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The Anabolic Activity of Liv.52

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SUMMARY

The anabolic effect of Liv.52 on the retention of nitrogen, phosphorus and calcium in adult male volunteers was evaluated over a period of 27 days. The study was divided into a pre-dose period to establish baseline data, a period where the drug was given daily, followed by a third period after treatment had ceased to investigate whether the effect was in any way prolonged. Liv.52 was well tolerated and showed a positive effect on nitrogen balance and weight gain in all subjects. The effects on calcium and phosphorus balance were less clear cut but indicated increased retention of both elements.

INTRODUCTION

The object of this study was to determine whether the effects of Liv.52 (The Himalaya Drug Co.) on nitrogen, calcium and phosphorus could be demonstrated on male volunteers (whose food intake was controlled by detailed charts), under normal living conditions, indicating its anabolic activity without the usual androgenic effect.

Histochemically increased succinic dehydrogenase enzyme in the muscle was demonstrated and related to anabolic activity, by increased leucine incorporation into plasma[2] albumin.

MATERIAL AND METHODS

Four adult healthy male volunteers were selected for this study. Each volunteer was provided with detailed menus to cover a 9-day period, differing from each other only to give variety but each designed to provide an intake of 2800-3000 cal/day, 100 gm. Protein calcium, phosphorus 500 mg and 800 mg respectively.

Liv.52 was administered to each of the four volunteers in the dosage of 2 tablets t.d.s. during the 9-day ‘dosing’ period. No difficulty was experienced in maintaining strict adherence to these diets.

All urine and faeces passed were collected every 3 days throughout the 27 days' experimental period which was sub-divided as follows:

Pre-dose period	–	9 days
Dose period	–	9 days
Post-dose period	–	9 days

Representative sub-samples of each three-day period were analysed for the following: Total nitrogen content, for urine and faeces; calcium and phosphorus; urinary urea.

Blood samples were collected in a fasting state at the onset of the study and each of the dietary periods. Specific parameters measured were plasma urea, serum creatinine, creatinine, calcium and inorganic phosphorus. Additionally, routine haematological and biochemical profiles were performed before and after the completion of the study.

RESULTS

No relevant clinical signs were noted during the experimental period. Weight loss was observed in these volunteers, all of whom were involved in relatively heavy manual activities during the 'Pre-dose' period. This suggested inadequate calorie intake. No change of diet was made and in each case the rate of weight loss was reduced or reversed during the subsequent two 9-day dosing and post-dosing periods (Table 1). The 'balance' for nitrogen, calcium and phosphorus was calculated as the dietary intake minus the sum of urinary and faecal outputs for each period.

Table 1: Summary of balances: daily average over the three 9-day periods

Subject	Age in years	Period	N (g)	Ca (g)	P (g)	Weight change (kg)	Starting wt. (Kg)
A	30	Pre-dose	+ 0.48	– 0.19	+ 0.59	– 1.02	72.58
		Dose	+ 1.97	+ 0.14	+ 0.78	– 0.46	
		Post-dose	+ 1.91	+ 0.18	+ 0.78	+ 0.68	
B	47	Pre-dose	+ 5.80	– 0.03	+ 0.71	+ 1.25	66.11
		Dose	+ 5.89	+ 0.31	+ 0.92	+ 0.23	
		Post-dose	+ 6.86	+ 0.32	+ 0.92	0.00	
C	27	Pre-dose	+ 3.87	+ 0.31	+ 0.90	– 1.48	77.23
		Dose	+ 7.08	+ 0.31	+ 0.99	– 0.11	
		Post-dose	+ 4.56	+ 0.43	+ 0.95	– 0.23	
D	34	Pre-dose	– 1.07	+ 0.35	+ 1.00	– 2.50	93.67
		Dose	+ 2.40	+ 0.27	+ 0.93	– 0.45	
		Post-dose	+ 1.47	+ 0.35	+ 0.94	+ 0.45	

N – Nitrogen, Ca – Calcium, P – Phosphorus.

Nitrogen: A positive nitrogen balance was demonstrated in all four subjects during the dosing period. This persisted during the post-dosing period, at levels higher than were observed before dosing commenced.

Calcium: Two volunteers showing a slight negative balance came into positive balance during the dosing and post-dosing periods. No definite effect was observed in the other two volunteers.

Phosphorus: All volunteers were in a state of positive balance, which was increased in the two who showed a change of calcium balance, without a definite effect being observed in the remaining two.

Of the additional tests undertaken, the following results were considered to be significant.

Urea nitrogen: Total urinary nitrogen was reduced in three out of 4 cases during the dosing periods and also subsequently. The effect was similar for urea nitrogen, so that the ratio of the two remained relatively constant (Table 2).

Table 2: Urinary nitrogen changes (g/9 day period)

Subject	Period	Total urinary N (g/9 days)	Urea-N	Urea N/total N%
A	Pre-dose	127.3	99.1	77.8
	Dose	114.6	99.3	86.6
	Post-dose	113.4	92.0	81.1
B	Pre-dose	77.5	65.5	84.5
	Dose	77.5	61.0	78.5
	Post-done	66.1	48.0	72.6
C	Pre-dose	99.5	85.7	86.1
	Dose	70.4	57.6	81.8
	Post-dose	93.7	64.1	68.4
D	Pre-dose	140.6	115.1	81.9
	Dose	104.5	87.9	84.1
	Post-dose	118.1	96.1	81.4

Urea-N – Urea Nitrogen

Plasma Urea: All values remained within normal limits. A slight reduction was observed at the end of the 9-day dosing period in three out of four cases; this returned to initial or slightly above values.

Serum Phosphorus: All volunteers showed slightly lower values after 9 days dosing with an increase subsequently in three out of four cases.

Serum Creatinine[1]: A reduction after the diet alone was observed in three out of four cases, completely reversed by dosing. No definite changes were observed as regards serum calcium and creatinine (the latter requiring stricter control of meat intake or preferably a meat-free diet).

DISCUSSION

The evidence obtained from the four healthy male volunteers, pursuing normal activities whilst on a reasonably controlled diet, was that this anabolic non-steroidal indigenous agent Liv.52 induced a positive effect on body weight change and nitrogen balance in all the volunteers. The effect of Liv.52 on calcium and phosphorus was less definite and significant but, again, tended towards a positive balance. Confirmation of the positive effect with regard to nitrogen was obtained by evidence of reduced urinary urea output (in line with reduced total urinary nitrogen loss) and reduction of plasma urea (in all volunteers) and serum creatinine (in three out of four volunteers).

Liv.52 was well tolerated by all the volunteers and no adverse effects were noted in either clinical or biochemical profiles performed at the start and at the conclusion of the study. The findings, therefore, confirm the anabolic activity of Liv.52 and are in conformity with the findings of several earlier workers[3-9].

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