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Study on Liv.52–An Indigenous Anabolic Compound

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Previous reports have shown that Liv.52 drops (a product of The Himalaya Drug Co.), containing Capparis spinosa, Cichorium intybus, Solanum nigrum, Cassia occidentalis, Terminalia arjuna, Achillea millefolium and Tamarix gallica, produces increased growth in young animals[1,2] and even with corticosteroid administration[3]. The present work was undertaken to study its effect on nitrogen balance and androgenic activity.

MATERIAL AND METHODS

Part I: Twenty-three adult female albino rats were divided in three groups. The rats were kept individually in metabolic cages and were given food and water *ad libitum*. Arrangements were made to collect 24 hours urine and faeces. Adequate caloric diet composed of 64% starch, 26% casein (with 77% protein content), 4% salt mixture, 1% vitamin mixture, 5% groundnut oil and 0.1% choline chloride was used. The amount of food consumed was weighed out every day.

The whole study was divided into three periods.

Period 1 – Control
Period 2 – Prednisolone 3 mg./kg. orally daily for 2-3 weeks till negative nitrogen balance was induced.
Period 3 – Prednisolone as above + drug for 2-3 weeks.

Drugs used were Ethylestrenol (2 mg./kg.) to group one and Liv.52 (5 ml./kg.) to the second group. The third group was given only water along with prednisolone.

Urinary and faecal nitrogen was estimated by direct Nesslerization method[4] after collecting 24 hours samples on three consecutive days in a week. The mean of the three days' readings was taken as mean excretion for that week. Nitrogen balance (NB) was calculated as the difference between nitrogen intake (NI) and nitrogen excretion. Nitrogen utilisation percentage (NUP) was determined as (NB/NI)x100. Activity indices were calculated by the method of Albanese.[5] Steroid protein activity index (SPAI) was determined as nitrogen utilisation percentage at the end of period 2, minus nitrogen utilisation percentage in the control period. Anticorticocatabolic activity index (ACAI) was determined as nitrogen utilisation percentage at the end of period 3 minus nitrogen utilisation percentage in period 2.

Part II – Twenty eight freshly-weaned albino rats were orchidectomized under ether anaesthesia and divided in three groups. One group acted as control and the other two were given Ethylestrenol and Liv.52 respectively, in the same dose as in Part I. Drug administration was started one day after castration and continued for eight days. Then rats were sacrificed to remove seminal vesicles and

levator ani muscle by method of Hershberger *et al.*[6] Both the tissues were weighed immediately after removal. Dry weight of levator ani was also recorded after drying it in the oven.

RESULTS

The results are shown in Tables I, II and III. In Part I study, the third group acting as control remained in negative nitrogen balance with continued administration of prednisolone.

Table I: Group I – Ethylestrenol (Orabolin)

Rat No.	NUP at the end of period			SPAI	ACAI
	I	II	III		
1	55	31	48	– 24	+ 17
2	47	31	40	– 16	+ 9
3	43	31	38	– 12	+ 7
4	48	32	53	– 16	+ 21
6	50	30	40	– 20	+ 14
5	43	26	35	– 17	+ 5
7	48	24	28	– 24	+ 4
8	75	31	46	– 44	+ 15
9	58	26	34	– 32	+ 8
Mean	51.88	29.11	40.22	– 22.77	+ 11.11

Table II: Group II – Liv.52

Rat No.	NUP at the end of period			SPAI	*ACAI
	I	II	III		
1	65	35	51	– 30	+ 16
2	68	40	46	– 28	+ 6
3	60	41	64	– 19	+ 23
4	56	41	56	– 15	+ 15
5	50	48	53	– 2	+ 5
6	62	50	54	– 12	+ 4
7	47	28	51	– 19	+ 23
8	63	47	56	– 16	+ 9
Mean	58.87	41.26	53.87	– 17.62	+ 12.62

* Statistically significant at 1% level as tested by Wilcox on signed rank test. Difference between Liv.52 and 'Orabolin' not significant as seen by Mann-Whitney U-test.

Table III: Weight of levator ani muscle and seminal vesicle of orchidectomized rats 8 days after drug treatment

Rat No.	Levator ani wt. in mg.		Seminal vesicle wt. in mg.	Levator ani wt. in mg.		Seminal vesicle wt. in mg.	Levator ani wt. in mg		Seminal vesicle wt. in mg.	
	Wet Wt.	Dry wt.		Wt.	Wt.		Wt.	Wt.		
1	10.9	2.0	2.3	9.7	2.4	2.7	5.6	1.2	4.2	
2	10.5	2.0	5.3	9.3	1.6	4.7	9.2	1.8	4.8	
3	11.6	2.2	3.7	11.1	2.1	5.1	9.0	1.6	5.9	
4	12.6	2.2	7.8	21.8	3.4	6.0	3.8	0.4	11.4	
5	6.2	1.0	6.0	8.2	1.2	3.0	4.0	0.9	3.6	
6	17.0	2.9	3.1	12.5	1.8	5.8	6.0	1.8	6.0	
7	16.4	2.6	6.2	17.4	2.6	4.7	6.4	1.4	3.2	
8	19.4	3.0	5.8	7.7	1.4	6.2	11.2	1.6	4.6	
9	9.6	1.6	5.4	7.0	1.0	5.0	7.0	1.2	3.6	
10	16.4	2.8	5.8	–	–					
Mean ISE	13.06 ±1.28	2.23± 0.197	5.14± 0.51	11.63* ±1.65	1.94*± 0.25	4.80 ± 0.41	6.9 ±0.82	1.32± 0.153	5.25± 0.83	No significant difference in seminal vesicle wt. between groups I, II & III.
Wet wt./ Dry wt. Ratio	5.85			5.99			5.22			

* Statistically significant (p<0.05) when compared with control. Difference between Orabolin and Liv.52 non-significant (p<0.01).

COMMENTS

The ratio of nitrogen balance to nitrogen intake has been determined, since it compensates for the dietary changes occurring during the experiment. The anabolic effects of a drug are prominent in catabolic state, hence anticorticocatabolic activity is used as an index of anabolic activity.

Prednisolone induced negative nitrogen balance in all the three groups as evidence by the negative SPAI values at the end of period 2 in our study. In the group where prednisolone alone was continued, the rats remained in negative nitrogen balance, whereas when Ethylestrenol and Liv.52 were given in the remaining two groups, both the drugs showed anticorticocatabolic effect denoted by the ACAI values.

Study in orchidectomized rats has indicated that with Liv.52 there is significant increase in the weight of levator ani comparable with that of Ethylestrenol. There is no evidence of over-hydration of muscles. Both Liv.52 and Ethylestrenol have not demonstrated overt androgenic effect since the weight of seminal vesicles in all the three groups have no statistically significant difference.

From our work it appears that Liv.52 has anabolic activity in rats especially when they are in negative nitrogen balance. In the doses used, it has not shown any androgenic activity; lack of such activity would be safe when it is used therapeutically.

SUMMARY
Liv.52, an indigenous drug combination exerts anabolic activity without any overt androgenic activity in rats.

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