(3, 10 and 30 mg/kg, i.p.) produced a significant, dose dependent decrease in the MAP and heart rate of LRA ligated rats. Significant reduction in MAP and heart rate was observed in hypertensive rats treated with propranolol (30 mg/kg), atenolol (10 mg/kg), DPJ 890 (3 and 10 mg/kg) and DPJ 955 (10 and 30 mg/kg). The fall in the the MAP produced by DPJ 890 (10 mg/kg) was greater compared to atenolol and propranolol while the effect of DPJ 955 was less than that of atenolol but greater than that of propranolol (Table 1).

The observed change in the MAP and heart rate in LRA ligated rats with DPJ 890 may be due to its stronger receptor (β_1) binding property compared to atenolol.

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Effect of curcumin on triton WR 1339 induced hypercholesterolemia in mice

Sir,

Curcumin (diferuloylmethane), a major component of turmeric, is a yellow pigment obtained from rhizomes of *Curcuma longa,* is commonly used in Indian cuisine as a spice and food-coloring agent. Curcumin and its analogues have a variety of physiological and pharmacological activities such as antioxidant, antiinflammatory, and anticarcinogenic properties.[1] The ability of curcumin to inhibit LDL oxidation and hypocholesterolemic effect in rabbits has been studied. Administration of curcumin to streptozotocin diabetic rats improves lipid profile. The ability of curcumin to decrease serum cholesterol, triglycerides and lipids has been studied extensively in various animal models by different authors.[1,3] But the effect of curcumin on hyperlipidemia induced by triton WR 1339 (Tyloxapol: a nonionic detergent, oxyethylated tertiary octyl phenol formaldehyde polymer) has not yet been studied. In this model to study the hypolipidemic drugs, triton WR 1339 is administered i.v. or i.p. in rodents to produce hypercholesterolemia by accelerating hepatic cholesterol synthesis[5] while in other models, hyperlipidemia is produced by feeding high cholesterol or high fat diet. Moreover Paoletti[4] suggested the use of triton WR 1339 induced hyperlipidaemia as an important approach to screen the action of hypolipidemic drugs. Hence in the present study, the effect of curcumin on serum triglycerides and total cholesterol was studied in triton WR 1339 induced hyperlipidemic mice.

The experiments and protocols described in present report were approved by the Institutional Animal Ethics Committee and are in accordance with guidance of Committee for the Purpose of Control and Supervision of Experiments on Animals (CPCSEA). The study was carried out in in-bred, male, Swiss albino mice (25 ± 4 g). All animals were housed in group of 6–and maintained under standardized condition (12/12 h light/dark cycle, 24° C) with free access to pellet food (CHAKKAN diet, Pranav Agro Pvt. Ltd., India) and water. triton WR 1399 (Tyloxapol) was obtained from Sigma, St. Louis, MO, USA. Curcumin was obtained as a gift sample from Cherrain Chemicals Ltd., India. Curcumin was orally administered in 0.5% sodium carboxy methyl cellulose suspension.

Hyperlipidemia was induced by single intravenous injection of 200 mg/kg of triton WR 1339 in normal saline. Control animals were injected with normal saline

The animals were divided into following groups.

1. Control
2. Triton control
3. Triton treated + curcumin 100 mg/kg
4. Triton treated + curcumin 200 mg/kg
5. Triton treated + curcumin 400 mg/kg
6. Control treated with curcumin 400 mg/kg

Curcumin (100, 200 and 400 mg/kg) was orally administered, immediately as well as 24 h after triton injection. Mice were not fed but had free access to water during the experiment period (44 h). Forty four hours after triton injection, blood was collected from anaesthetized mice by cardiac puncture. Serum cholesterol and triglycerides were estimated using commercially available kits (SPAN Diagnostics Pvt. Ltd.)

The results are expressed as mean ± SEM. The difference between groups was analyzed by one-way analysis of variance (ANOVA) followed by Dennett's test with 5% level of significance ($P<0.05$). Percentage change was calculated using the formula

$$\% \text{ Change} = [(Tt - Tc) / Tc] \times 100$$

Where Tt = values of treated group and Tc = values of respective control group.

Total cholesterol and triglycerides levels were significantly increased in triton-injected animals as compared to control mice. Treatment with curcumin (100 mg/kg) caused 6.2% and 5.0% reduction in total cholesterol and triglycerides respectively. Treatment with (200 and 400 mg/kg) of curcumin caused a dose dependent change in total cholesterol and triglycerides (Table 1). Control mice treated with curcumin had no significant change in total cholesterol and triglycerides.

Table 1

Effect of curcumin treatment on serum triglycerides and total cholesterol levels in control and triton injected mice

Treatment	Triglyceride		Total cholesterol	
	mg/dl	% change	mg/dl	% change
Control (normal saline)	68.9 ± 4.21	-	74.8 ± 6.72	-
CUR (400 mg/kg)	65.3 ± 2.43	1.017 ± 0.23	72.4 ± 4.38	0.98 ± 0.17
TRI	356.2 ± 24.75	-	289.4 ± 18.17	-
TRI+CUR (100 mg/kg)	338.3 ± 19.41*	5.025 ± 1.87	271.5 ± 22.92*	6.185 ± 1.98
TRI+CUR (200 mg/kg)	296.4 ± 28.66**	16.79 ± 2.43*	204.3 ± 27.64**	29.41 ± 3.21**
TRI+CUR (400 mg/kg)	209.5 ± 26.34**	41.18 ± 2.31**	146.7 ± 24.86**	49.31 ± 2.67**
One-way ANOVA F	7534.30	106.9	3654.59	118.9
One-way ANOVA *P*	*< 0.0001*	*< 0.0001*	*< 0.0001*	*<0.0001*

TRI - Triton WR 1339 (200 mg/kg; iv); CUR - Curcumin
% change was calculated using formula %Change = [(Tt – Tc)) / Tc] x 100
where in Tt = values of treated group and Tc = values of respective control group. % change of curcumin group is calculated with respect to control (normal saline) group, while % change of TRI+CUR groups is calculated with respect to TRI group.
All the values are expressed as mean ± SEM. **P*<0.05 and ***P*<0.001 when compared to TRI. n= 6 in each group; df=5,30.

Hypolipidemic effect of curcumin is in concurrence with other studies. Soni *et al* [2] have previously shown the hypocholesterolemic effect of curcumin in human volunteers. Curcumin is reported to have hypolipidemic effect in cholesterol fed rabbits, hypercholesterolemic rats and streptozotocin diabetic rats. This could be due to an increase in HDL cholesterol[3], indicating that curcumin may be mobilizing cholesterol from extra hepatic tissues to the liver where it is catabolised. Curcumin is reported to activate the rate limiting step in cholesterol catabolism, that is, cholesterol 7-α-hydroxylase thereby stimulating the conversion of cholesterol to bile acid, an important pathway in the degradation of cholesterol.[7] The present study shows that the reduction in total cholesterol and triglycerides by curcumin is not attributed to a decrease in absorption of lipids from diet, as lipids (diet) were not administered during the study. Hepatic cholesterol synthesis is accelerated by triton WR 1339. Moreover, triton physically alters very low density lipoproteins rendering them refractive to the action of lipolytic enzymes of blood and tissues, preventing or delaying their removal from blood.[6] Hence the hypolipidemic effect of curcumin administration could be due to an increased catabolism of cholesterol into bile acids.

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Prescribing pattern for outpatients in government hospitals in Jaipur

The WHO-India program on the Rational use of Drugs, which has been going on for almost 20 years in India aims at promoting rational prescribing through a multi-pronged strategy which includes interventions to correct drug use problems, adoption of Essential Drug List (now called the Essential Medicine List, EML), development of Standard Treatment Guidelines, determining and restricting irrational prescribing. Several studies have been conducted to obtain baseline data on WHO-core prescribing indicators in day-to-day practice.[1] The present study was conducted to obtain such information from government hospitals in Jaipur.

Prescriptions were collected from the OPDs of Medicine (Med), Pediatrics (Ped), Surgery and Gynecology (Gyne) from a government-administered teaching hospital namely the S.M.S. Hospital, and two satellite hospitals located in the city of Jaipur. The prescriptions were collected by three knowledgeable and trained workers who were required to record the information in a pre-designed and tested proforma. To eliminate the possibility of bias, the location, the department, and the dates of prescription collection were determined by draw of lots. The observations were compiled to obtain information on some WHO prescribing indicators.

The data show that in general and for the majority of the WHO prescribing indicators, there was no difference (Chi-square test; level of significance – 0.05) between the prescriptions of doctors working in the satellite hospitals and those working in the teaching hospital. The percentage of