymectomy

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
170	.301	.950	1.97	.294	.437	.234	.290	1.22	.549	.870	1.60	.176
171	.481	.892	3.19	.321	.686	.286	.409	1.17	.581	.573	2.06	.129
172	.491	.893	2.34	.373	.628	.329	.539	1.31	.641	.740	1.74	.151
173	.493	.690	2.15	.310	.392	.306	.365	1.09	.557	.860	1.60	.182
Mean	.4415	.8562	2.413	.3245	.5358	.2888	.4008	1.198	.5820	.7608	1.750	.1595

TABLE XXIId

HORMONE - FSH + LH SURGICAL STATE - Unoperated

Zn^{65} Uptake (% of dose per gram of tissue)

Rat #	V.P.	D.P.	L.P.	S.V.	Coag. Gl.	Testis	Prepu.	Kidney	Thymus	Adr.	Liver	Sk. Mu.
174	.389	1.10	1.87	.595	.502	.373	.440	1.27	.703	.938	1.58	.226
175	.361	.519	1.78	.219	.134	.299	.374	1.24	.549	.861	1.77	.126
176	.456	.758	3.83	.378	.705	.403	.572	1.06	.573	.754	1.36	.130
177	.635	.242	2.82	.400	2.59	.413	.512	1.45	.755	.924	1.92	.243
Mean	.4603	.6548	2.575	.3980	.9828	.3720	.4745	1.255	.6450	.8693	1.658	.1813

APPENDIX II

SUMMARY

SUMMARY

Most previous work on gonadotrophins and zinc uptake has been performed on hypophysectomized and/or castrated albino rats. The purpose of these studies was to examine effects of gonadotrophins on Zn^{65} uptake and organ weights in hooded rats with intact pituitary glands and gonads, and study the influence of the thymus gland on responses to the gonadotrophins. Thymectomized, sham thymectomized and unoperated male rats weighing 110-150 grams on the day of surgery were maintained on Purina rat pellets and tap water in an air conditioned room. The following gonadotrophins were injected during the third and fourth post-operative weeks: human chorionic gonadotrophin (HCG), follicle stimulating hormone (FSH), luteinizing hormone (LH), prolactin, and combinations of FSH plus prolactin and FSH plus LH. Zn^{65} was administered twenty-four hours before sacrifice on the twenty-eighth experimental day. The following organs were excised, wet weighed and assayed for percent uptake of Zn^{65} per organ and per gram of tissue: ventral prostate, dorsal prostate, lateral prostate, coagulating, preputial, adrenal and thymus glands, seminal vesicles, testes and kidneys. In addition, Zn^{65} uptake per gram of tissue were determined for liver and skeletal muscle.

The observation that the lateral prostate gland is the organ of highest uptake of Zn^{65} per gram of tissue, previously reported by others in albino rats, was confirmed in these ani-

mals. Lower rates of Zn^{65} uptake by ventral prostate glands, seminal vesicles and testes observed in the hooded rats are in general agreement with values reported for albino rats. Hormonal control of zinc uptake by dorsal and lateral prostate glands and testes was also confirmed but, in addition, it was noted that gonadotrophins exerted important influences on zinc uptake in tissues not previously reported to be thus influenced by gonadotrophins. Zn^{65} uptake was affected in non-reproductive, as well as in reproductive structures. FSH decreased the Zn^{65} uptake in all organ studied below that of the no hormone animals and the differences were significant in many of these organs. HCG significantly increased the organ weights of all secondary reproductive structures but the preputial glands, and significantly increased the Zn^{65} uptake in many of the reproductive and non-reproductive structures. LH increased the Zn^{65} uptake in the accessory reproductive structures and significantly decreased the weight of these structures. Prolactin had no significant effect in the unoperated animals.

Surgery affected the zinc uptake and organ weight response in some of the hormonal states. In the no hormone animals a decrease in organ weight and Zn^{65} uptake in accessory reproductive structures resulted from the stress of surgery. In the operated animals treated with HCG, there was a greater increase in weight and less of an increase in Zn^{65} uptake than in unoperated rats. Prolactin significantly increased the Zn^{65} uptake in the lateral prostate gland of the operated animals, and when combined with FSH, brought the level of zinc up to that of the uninjected controls.

All accessory reproductive structures were heavier in thymectomized FSH treated rats than in sham operated or unoperated FSH treated animals. In addition, the removal of the thymus gland facilitated the action of FSH in reducing Zn^{65} uptake. The effect of LH was different from that of FSH, in that it tended to decrease weight and increase Zn^{65} uptake. In this case the thymus gland is necessary for the action of LH, because thymectomy results in higher organ weights and lower zinc uptake. It seems possible that the normal growth and zinc content of the accessory reproductive structures is maintained by a balance between these two hormones, with the thymus gland exerting fine homeostatic control.

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Betty Greenebaum Rosoff was born on May 28, 1920, in New York City. She attended the New York City public schools and graduated from Walton High School in 1937. She earned a B.A. degree from Hunter College in 1942, and was a chemistry major and physics minor. She was married to Hyman Rosoff in 1942 and has one son, David.

Betty Rosoff was awarded an M.A. degree from Hunter College in 1960, and was a major in mammalian physiology. Her master's thesis, sponsored by Dr. Melvin Schwartz, was entitled The Binding of Yttrium Chelates to Serum Albumin.

Mrs. Rosoff was employed as a research chemist in the fields of synthetic dyestuffs from 1943 to 1948. She worked as a research associate in the Neoplastic Division of Montefiore Hospital from 1952 to 1962. Betty Rosoff has had 29 publications from 1956 to the present in the following areas: trace metal and rare earth metabolism, metal chelates, radioisotope decontamination and binding of metals to proteins and nucleic acids.

Her teaching experience has been as a lecturer in physiology at Hunter College from 1961 to 1964 and 1965 to 1966. She also taught as a biology instructor at Bronx Community College, 1964 to 1965.

Mrs. Rosoff is a member of Phi Sigma and AAAS. Her main area of interest is reproductive endocrinology.