INTRODUCTION

It is known that vitamin C deficiency and chlorpromazine administration cause disturbances in the metabolism of testis and epididymis in guinea pigs and rats (Chapters IV, V A). A decreased rate in hydroxylation and metabolism of drugs occur in scorbutic guinea pigs (Degkwitz et al., 1968; Kato et al., 1969; Zannoni et al., 1972), which are known to be more sensitive to the effects of drug than the normal animals (Richard et al., 1941; Richard, 1947; Conney et al., 1961). Administration of ascorbic acid in vivo to phenobarbital treated vitamin C deficient guinea pigs was found to bring about a recovery in the activities of hepatic drug metabolizing enzymes (Zannoni et al., 1972). A similar recovery in the activities of androgen dependent enzymes of the testis and epididymis, their spermatozoa and accessory reproductive glands in drug treated rats has been elucidated (Chapters V A-D; Buch, 1976; Chinoy and Sheth, 1976; 1977 a,b). This beneficial effect of ascorbic acid (AA) is mediated via its increased mobilization and utilization due to the enhanced
formation of its free radical, monodehydroascorbic acid (MDHA) as demonstrated by ESR studies (Buch, 1976). It is also known that an increase in synthesis of vitamin C occurs in the drug treated animals (Longenecker et al., 1940; Conney et al., 1961; Subramanian et al., 1973, 1974; Nandi et al., 1974) concomitant with the enhanced formation or release of histamine which is toxic to the body. Ascorbic acid detoxifies the histamine (Subramanian et al., 1973).

In the light of these results, the present investigation was undertaken to study the effects of a tranquilizer viz., chlorpromazine on the metabolism of testis and epididymis in vitamin C deficient guinea pigs and those fed an ascorbic acid fortified diet.

MATERIALS AND METHODS

Healthy adult male guinea pigs (Cavia porcellus) weighing 450-500 gm were used for the experiments. The animals were kept in an air conditioned animal house (Temperature 26±2°C) with 14 day light hours. One group of guinea pigs was maintained on vitamin C fortified diet and water ad libitum while the other group was fed a vitamin C deficient diet which was prepared according to the method of Friberg and Lohmander (1970).

The details of the source of drug (Chlorpromazine), the dose and mode of administration are described in Chapter
V-A. The animals were divided into the following experimental groups.

<table>
<thead>
<tr>
<th>Groups</th>
<th>Treatments</th>
<th>No. of animals used</th>
<th>Day of autopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Control (Guinea pigs fed vitamin C fortified diet)</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Control + Chlorpromazine (CPZ) treated (Control guinea pigs were injected with CPZ (1 mg/animal/day) intramuscularly for 7 days)</td>
<td>12 8th</td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Control + CPZ + ascorbic acid (AA) treated (Control guinea pigs were given AA (100 mg/animal/day) orally along with CPZ treatment for 7 days continuously)</td>
<td>12 8th</td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Vitamin C deficient animals (Guinea pigs were maintained on vitamin C deficient diet for 21 days)</td>
<td>12 8th</td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Vitamin C deficient + CPZ treated animals (Guinea pigs maintained on vitamin C deficient diet were injected with CPZ (1 mg/animal/day) from the 16th day of deficiency upto 21 days)</td>
<td>12 22nd</td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Vitamin C deficient + CPZ + ascorbic acid (AA) treated animals (Guinea pigs maintained on vitamin C deficient diet and treated with CPZ as in group V were given AA (100 mg/day/animal) orally from days 16 to 21)</td>
<td>12 22nd</td>
<td></td>
</tr>
</tbody>
</table>
The animals were autopsied after the respective treatments and the testis as well as cauda epididymis were excised, blotted free of blood, cleared off fat bodies, connective tissue and weighed. The following biochemical estimations were carried out using the standard procedures described in Chapter I.

Free ascorbic acid (AA), ascorbigen (ASG), rates of ascorbic acid utilization (AAU) and ascorbic acid macromolecule complexing: (Chinoy et al., 1974).

Ascorbic acid free radical (AA-FR) forming special peroxidase: (Chinoy, 1973).

Cholesterol: (Pearson et al., 1953).

Succinate dehydrogenase (SDH): (Kun and Abood, 1949).

Alkaline and acid phosphatases: (Belfield and Goldberg, 1971).

Protein: (Gornall et al., 1949).

A minimum of six replicates were done for each tissue and parameter and the results were analyzed statistically by using student's 't' test.

RESULTS

Since a comparison of results between the normal control and vitamin C deficient animals (groups I and IV) has been made earlier in Chapter IV, the effects of chlorpromazine on testis and epididymis or vitamin C deficient guinea pigs.
(group V) have been compared with those of groups I and IV respectively.

**Organ weights:**

By the administration of CPZ to animals of groups II and V, the weight of testis and cauda epididymis was not much altered in comparison with those of group I except for a decline in the weight of cauda of group V animals. CPZ + ascorbic acid (AA) administration restored the weight of both organs in group III animals, whereas, in deficient guinea pigs no recovery was observed (Table I).

**Free ascorbic acid (AA):**

Administration of CPZ to control (group II) guinea pigs brought about a decrease in the levels of free AA in both testis and cauda, in comparison with group I. In deficient + CPZ treated animals (group V) however, the levels were elevated significantly ($P < 0.01$) in comparison with groups I and IV. CPZ + AA administration to animals of group III, restored the levels in cauda, but in the testis it was same as in group II. On the other hand, in deficient + CPZ + AA treated guinea pigs (group VI) the free AA levels decreased ($P < 0.01$) in testis but recovered in cauda in comparison to those of group V (Fig. 1).

**Ascorbigen (ASG):**

CPZ administration to both control (group II) and deficient animals (group V) increased the levels of ASG in
testis in comparison with those of groups I and IV. But in cauda it decreased. ASG concentration also increased by CPZ + AA administration in the testis and cauda of guinea pigs of groups III and VI respectively in comparison with those of groups II and V. However, ASG was not detectable in testis of group III (Fig. 1).

Ascorbic acid utilization (AAU): CPZ administration to control (group II) animals brought about a decrease (P < 0.01) in the rate of AAU of both the testis and cauda as compared to groups I and IV respectively. But in deficient animals, an increase was noted. CPZ + AA treatment decreased the AAU rate in testis of both group III and vitamin C deficient animals (group VI) in comparison with group I. In cauda of group III, a recovery was noted, while in group VI, AAU was same as in deficient + CPZ treated guinea pigs (Fig. 1).

Ascorbic acid macromolecule complexing rate (AA-MM): The AA-MM complexing rate was by and large decreased or undetectable in cauda of group II (control + CPZ) and group V (deficient + CPZ) animals respectively, as compared to those of group I. However, in the testis (group II) an increase was observed. CPZ + AA administration restored the rate to nearly that of group I in testis and cauda of group III
animals. In group VI animals however, it was undetectable in both the organs (Fig. I).

**AA-FR special peroxidase:**

AA-FR special peroxidase activity was on the whole increased in testis and cauda of animals of both groups II and V respectively, than in those of groups I and IV. CPZ + AA administration brought about a recovery in enzymic levels of testis of group III and of both organs in group VI animals (Fig. 1).

**Cholesterol:**

CPZ administration decreased \( P \leq 0.001, 0.01 \) the cholesterol concentration in testis and epididymis of animals of groups II and V in comparison with those of groups I and IV. However, CPZ + AA treatment caused an increase in its levels \( P \leq 0.001, 0.01 \) in testis and epididymis of group III, but in vitamin C deficient animals (group VI), a recovery was noted unlike that of the group V (Table II).

**Succinate dehydrogenase (SDH):**

SDH activity decreased in testis and cauda by CPZ administration to animals of group II and V but not in animals of group IV. However, in cauda (group II) the enzymic activity was unaltered. CPZ+AA administration restored the enzymic levels in the testis of animals of group III and in cauda of
group VI. However, in cauda of group III, SDH decreased significantly as compared with those of groups I and II (Fig. 2).

**Alkaline phosphatase:**

The drug administration brought about an increase \((P < 0.01)\) in the alkaline phosphatase activity in testis of animals of group II and V unlike in those of groups I and IV respectively. In cauda, the enzymic activity increased only in group II but decreased in group V. CPZ + AA treatment also activated the enzyme significantly \((P < 0.001)\) especially in testis and cauda of group III as compared to groups I and II. On the other hand, the enzymic levels were restored in both organs of guinea pigs of group VI (Fig. 2).

**Acid phosphatase:**

Acid phosphatase activity increased in both the drug treated groups II and V respectively except that it was slightly decreased in testis (group II) in comparison with those of group I. CPZ + AA administration activated the enzyme in both the organs of animals of group III, whereas, in the animals of group VI the enzymic levels were restored to control value (Fig. 2).

**Protein:**

CPZ administration to animals of groups II and V brought about a decrease \((P < 0.001, < 0.01)\) in the levels of protein of testis and epididymis CPZ + AA treatment elevated the protein
concentration significantly (P < 0.001) in cauda of group III animals. In testis protein recovered in group III and VI but in cauda (group VII), there was a significant decrease (P < 0.001) in comparison with control (Fig. 2).

**DISCUSSION**

It has already been reported in Chapter V A that a tranquilizer like chlorpromazine (CPZ), affects the testicular androgen synthesis and thereby brings about an alteration in the physiological milieu of the testis and epididymis in rats. It is apparent from the results of this study and those of Chapter V A, that guinea pigs which are not able to synthesize ascorbic acid, unlike the rats, are more susceptible to the effects of chlorpromazine than the rats. Moreover, the effects of CPZ on testis and epididymis of scorbutic guinea pigs were more pronounced than in those maintained on a vitamin C fortified diet. These observations are in conformity with those of others (Richards *et al.*, 1941; Richard, 1947; Buch, 1976). It is probable that the vitamin C deficient guinea pigs are more susceptible to drugs because the activities of their liver microsomal enzymes involved in drug oxidation are decreased (Zannoni *et al.*, 1972; Buch, 1976). Moreover, vitamin C deficiency is known to decrease the androgenicity of the testis and impair epididymal metabolism (Chapter IV). This
observation is further substantiated by the fact that recovery of all androgen dependent parameters to almost their normal levels occurred by the administration of ascorbic acid to animals of groups III and VI. These observations suggest that ascorbic acid has a protective and beneficial role in maintenance of the physiological integrity of the testis and epididymis in drug treated animals by its direct stimulatory effects on enzymes and via the formation of its free radical, monodehydroascorbic acid, which is involved in testicular steroidogenesis (Biswas and Deb, 1970; Carballeiva et al., 1974; Datta and Sanyal, 1976; Chapters V A-D; Buch, 1976; Sheth, 1976). It is also probable that ascorbic acid inactivates the drug induced histamine, which impairs testicular functions (Ellis, 1970; Subramanian et al., 1973; 1974; Nandi et al., 1974).

In conclusion, this study reveals that vitamin C deficient guinea pigs are more susceptible to drug administration than those fed an ascorbic acid fortified diet, since vitamin C is necessary for both drug metabolism and maintenance of reproductive functions.

SUMMARY

A comparative study on the effects of administration of chlorpromazine (CPZ) and CPZ + ascorbic acid (AA) on testicular and cauda epididymal functions of guinea pigs fed
a normal and scorbutic diet was carried out. The results suggest that vitamin C deficient guinea pigs are more susceptible to drug administration than those fed an ascorbic acid fortified diet, since vitamin C is necessary for both drug metabolism and maintenance of reproductive functions.
REFERENCES


4. Chapter I. Synergistic action of testosterone and ascorbic acid for maintenance of epididymal functions.

5. Chapter IV. Effects of vitamin C deficiency on the metabolism of testis and epididymis in guinea pigs.


7. Chapter V B. Effects of drugs on reproductive physiology of male albino rats. II. Non-narcotic analgesics.

8. Chapter V C. Effects of drugs on reproductive physiology of male albino rats. III. Narcotic analgesics.


**TABLE II**

Weight (in gm) of testis and cauda epididymis of normal (group I), normal + CPZ (group II), normal + CPZ + ascorbic acid (group III), deficient (group IV), deficient + CPZ (group V), deficient + CPZ + ascorbic acid (group VI) treated rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>Testis</th>
<th>Cauda epididymis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.69±0.10</td>
<td>0.44±0.05</td>
</tr>
<tr>
<td>II</td>
<td>1.39±0.20</td>
<td>0.37±0.03</td>
</tr>
<tr>
<td>III</td>
<td>1.73±0.10</td>
<td>0.47±0.05</td>
</tr>
<tr>
<td>IV</td>
<td>1.44±0.09</td>
<td>0.31±0.003</td>
</tr>
<tr>
<td>V</td>
<td>1.72±0.01</td>
<td>0.33±0.04</td>
</tr>
<tr>
<td>VI</td>
<td>1.47±0.08</td>
<td>0.29±0.02</td>
</tr>
</tbody>
</table>

Values are mean ± S.E.
TABLE III

Cholesterol concentration (in mg %) testis and cauda epididymis of normal (group I), normal + CPZ (group II), normal + CPZ + ascorbic acid (group III), deficient (Group IV), deficient + CPZ (group V), and deficient + CPZ + ascorbic acid (all) treated rats

<table>
<thead>
<tr>
<th>Groups</th>
<th>Testis</th>
<th>Cauda epididymis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.15±0.014</td>
<td>0.14±0.006</td>
</tr>
<tr>
<td>II</td>
<td>0.06±0.006</td>
<td>0.10±0.001</td>
</tr>
<tr>
<td>III</td>
<td>0.21±0.01</td>
<td>0.18±0.01</td>
</tr>
<tr>
<td>IV</td>
<td>0.18±0.03</td>
<td>0.13±0.01</td>
</tr>
<tr>
<td>V</td>
<td>0.12±0.01</td>
<td>0.08±0.01</td>
</tr>
<tr>
<td>VI</td>
<td>0.13±0.02</td>
<td>0.10±0.02</td>
</tr>
</tbody>
</table>

Values are mean ± S.E.
The concentrations of free ascorbic acid (AA), ascorbigen (ASG), rates of ascorbic acid utilization (AAU), ascorbic acid macromolecule (AA-MM) complexing and ascorbic acid free radical (AA-FR) forming specials peroxidase activity in testis and cauda epididymis of guinea pigs.

ND = not detectable

1 = Control
2 = Control + chlorpromazine (CPZ) treated - 7 days
3 = Control + CPZ + ascorbic acid (AA) treated - 7 days
4 = Vitamin C deficient - 21 days
5 = Vitamin C deficient + CPZ treated - 7 days
6 = Vitamin C deficient + CPZ + ascorbic acid (AA) treated - 7 days
Fig. 2

The activities of succinate dehydrogenase (SDH), alkaline, acid phosphatases and protein levels in testis and cauda epididymis of guinea pigs

1 = control
2 = Control + Chlorpromazine treated - 7 days
3 = Control + Chlorpromazine (CPZ) + ascorbic acid (AA) treated - 7 days
4 = Vitamin C deficient - 21 days
5 = Vitamin C deficient + CPZ treated - 7 days
6 = Vitamin C deficient + ascorbic acid (AA) treated - 7 days
EFFECTS OF ASPIRIN ON THE METABOLISM IN TESTIS AND EPIDIDYMIS OF VITAMIN C DEFICIENT GUINEA PIGS

INTRODUCTION

It has already been demonstrated that vitamin C deficient guinea pigs are more susceptible to drugs (tranquilizers and barbiturates) than normal guinea pigs (Zannoni et al., 1972; Chapter VI A), since ascorbic acid is necessary for drug metabolism and for maintenance of reproductive function (Zannoni et al., 1972; Chapters IV, VI A). Since acetyl salicylic acid (aspirin), an analgesic, is also known to affect the reproductive functions in male rats (Chapters V B; Sheth, 1976; Buch, 1976), it was thought worthwhile to study its effects in vitamin C deficient guinea pigs and compare with those animals fed an ascorbic acid fortified diet.

MATERIALS AND METHOD

Healthy, adult male guinea pigs (Cavia porcellus L) weighing 400-450 gm were used for the experiments. All the animals were kept in an air conditioned animal house (temperature 26±2°C) with 14 day light hours. One group of guinea pigs was fed normal vitamin C fortified diet and another group was maintained on vitamin C deficient diet, which was prepared according to the method of Friberg and Lohmander (1970).
The details regarding the source of drug (aspirin), its dose and mode of administration are detailed in Chapter V B.

The animals were divided into the following groups:

<table>
<thead>
<tr>
<th>Group</th>
<th>Treatment</th>
<th>No. of animals used</th>
<th>Day of autopsy</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Control</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Guinea pigs were fed vitamin C fortified diet</td>
<td></td>
<td></td>
</tr>
<tr>
<td>II</td>
<td>Control + Aspirin treatment 7 days</td>
<td>12</td>
<td>8th</td>
</tr>
<tr>
<td></td>
<td>Control animals were injected aspirin (800 μg/day/animal) intramuscularly for 7 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>III</td>
<td>Control + ascorbic acid (AA) treatment</td>
<td>12</td>
<td>8th</td>
</tr>
<tr>
<td></td>
<td>Control animals were given AA (100 mg/animal/day) orally along with aspirin treatment for 7 days continuously</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>Vitamin C deficient</td>
<td>12</td>
<td>22nd</td>
</tr>
<tr>
<td></td>
<td>Guinea pigs were maintained on vitamin C deficient diet for 21 days</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V</td>
<td>Vitamin C deficient + aspirin treatment</td>
<td>12</td>
<td>22nd</td>
</tr>
<tr>
<td></td>
<td>Guinea pigs maintained on vitamin C deficient diet were injected aspirin (800 μg/animal/day) from 16th day of deficiency to day 21</td>
<td></td>
<td></td>
</tr>
<tr>
<td>VI</td>
<td>Vitamin C deficient + ascorbic acid (AA) treatment</td>
<td>12</td>
<td>22nd</td>
</tr>
<tr>
<td></td>
<td>Guinea pigs maintained on vitamin C deficient diet and treated with aspirin as in group V were given AA (100 mg/animal/day) orally from 16th day of deficiency to day 21</td>
<td></td>
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</tr>
</tbody>
</table>
The guinea pigs were autopsied after the respective treatments and the testis and cauda epididymis were excised, blotted free of blood, cleared off fat bodies, connective tissue, weighed and used for biochemical studies. The following estimations were carried out using the standard procedures described in Chapter I.

Ascorbic acid (AA), ascorbigen (ASG), rates of ascorbic acid utilization (AAU) and ascorbic acid macromolecule complexing (AA-MMC) (Chinoy et al., 1974).

Ascorbic acid free radical (AA-FR) forming special peroxidase: (Chinoy, 1973).

Cholesterol: (Pearson et al., 1953).

Succinate dehydrogenase (SDH): (Kun and Abood, 1949).

Alkaline and acid phosphatases: (Belfiedy and Goldberg, 1971).

A minimum of six replicates were done for each tissue and parameter and the results were analyzed statistically by using student's 't' test.

RESULTS

Since a comparison of results between the normal control and vitamin C deficient (groups I and IV) has been made earlier in Chapter IV, the effects of aspirin on testis and epididymis of vitamin C deficient guinea pigs (group V) have been compared with those of groups I and IV.
Organ weights:

Administration of aspirin to animals of groups II and V reduced \( P < 0.1 \) the weights of testis and epididymis than those of group I. The decrease was more pronounced in cauda of both the groups. A recovery in organ weights occurred by administration of aspirin+ascorbic acid (groups III and VI) as compared to groups II and V (Table I).

Free ascorbic acid (AA):

By administration of aspirin to animals of groups II and V, the levels of free ascorbic acid were not altered in testis in comparison with group I. In cauda, however, an increase was noted. Aspirin + AA treatment to guinea pigs of groups II and VI brought about a reduction in the levels of free AA except in cauda (of group VI animals) wherein a recovery was observed (Fig. I).

Ascorbigen (ASG):

ASG levels were increased in testis \( P < 0.001 \) and decreased in cauda of guinea pigs of groups II and V as compared to those of groups I and IV. By aspirin + AA, ASG levels were not detectable in testis and epididymis of group III but increased significantly \( P < 0.001 \) in those of group VI in comparison with ASG in groups I and V (Fig. I).

Ascorbic acid utilization (AAU):

An overall increase was noted in the rate of AAU by aspirin treatment in testis and cauda of guinea pigs of
groups II and V in comparison with group I. Aspirin + AA administration brought about a recovery in AAU in testis of groups III animals and cauda of group VI respectively, in comparison to those of groups II and V (Fig. I).

Ascorbic acid macromolecule (AA-MM) complexing rate:

Aspirin administration enhanced ($P < 0.001, 0.01$) the AA-MM complexing rate in testis of guinea pigs of groups II and V unlike in those of group I. ASG was undetectable in cauda of group II, but in group V, it was same as in control. AA-MM complexing rate was undetectable in groups III and VI except for an increase in testis (group VI) (Fig. I).

AA-FR specific peroxidase:

The enzymic activity in testis of guinea pigs of groups II and V was almost same as in control but in cauda (group II) it decreased ($P < 0.02$) and was activated in group V. Aspirin + AA administration restored the enzyme to normal control values in guinea pigs of groups III and VI, except in testis (group III), wherein it was elevated (Fig. I).

Cholesterol:

Aspirin administration to group II and V brought about a significant ($P < 0.001$) increase in the levels of cholesterol in cauda but a decrease in testis (group V). Aspirin + AA administration (Groups III and VI) restored the levels to control values in testis (group III), whereas, in cauda it was
elevated (groups III and VI) (Table II).

**Succinate dehydrogenase (SDH):**

Testicular SDH was not much altered in group II guinea pigs but in cauda it was enhanced. On the other hand, the enzymic activity was significantly decreased ($P \lt 0.05$) in deficient animals treated with aspirin (group V) in comparison to group I. In group III animals (aspirin + ascorbic acid), SDH activity was not restored in testis and cauda, whereas in group VI (deficient + aspirin + ascorbic acid) it recovered in testis and was elevated significantly ($P \lt 0.001$) in cauda (Fig. 2).

**Alkaline phosphatase:**

In groups II and V animals, the enzymic activity was enhanced in testis ($P \lt 0.01$) and cauda ($P \lt 0.001$) except for a decrease in cauda (group II). Aspirin + AA administration to animals of groups III and VI brought about a restoration of the activity in both the organs. In cauda (group VI) it was elevated in comparison to group I (Fig 2).

**Acid phosphatase:**

Acid phosphatase activity was enhanced in both testis and cauda ($P \lt 0.05$) in guinea pigs of groups II and V. Aspirin + AA administration activated the enzyme in testis but restored it in the cauda of groups III and VI (Fig. 2).
Protein levels were increased in testis of guinea pigs of groups II and V. In cauda a decrease was noted in group II, but no significant alteration in group V. Aspirin + AA treatment restored protein concentrations in both organs of group III. In group VI it was decreased in cauda but in testis protein level was same as in those of group V (Fig. 2).

DISCUSSION

It has been reported in Chapter VB that aspirin affects the testicular androgenesis by bringing about an alteration in the levels of androgen dependent parameters in rats. A similar effect of aspirin was observed in normal and to a greater extent in vitamin C deficient guinea pigs. However, these alterations were transient and were reversible almost to normal conditions by the extraneous administration of ascorbic acid (AA) to both control and vitamin C deficient drug treated guinea pigs (groups III and VI). These observations substantiate the hypothesis (Chapters II to V) that ascorbic acid has an important role in reproductive functions via its involvement in steroidogenesis and other oxidoreduction reactions, as well as by its synergistic action with testosterone (Biswas and Deb, 1970; Matsky, 1973; Ceballeivx et al., 1974; Buch, 1976; Datta and Sanyal, 1976). No significant changes were noted in the metabolism of ascorbic
acid in testis and epididymis of vitamin C deficient and control aspirin treated animals (groups V and II) respectively. This data suggests that the alterations in the metabolism of testis and epididymis induced by aspirin administration in vitamin C deficient guinea pigs were comparatively less pronounced than those brought about by chlorpromazine in scorbutic guinea pigs (see Chapter VI A) in conformity with the observations of Buch (1976).

SUMMARY
A biochemical study was undertaken to investigate the effects of administration of acetyl salicylic acid (an analgesic) on reproductive functions of male guinea pigs fed a vitamin C fortified and deficient diet. The physiological integrity of testis and epididymides was altered in both groups of animals, although the overall effect of the drug was more pronounced in cauda epididymis of vitamin C deficient guinea pigs. However, these alterations were transient and reversible by the extraneous administration of ascorbic acid to both control and vitamin C deficient drug treated guinea pigs via its involvement in steroidogenesis, other oxido-reduction reactions and synergistic action with testosterone.
REFERENCES


4. Chapter I. Synergistic action of testosterone and ascorbic acid for maintenance of epididymal functions.

5. Chapter II. Effects of an anti-androgen, cyproterone acetate on the metabolism of testis and epididymides of male albino rats.

6. Chapter IIIA. Metabolic significance of ascorbic acid in vasectomized rats.

7. Chapter III B. Effects of vasoligation on physiology of testis and epididymides of albino rats.

8. Chapter IV. Effects of vitamin C deficiency on the metabolism of testis and epididymis in guinea pigs.


TABLE I

Weight (in gm) of testis and epididymis in control (group I), control + aspirin (group II), control + aspirin + ascorbic acid (AA) (group III), vitamin C deficient (group IV), deficient + aspirin (group V) and deficient + aspirin + AA (group VI) treated guinea pigs

<table>
<thead>
<tr>
<th>Groups</th>
<th>Testis</th>
<th>Cauda epididymis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>1.69±0.10</td>
<td>0.44±0.05</td>
</tr>
<tr>
<td>II</td>
<td>1.46±0.07</td>
<td>0.30±0.05</td>
</tr>
<tr>
<td>III</td>
<td>1.76±0.28</td>
<td>0.40±0.05</td>
</tr>
<tr>
<td>IV</td>
<td>1.41±0.09</td>
<td>0.31±0.003</td>
</tr>
<tr>
<td>V</td>
<td>1.54±0.06</td>
<td>0.29±0.023</td>
</tr>
<tr>
<td>VI</td>
<td>1.68±0.12</td>
<td>0.35±0.04</td>
</tr>
</tbody>
</table>

Values are mean ± S.E.
Table II

Cholesterol concentration (in mg %) in testis and epididymis of control (group I), control + aspirin (group II), control + aspirin + ascorbic acid (AA) (group III), vitamin C deficient (group IV), deficient + aspirin (group V) and deficient + aspirin + AA (group VI) treated guinea pigs

<table>
<thead>
<tr>
<th>Groups</th>
<th>Testis</th>
<th>Cauda epididymis</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>0.15±0.014</td>
<td>0.14±0.006</td>
</tr>
<tr>
<td>II</td>
<td>0.15±0.23</td>
<td>0.35±0.05</td>
</tr>
<tr>
<td>III</td>
<td>0.14±0.15</td>
<td>0.21±0.018</td>
</tr>
<tr>
<td>IV</td>
<td>0.18±0.03</td>
<td>0.13±0.01</td>
</tr>
<tr>
<td>V</td>
<td>0.12±0.01</td>
<td>0.15±0.01</td>
</tr>
<tr>
<td>VI</td>
<td>0.23±0.015</td>
<td>0.24±0.02</td>
</tr>
</tbody>
</table>

Values are mean ± S.E.
The concentrations of free ascorbic acid (AA), ascorbigen (ASG), rates of ascorbic acid utilization (AAU), ascorbic acid macromolecule (AA-MM) complexing and ascorbic acid free radical (AA-ER) forming special peroxidase activity in testis and cauda epididymis of guinea pigs.

ND = not detectable
1 = Control
2 = Control + aspirin treated - 7 days
3 = Control + aspirin + ascorbic acid (AA) treated - 7 days
4 = Vitamin C deficient - 21 days
5 = Vitamin C deficient + aspirin treated - 7 days
6 = Vitamin C deficient + aspirin + ascorbic acid (AA) treated - 7 days
Fig. 2

The activities of succinate dehydrogenase (SDH), alkaline, acid phosphatases and protein levels in testis and cauda epididymis of guinea pigs

1 = Control
2 = Control + aspirin treated - 7 days
3 = Control + aspirin + ascorbic acid (AA) treated - 7 days
4 = Vitamin C deficient - 21 days
5 = Vitamin C deficient + aspirin treated - 7 days
6 = Vitamin C deficient + aspirin + ascorbic acid (AA) treated - 7 days