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The Effect of Eggs and Other Fat Sources on Cholesterol and  
Fatty Acid Parameters in Growing Rats

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The increase in heart attacks in the past two decades has caused many physicians and research workers to examine the diet of the average American. Frequently blamed are the high levels of cholesterol in the diet, which some researchers say increase blood cholesterol and therefore arteriole placque formation. Two studies have been conducted with rats to test several fat sources for their effects on cholesterol parameters.

Trial 1

Forty-eight weanling rats were randomized into three replicates of each sex. The basal diet was a synthetic casein-sugar diet with no added fat. Other treatments were 10% fat as corn oil, corn oil-low melting margarine, butter, beef tallow or pork lard. Further treatments were 2% cholesterol and 10% whole egg. Rats were provided no means of exercising and no effort was made to control caloric intake.

The effect of the treatment on the adipose tissue was found to be directly related with that of the fat source, with all treatments except butter increasing the level of unsaturation and linoleic acid composition above that of the control. The butter diet decreased unsaturation but had no effect on linoleic acid content.

The treatment effects on blood and liver cholesterol parameters in the male rats are shown in table 1. All fat additions significantly increased serum cholesterol with the pork treatment causing the highest increase. Liver cholesterol was increased by fat additions except for the margarine treatment. The cholesterol treatment resulted in a significantly higher concentration of cholesterol in both tissues.

Trial 2

Sixty male weanling rats were randomized into five replicates of six treatments. The control diet was a synthetic casein-sugar diet with 1% added corn oil. Other treatments were 10% fat as corn oil, butter, raw egg yolk, beef tallow and pork lard. All the treatments were fed isocalorically and the rats were not provided a means for exercise.

Treatment effects on adipose tissue were found to be generally the same as in Trial 1 with all treatments except butter increasing unsaturation over the control.

Although the rats were fed isocalorically, significant differences in blood and liver cholesterol content were observed (table 1). The pork lard and margarine

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diets and to a lesser extent the egg diet significantly increased serum cholesterol over the control, with the more saturated diets, butter and beef, allowing for little or no increase in serum cholesterol. Significant differences were also noted in liver cholesterol, with the rats on the egg diet showing significantly higher values than those on the other treatments in this trial.

Table 1. Treatment Effects on Cholesterol Parameters of Rats With Ad Libitum Versus Isocaloric Feeding

Treatment	<u>Ad Libitum feeding - Trial 1</u>		<u>Isocaloric feeding - Trial 2</u>	
	Serum mg/100 m	Liver mg/gm	Serum mg/100 m	Liver mg/gm
Control	65	2.5	81	2.3
Corn oil	92	3.1	--	--
Margarine	91	2.5	101	2.1
Butter	83	3.0	87	2.5
Egg	82	3.6	92	6.0
Cholesterol	101	5.5	--	--
Beef	94	3.4	79	2.8
Pork	116	3.4	108	2.9