

The following demonstration was given at the Guildford meeting of the British Pharmacological Society, 29–31 March, 1978.

## Vitamin C and the cholesterol-lowering effect of lofibrate

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The role of vitamin C has been examined on the cholesterol-lowering activity of clofibrate in guinea pigs fed a scorbutic cholesterol diet. Male guinea pigs (Duncan Hartley) received a scorbutogenic (vitamin C-deficient) diet containing 0.3 g% cholesterol (Ginter & Zioch, 1972) for 24 days during which body weight and food-intakes were measured. Guinea pigs on the diet supplemented with 30 mg vitamin C/kg daily, showed normal weight gain and maintained adequate food intake throughout the 24 days (Odumosu & Wilson, 1973). Scorbutic guinea pigs receiving the diet alone, or with cholesterol, increased weight during 14 days, after which it decreased. Food-intake was maintained for 21 days after which loss of appetite occurred. On day 24, plasma and ascorbic acid (AA) levels had increased significantly in the guinea pigs receiving vitamin C ( $P < 0.02$ ). In those receiving the diet alone, or with cholesterol, AA levels had fallen significantly, the reduction being greater in the cholesterol-fed guinea pigs ( $P < 0.05$ ). Cholesterol levels were highest in the cholesterol-fed groups, and lowest in the guinea pigs supplemented with vitamin C.

On day 24, four control guinea-pigs were killed from the scorbutic cholesterol fed group. The 16 remaining guinea-pigs were divided into four groups.

During the following 10 days, two groups received clofibrate (CSc) or clofibrate with supplementary vitamin C (CAASc); the other two received the diet with saline (Sc) or with vitamin C supplement (AASc). Plasma and hepatic values for ascorbic acid and cholesterol are shown in Table 1.

On day 34, body weight and food-intakes had increased in the supplemented groups, but had diminished in those not receiving vitamin C supplementation. Supplements of vitamin C daily with or without clofibrate caused a pronounced increase in plasma and hepatic AA compared with their values on day 24 (CAASc and AASc). Tissue cholesterol was significantly reduced in the guinea pigs receiving clofibrate (CAASc and CSc). The reduction was less in the scorbutic group. It was also significantly reduced in those receiving vitamin C alone (AASc). Cholesterol remained elevated in the guinea pigs receiving the diet alone (Sc). Cholesterol reduction was greatest in the vitamin C supplemented group receiving clofibrate (CAASc). It is concluded that administration of vitamin C daily for 10 days potentiates the cholesterol lowering effect of clofibrate in the plasma and siver of hypercholesterolaemic guinea pigs.

## References

- GINTER, E. & ZIOCH, Z. (1972). Raised ascorbic acid consumption in cholesterol-fed guinea pigs. *Int. J. Vit. Nutr. Res.* **42**, 72–79.  
ODUMOSU, A. & WILSON, C.W.M. (1973). Metabolic availability of Vitamin C in guinea pigs. *Nature, Lond.*, **242**, 519–521.

**Table 1** The effect of daily clofibrate (200 mg/kg) with or without vitamin C (30 mg/kg) for 10 days on tissue AA and cholesterol in guinea pigs after 24 days on a scorbutic-cholesterol diet.  $P$ -values between groups and periods on diet. Values are means  $\pm$  s.d.

Days on diet	Ascorbic acid		P	Cholesterol		P
	Control Day 24	Treatment Day 34		Control Day 24	Treatment Day 34	
Animal groups	Plasma (mg/100 ml)					
Clofibrate P	0.17 ± 0.04	0.25 ±0.01 <0.05	>0.05	426 ± 71	347 ± 27 <0.05	<0.05
Clofibrate + Vitamin C P	0.17 ± 0.04	0.89 ±0.05 <0.05	<0.02	426 ± 71	119 ± 6 >0.05	<0.02
Vitamin C P	0.17 ± 0.04	1.42 ±0.20 <0.01	<0.01	426 ± 71	144 ± 18 <0.02	<0.02
Saline	0.17 ± 0.04	0.13 ±0.03	>0.05	426 ± 71	435 ± 23	>0.05
	Liver (mg/kg)					
Clofibrate P	2.46 ± 0.56	1.89 ± 0.14 <0.02	>0.05	760 ± 46	651 ± 30 <0.02	<0.05
Clofibrate + Vitamin C P	2.46 ± 0.56	9.96 ± 1.45 >0.05	<0.05	760 ± 46	346 ± 61 <0.05	<0.02
Vitamin C P	2.46 ± 0.56	12.70 ± 0.76 <0.01	<0.02	760 ± 46	471 ± 54 <0.05	<0.05
Saline	2.46 ± 0.56	0.98 ± 0.25	0.05	760 ± 46	774 ± 16	>0.05