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Some Effects of Egg Fat, Corn Oil  
and Lard on Adult Rats

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Much has been said and written about the American diet and its possible effects on heart disease. There are those who contend that major changes must be made in dietary patterns of the American people, while others say that little evidence is available to link diet with heart disease. Researchers will agree that it is hard to maintain scientific objectivity when human welfare is considered. Therefore, when conducting research of this nature, the ultimate truth is required.

Since many studies have shown serum cholesterol level to be related to Coronary Heart Disease (CHD), many experiments have been conducted to test dietary effects on serum cholesterol. Two such experiments using albino rats have been conducted in our laboratory and the results reported (A.S. Series 72-12). Another study is now under way and will be discussed here.

Seventy adult albino rats previously fed practical diets were divided into seven treatments to determine the effect of corn oil, egg fat and lard on serum cholesterol. The three lipids were fed to contribute 20 or 40% of the caloric value of the diet. For many Americans, 25% of their daily caloric intake comes from fat. A seventh treatment included only 2% corn oil and served as a control diet, with about 5% of its calories thus coming from fat. The semi-purified diets were fed on an isocaloric basis each day. The egg fat was extracted from egg yolk with petroleum ether and therefore contained the egg cholesterol plus most of the other egg lipids.

As shown in the table, some differences in serum levels are quite apparent. After body weights became stabilized, rats on all treatments showed increases in serum cholesterol with those on the egg diets showing the largest increases. In general, no differences occurred due to fat level in the diet. For corn oil particularly, rats on the 40% diets showed lower cholesterol values than those on diets with 20% of their calories from corn oil. It is interesting to note that, although the egg fat diets did increase serum cholesterol by about one-third, feeding twice the amount of cholesterol had very little, if any, effect upon serum cholesterol.

No analyses have been made on the diets to check their cholesterol content, but calculated cholesterol consumption indicated that about 100 mg per day were obtained from the 20% egg fat diet and about 200 mg from the 40% diet. An average egg contains about 250 to 300 mg of cholesterol. This amount of cholesterol consumption from the 20% egg fat diet is equivalent to about 30 to 50 eggs per day for the average American male.

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A discussion of diet patterns and their possible role in CHD would be too cumbersome here. In summary though, human consumption of vegetable oils has increased markedly while consumption of eggs and animal fats has declined. In spite of these dietary changes, CHD has increased dramatically, suggesting that other risk factors are playing a greater role in this disease.

Nevertheless, many persons are recommending major dietary changes for the whole population. Do we upset a whole nation's diet for an unknown percentage of people who might benefit from a radical dietary change? A drastic change could cause new problems such as nutritional imbalances, deficiencies or metabolic disruptions. Such are concerns we cannot completely evaluate with our present knowledge, but these studies with rats indicate that typical diets play a minimal role in maintaining serum cholesterol levels. Only with massive cholesterol intakes were higher serum cholesterol levels noted.

Table 1. Effect of Corn Oil, Egg Fat and Lard on Serum Cholesterol and Weight of Adult Rats

Week of experiment	Control	Corn oil <sup>1</sup>		Egg fat <sup>1</sup>		Lard <sup>1</sup>		
		20%	40%	20% <sup>2</sup>	40%	20%	40%	
Mg cholesterol/100 ml blood								
0	99	102	104	106	111	102	102	
4	109	122	114	123	132	116	126	
8	99	113	110	122	154	117	126	
14	122	119	115	129	159	123	138	
20	145	184	156	214	221	164	158	
24	138	160	139	208	199	161	146	
28	157	169	154	233	238	165	172	
32	146	155	150	211	220	150	152	
Avg. body wt. in gm								
0	382	372	388	381	364	378	378	
4	404	408	416	400	379	406	402	
8	408	411	423	407	379	415	414	
12	402	414	119	399	364	417	413	
16	422	434	446	429	399	442	437	
20	418	438	454	431	400	439	436	
24	446	458	481	463	438	467	461	
28	457	456	483	461	332	472	464	
32	467	469	491	470	436	482	474	
36	472	472	496	480	447	484	480	
40	479	475	487	470	435	481	477	

<sup>1</sup> Included in the diet to supply the indicated proportion of calories.  
<sup>2</sup> The calculated cholesterol intake is 100 mg/rat/day. This would be equivalent to about 30 to 50 eggs/day for a man.