Effect of an Indigenous Drug (Speman) on Accessory Reproductive Functions of Mice

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SUMMARY
The effect of an indigenous drug, Speman, on the accessory reproductive organs was observed on castrated adult mice and on immature intact mice. The dose related growth of ventral prostate and the systemic increase in the weights as well as the secretions of accessory sex organs of the castrated adults treated with Speman indicated that the drug possessed anabolic-cum-androgen like activity.

Several reports have appeared recently indicating beneficial effect of an indigenous preparation, Speman (The Himalaya Drug Company), on the gametogenic as well as androgenic functions of the testes in man1-4 and in animals5,6. However, the mode of action of this drug on the function of the testes and accessory reproductive organs has not yet been clarified. The purpose of the present study was to investigate whether Speman has any beneficial effect on the accessory organ of male mice.

The drug, Speman (The Himalaya Drug Co. Bombay), has the following composition (mg): Orchis mascula, 65; Lactuca scariola, 16; Hygrophila Spinosa, 32; Mucuna pruriens, 16; Parmelia parlata 16; Argyriea speciosa, 32; Tribulus terrestris, 32; Leptadenia reticulata 32; Suvarnavang 16.

Adult male mice (3-3½ months old) of Swiss strain were bilaterally castrated, with a transverse incision on the scrotal sac under the light ether anaesthesia. The animals had free access to food and water and were kept in the same environment throughout the experimental period. The treatment commenced on the 11th day from the day of castration. The animals were treated for 7 days and autopsied on the subsequent day.

In the second experiment, immature Swiss mice, (21 days old) and weighing between 10 and 16 g, were fed orally with Speman suspension 100 µl (0.55 mg) every day for 20, 30 and 40 days. Simultaneously, control group was fed orally with 100 µl of 10% CMC suspension.
At the end of the experimental period, the mice were decapitated and the accessory organs were dissected out, washed with saline, blotted and weighed on a torsion balance. The homogenates of seminal vesicles along with coagulating glands were assayed for fructose content by the resorcinol method and the maltase activity of the dorsolateral prostates by glucose oxidase method. These 2 constituents were shown to be androgen dependent.

Results indicated in Table 1 show that the compound Speman has distinct androgenic activity. The weights of the accessory organ of reproduction, viz. the ventral prostate has shown significant increase from the control values; so also, the androgen-dependent biochemical parameters, fructose and maltase activity, have shown increase over their respective control values. Furthermore, this increase is dose dependent and is highly significant \( p<0.001 \). The correlation coefficient ‘\( r \)’ was found to be equal to 0.97529 for unknown and 0.9843 for the standard. Bartletts test for significance of the heterogeneity of several independent variance estimates was applied \( [x^2 (6)=7.237] \) and found to be non-significant. The bioassay data were analysed for parallelism according to the formula described by Finney and found to be non-significant (=0.09). The androgen like activity of the compound in terms of testosterone propionate (W.M.S. Merrell Co., USA) is found to be equal to 16.115 \( \mu g/mg \pm 0.14 \) as indicated from the ventral prostate assay.

![Table 1](image-url)

Levels of significance: \( p<0.001 \) compared to respective controls and between subsequent groups I-V and VII-IX.
When Speman was fed to immature intact mice, significant increase occurred in the fructose content of seminal vesicle and coagulating gland as well as in the maltase activity of dorsolateral prostate. Also, significant increase occurred (\(p<0.001\)) in the testicular weights of Speman treated groups compared with their respective controls (Table 2).

<table>
<thead>
<tr>
<th>Groups</th>
<th>No. of days</th>
<th>Total dose (mg)</th>
<th>Testis (mg/100g b. wt.)</th>
<th>Seminal vesicles (mg/100g b. wt.)</th>
<th>Ventral prostate (mg/100g b. wt.)</th>
<th>Fructose (µg/100 mg tissue)</th>
<th>Maltase (µg glucose liberated/100 mg tissue)</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>Control</td>
<td>20</td>
<td>–</td>
<td>812.2 ± 8.24</td>
<td>445.4 ± 8.1</td>
<td>26.5 ± 1.53</td>
<td>227.1 ± 2.27</td>
</tr>
<tr>
<td>II</td>
<td>Treated</td>
<td>20</td>
<td>11</td>
<td>956.2 ± 10.47</td>
<td>531.1 ± 6.32</td>
<td>35.5 ± 2.97</td>
<td>339.6 ± 10.2</td>
</tr>
<tr>
<td>III</td>
<td>Control</td>
<td>30</td>
<td>–</td>
<td>861.7 ± 4.53</td>
<td>471.8 ± 13.82</td>
<td>27.6 ± 1.58</td>
<td>252.4 ± 10.5</td>
</tr>
<tr>
<td>IV</td>
<td>Treated</td>
<td>30</td>
<td>16.5</td>
<td>990.3 ± 9.62</td>
<td>612.1 ± 11.27</td>
<td>38.6 ± 1.61</td>
<td>546.8 ± 4.96</td>
</tr>
<tr>
<td>V</td>
<td>Control</td>
<td>40</td>
<td>–</td>
<td>867.8 ± 5.31</td>
<td>485.4 ± 9.24</td>
<td>28.4 ± 0.62</td>
<td>268.3 ± 2.24</td>
</tr>
<tr>
<td>VI</td>
<td>Treated</td>
<td>40</td>
<td>22.0</td>
<td>1009.7 ± 25.2</td>
<td>658.3 ± 10.65</td>
<td>37.9 ± 0.24</td>
<td>619.7 ± 3.43</td>
</tr>
</tbody>
</table>

Results are significant: \(p<0.001\) when compared with respective controls.

Clinical importance of Speman in the treatment of human oligospermia has been well documented. Many reports\(^1\)\(^-\)\(^4\) pertaining to the clinical application of Speman reveal that at least 50% of the oligospermic men improve in their sperm concentration and sperm motility. Mukherjee\(^4\) has reported the beneficial effect of this drug even on azoospermia patients. He observed that, after a prolonged treatment ranging between 12 and 24 months in a group of 41 azoospermia patients, nearly 50% of patients had in their ejaculates a few sperms.

The role of testosterone in the maintenance of spermatogenesis\(^11\) and accessory sex organs\(^12\)\(^-\)\(^14\) has been well demonstrated. Of the end points, increase in the weights of accessory reproductive organs in castrated animals following treatment with testosterone has been used as basis for many conventional bioassays for estimating the potency of an androgen or androgen like activity of an unknown compound\(^15\).

In the present study the androgen like activity of Speman has been demonstrated by the fact that when administered to castrated male mice in increasing doses, it induced a systematic increase in the weights of accessory sex organs. The apparent lack of further increase in the response of the accessory sex organs to the higher doses (Groups X, XI and XII, Table 1) may possibly be due to its inhibitory effect or due to other constituents present in it.
It must be pointed out that in this bioassay, the mode of administration of Speman is different from that of testosterone. It is known that testosterone propionate is effective only when administered parenterally\(^{16}\). On the other hand, Speman suspension supplied could be administered only orally. In spite of differences existing in the mode of administration, the present bioassay was valid due to the fact that both the standard and the unknown dose response curves exhibit linearity and parallelism (Fig. 1).

In view of the reliability of the present bioassay system, an attempt was made to estimate the androgen-like activity of Speman. The estimated androgen-like activity of this drug in terms of testosterone propionate (W.M.S. Merrell Co., USA) was found to be in between 13.490 and 18.740 \(\mu\)g/mg of Speman.

In the present study administration of Speman to castrated adult mice at increased doses induced a systematic increase in maltase activity of dorsolateral prostate. Fructose content of seminal vesicles along with coagulating glands also showed significant results suggesting androgen-like activity of Speman.

In a study of Rubinstein and Kurland\(^{17}\) immature rats treated with testosterone at smaller dose (5 \(\mu\)g) showed increase in testicular weight. But the animals, which received a dose of 50 \(\mu\)g/day showed decreased testicular weight. Our results are in agreement with those of Rubinstein and Kurland\(^{17}\) who observed increase in testicular weight with smaller doses (Table 2). The increase in testicular weight due to Speman administration has previously been reported in rats\(^{18}\). The drug seems to promote weight as well as secretory activity of the accessory sex organs.

The observations that Speman possesses anabolic cum-androgen-like activity warrants a detailed study on its effect on pituitary-gonadal axis.

The authors are indebted to The Himalaya Drug Co., Bombay for the kind supply of ‘Speman’ for this study.

**REFERENCES**
