Abstracts

• Biochemistry and Nutrition

SYNTHESIS OF CHLOROPLAST MEMBRANE LIPIDS AND CHLOROPHYLL IN SYNCHRONOUS CULTURES OF CHLAMYDOMONAS REINHARDI. J.C. Beck and R.P. Levine, *Biochim. Biophys. Acta* **489**, 360–9 (1977). Chloroplast membrane lipid synthesis has been studied in synchronously growing cultures of *Chlamydomonas reinhardi*. The synthesis of sulfolipid and phospholipid were measured by incorporation of $^{35}SO_4^{2-}$ and $^{32}PO_4^{3-}$ during a 1-h pulse. Galactolipid synthesis was measured by $H^{14}CO_3^-$ incorporation into lipid fractions separated by thin layer chromatography. Lipid synthesis occurs principally during the light portion of the synchronous cycle. Phosphatidylglycerol is synthesized between 3–4 h in the light and sulfolipid is labeled between 7–9 h in the light. Galactolipid synthesis appears to reach maximal rates shortly after the lights go on and again at 7 h. Chlorophyll reaches maximal rates of synthesis after 7 h. These lipids are made and inserted into the chloroplast membrane prior to major increases in photosynthetic capacity. Our results also show that chloroplast membrane lipids are synthesized in a sequential or multistep process.

ACTION OF INSULIN AND CATECHOLAMINES ON THE PHOSPHORYLATION OF PROTEINS ASSOCIATED WITH THE CYTOSOL, MEMBRANES, AND "FAT CAKE" OF RAT FAT CELLS. W.B. Benhamin and N. Clayton, *J. Biol. Chem.* **253**(5), 1700–9 (1978). Hormone-induced phosphoprotein phosphorylations were studied in isolated rat fat cells and in subcellular fractions derived from fat cells. Insulin action increased the phosphorylation of two phosphoproteins designated 2 and 6b, the molecular weights of which are 130,000 and 62,000, respectively. Epinephrine and isoproterenol action decreased the phosphorylation of phosphoprotein-6b and markedly increased the phosphorylation of phosphoprotein-5, the molecular weight of which is approximately 65,000 to 70,000. Since the phosphorylation of phosphoprotein-6b is regulated by hormones and has been found to be associated with membrane filaments and short segments, phosphoprotein-6b may be involved in the elaboration of insulin action.

EFFECT OF POLYOL DETERGENTS ON CHOLESTEROL AND TRIGLYCERIDE ABSORPTION. HYPOLIPIDEMIC ACTION OF CHRONIC ADMINISTRATION OF HYDROPHOBIC DETERGENT. W.J. Bochenek and J.B. Rodgers, *Biochim. Biophys. Acta* **489**, 503–6 (1977). Nonionic detergents were found to affect absorption of neutral lipid and cholesterol. The effects of these detergents were related to their physicochemical properties. The most effective detergents for producing an inhibition of lipid absorption were detergents containing 90% hydrophobic components. Hydrophilic detergents did not interfere with lipid absorption and in some cases, it was facilitated. Studies done over a period of one month demonstrate that addition of a hydrophobic detergent to a high fat-high cholesterol diet results in lower serum levels of cholesterol and triglyceride and prevents cholesterol accumulation in the liver of the rat. This effect was also associated with significant loss of body weight.

ROLE OF PHOSPHATIDYLCHOLINE ON MICROSOMAL CHAIN ELONGATION AND THE FATE OF STEAROYL-CoA IN RAT LIVER MICROSOMES. Y. Kawashima and Y. Suzuki, *Biochim. Biophys. Acta* **529**, 489–92 (1978). The effect of phosphatidylcholine dispersion on the chain elongation of palmitoyl-CoA in rat liver microsomes has been investigated. Addition of phosphatidylcholine increased the formation of stearic acid and its incorporation into phosphatidylcholine. The incorporation of newly formed stearic acid into microsomes was much higher than that into the added phosphatidylcholine dispersion.

LIVER AND THYMUS LIPID COMPOSITION IN AKR MICE WITH AND WITHOUT LYMPHOMAS. S. Kitada *et al.*, *Lipids* **13**, 464–7 (1978). Lipid composition of liver and thymus in controls, early stage lymphoma, and advanced stage lymphoma-bearing AKR mice was studied. There was a significant decrease in the liver total lipid content in mice with advanced lymphoma, whereas in the early stages, no quantitative change was seen. Similar changes were seen in the thymus, in which the lipid composition reflected the transformation from normal to malignant cells.

FUNCTION OF PHOSPHOLIPIDS ON THE REGULATORY PROPERTIES OF SOLUBILIZED AND MEMBRANE-BOUND SN-GLYCEROL-3-PHOSPHATE ACYLTRANSFERASE OF ESCHERICHIA COLI. M. Kito, M. Ishinaga and M. Nishihara, *Biochim. Biophys. Acta* **529**, 237–49 (1978). Glycerophosphate acyltransferase (acyl-CoA: *sn*-glycerol-3-phosphate *O*-acyltransferase, EC 2.3.1.15) solubilized from *Escherichia coli* membranes was highly activated by phosphatidylglycerol. Phosphatidylethanolamine, cardiolipin and 1,2-diacyl-*sn*-glycerol 3-phosphate showed no effect. The K_m of the enzyme for *sn*-glycerol 3-phosphate was increased 20-fold by solubilization. The value could not be restored by the addition of phospholipids.

VERY LOW DENSITY LIPOPROTEIN STIMULATION OF TRIGLYCERIDE ACCUMULATION IN RAT PREADIPOCYTE CULTURES. M. de la Llera *et al.*, *Biochim. Biophys. Acta* **529**, 359–64 (1978). Exposure of cultured rat epididymal preadipocytes to human very low density lipoproteins (VLDL) resulted in the rapid accumulation of large amounts of cellular triglyceride which was accompanied by the appearance of numerous large cellular lipid inclusions. Addition of heparin produced a two-fold stimulation of lipoprotein induced triglyceride accumulation. Supplementation of the growth medium with either low density lipoprotein, oleic acid or artificial triglyceride emulsion did not produce cellular triglyceride levels equivalent to that obtained with VLDL. Fibroblastic cells from rat skin and lung did not accumulate triglycerides when exposed to VLDL and heparin.

BIOSYNTHESIS OF HYDROCARBONS IN INSECTS: DECARBOXYLATION OF LONG CHAIN ACIDS TO N-ALKANES IN PERIPLANETA. M.A. Major and G.J. Blomquist, *Lipids* **13**, 323–8 (1978). The biosynthetic pathway of *n*-alkanes was investigated in the cockroaches *Periplaneta americana* and *Periplaneta fuliginosa*. Both sodium (1-^{14}C)acetate and randomly tritiated long chain fatty acids were incorporated into the cuticular hydrocarbons of both species. The relative incorporation of acetate into each component of the hydrocarbon fraction was about the same as the relative amount of each component in the fraction. The demonstration of the direct decarboxylation of long chain fatty acids to *n*-alkanes one carbon unit shorter and the lack of incorporation of proposed intermediates of a condensation-reduction pathway constitute the strongest evidence to date that insects utilize an elongation-decarboxylation pathway for *n*-alkane biosynthesis.

HEPATIC FATTY ACID OXIDATION AND KETOGENESIS AFTER CLOFIBRATE TREATMENT. G.P. Mannaerts *et al.*, *Biochim. Biophys. Acta* **529**, 201–11 (1978). The effect of clofibrate treatment on hepatic ketogenic capacity was studied in rats. It is concluded that the enhanced ketogenic capacity induced by clofibrate is the result of an increase in mitochondrial β-oxidation, an increase in the activity of carnitine palmitoyltransferase and possibly of the observed increases in hepatic carnitine content and fatty acid uptake.

BILE ACID POOL CHANGES AND REGULATION OF CHOLATE SYNTHESIS IN EXPERIMENTAL DIABETES. F.O. Nervi *et al.*, *Biochim. Biophys. Acta* **529**, 212–23 (1978). The effect of alloxan-diabetes and insulin treatment in bile acid pool size and composition, bile acid secretion and cholic acid synthesis was investigated in the rat. The size of the cholate pool was

significantly increased 4 days after diabetes induction. It reached a constant size three times that of control animals after 2 weeks of diabetes. These studies demonstrated that bile acid metabolism was profoundly changed in alloxan-diabetic rats and suggested that insulin may play an important role in the regulation of bile acid synthesis and intestinal absorption.

ENZYMIC HYDROLYSIS OF DIOL LIPIDS BY PANCREATIC LIPASE. M. Noda, H. Tsukahara and M. Ogata, *Biochim. Biophys. Acta* 529, 270–9 (1978). Chain length and positional specificities of pancreatic lipase for diol lipids have been examined by use of the synthetic substrates such as the diol esters and the related esters that contain C_6–C_{20} even-numbered saturated acids and oleic acid as fatty acids, and ethylene glycol, 1,2- and 1,3-propanediols, 1,3-, 1,4- and 2,3-butanediols, monohydric alcohols, and glycerol as alcohols. Pancreatic lipase specifically released only the fatty acids esterified with the primary hydroxyl groups of diols.

WESTERNIZATION OF DIET AND SERUM LIPIDS IN ETHIOPIANS. R. Ostwald and M. Gebre-Medhin, *Am. J. Clin. Nutr.* 31, 1028–40 (1978). The dietary pattern, physical work output, and blood lipids were studied in three groups of healthy, young, urban Ethiopian men differing in the degree of "Westernization." The results showed striking increases in serum lipids that were associated with the degree of Westernization of the diet. These changes could not be accounted for by differences in other group characteristics such as age, weight, smoking, or length of residence in Addis Ababa. The effects of the level of physical work output on serum lipids were equivocal because the methods used for the assessment of energy output yielded crude approximations only.

RATE OF RELEASE OF HEPATIC TRIACYLGLYCEROL INTO SERUM IN THE STARVED RAT. J.F. Palmer, C. Cooper and R.A. Shipley, *Biochem. J.* 172, 219–26 (1978). After an intravenous injection of a pulse of (U-^{14}C)palmitate to starved rats, the time-dependent radioactivity profiles were determined in the triacylglycerol (triglyceride) of hepatic microsomal fractions, floating fat, mitochondria and nuclei. The profile of activity in serum gave a value of 0.08 mg/min per 100 g body wt. for the irreversible disposal rate of triacylglycerol from serum. This value, combined with the previously estimated rate of movement of triacylglycerol from serum to liver, and the reported rate from intestine to serum, gave a calculated value of 0.35 mg/min per 100 g body wt. for release rate of triacylglycerol from liver to serum. It was concluded that the use of Triton underestimates the true rate of movement of triacylglycerol from liver to serum.

HIGH FAT RATIONS FOR DAIRY COWS. EFFECTS OF FEED INTAKE, MILK AND FAT PRODUCTION, AND PLASMA METABOLITES. D.L. Palmquist and H.R. Conrad, *J. Dairy Sci.* 61, 890–901 (1978). High fat diets (2.9 to 10.8% ether extract in total diet dry matter) for cows in early lactation were compared in two 4 × 4 Latin squares. In Trial 1, grain concentrate was 42% of the ration dry matter. Total diets and their ether extract (percent) were: 1) control, 3.2; 2) ground raw soybeans 5.9; 3) hydrolyzed fat, 5.7; and 4) hydrolyzed fat, 10.8. While dry matter intake of Holsteins was lowest with Diet 2 and highest with Diet 3, milk production, fat, and protein were not different. Jerseys produced the most fat-corrected milk per unit metabolic body size on Diet 4. Seven to eight percent fat can be included in lactation total diets to 1) increase diet energy density or 2) increase the forage to concentrate ratio to maintain milk fat percent, without negative effects on digestibility.

TURNOVER OF LIPOPROTEINS AND TRANSFER TO MILK FAT OF DIETARY (1-CARBON-14) LINOLEIC ACID IN LACTATING COWS. D.L. Palmquist and W. Mattos, *J. Dairy Sci.* 61, 561–5 (1978). Chylomicra and very low density lipoproteins labeled with 1-Carbon-14 linoleic acid were isolated from thoracic duct lymph of a calf fed the labeled fatty acid and injected into lactating cows fed a control diet of hay, grain, and corn silage (Experiments 1 and 3) or a high grain-restricted roughage diet (Experiment 2). Particle size of injected material influenced rate of removal of very low density lipoproteins whereas removal of low density lipoproteins was slowest in the cow fed a high grain diet.

PHOSPHOLIPASE A_2 OF RAT LIVER MITOCHONDRIA IN VITAMIN E DEFICIENCY. A.S. Pappu, P. Fatterpaker and A. Sreenivasan, *Biochem. J.* 172, 349–52 (1978). There is a more than 2-fold increase in phospholipase A_2 activity (EC 3.1.1.4) of liver mitochondria isolated from vitamin E-deficient rats compared with that in normal rats. α-Tocopherol in lipoprotein-bound form is more effective than free α-tocopherol in restoring the enzyme activity to normal.

EFFECT OF LEVEL OF FEED INTAKE ON LACTATE AND ACETATE METABOLISM AND LIPOGENESIS IN VIVO IN SHEEP. R.L. Prior, *J. Nutr.* 108, 926–35 (1978). Experiments were conducted to investigate the relative importance of acetate and lactate as precursors for fatty acid synthesis in vivo in sheep fed ad libitum (3.3 Mcal of metabolizable energy (ME)/day) or a restricted level of feed intake (1.7 Mcal of ME/day). Tritiated water (^3H_2O) was also used to estimate fatty acid synthesis from all carbon precursors rather than from a specific carbon precursor. On the basis of the (^{14}C)lipid relative specific activity, lactate was incorporated into carcass adipose tissue fatty acids at 38% of the rate for acetate in ad libitum fed sheep and only 16% and 21% of the rate for acetate in perirenal and omental adipose tissue. Lactate appears to have been more important as a lipid precursor in ad libitum fed than in restricted fed sheep.

NUTRITION SURVEY OF FINNISH RURAL CHILDREN. IV. SERUM CHOLESTEROL VALUES IN RELATION TO DIETARY VARIABLES. L. Rasanen *et al.*, *Am. J. Clin. Nutr.* 31, 1050–6 (1978). In connection with a survey of child nutrition in Finland a study was carried out on the serum cholesterol concentration in childhood and its relationship to dietary and other variables. The material consisted of 1496 children ages 5, 9, and 13 years from 14 local districts in Finland. Total cholesterol was determined from nonfasted venous serum samples by a modification of the p-toluenesulfonic acid reaction. Food consumption was investigated by the 24-hr recall method and nutrient intakes determined from these results using food composition tables. Serum cholesterol concentration was not correlated with sex, relative body weight, or systolic or diastolic blood pressure. High cholesterol concentrations appeared to be associated with traditional dietary habits and especially with a high proportion of saturated fats in the diet.

EFFECT OF DIETARY SUCROSE AND CHOLESTEROL ON ATHEROSCLEROSIS, LIVER MALATE DEHYDROGENASE AND PLASMA LIPOPROTEIN LIPASE LEVELS IN PIGEONS. R.M. Ray Jr. and F. Young, *J. Nutr.* 108, 944–53 (1978). Eight-week old atherosclerosis-resistant Show Racer (SR) and -susceptible White Carneau (WC) pigeons were fed one of four purified diets as follows: a basal (dextrin) diet (B), a basal-cholesterol diet (BC), a sucrose diet (S), or a sucrose-cholesterol diet (SC). Blood cholesterol and triglyceride concentrations, liver malate dehydrogenase activity (MDHA), liver cholesterol and triglyceride concentrations, liver protein and total lipid levels, and plasma lipoprotein lipase activity (LPLA) were assayed and evaluated statistically to determine their relationships to dietary modification and their significance in the pathogenesis of aortic atherosclerosis. A larger number of SR developed the disease when subjected to elevated blood triglyceride levels while a larger number of WC developed the disease when subjected to elevated blood cholesterol levels.

LIPOPROTEIN AND CHOLESTEROL METABOLISM IN RABBIT ARTERIAL ENDOTHELIAL CELLS IN CULTURE. J.P.D. Reckless, D.B. Weinstein and D. Steinberg, *Biochim. Biophys. Acta* 529, 475–87 (1978). Like all other peripheral cells types thus far studied in culture, endothelial cells derived from the rabbit aorta bind, internalize and degrade low density lipoprotein (LDL) at a significant rate. At any given LDL concentration, the metabolism by rabbit endothelial cells was slower than that by fibroblasts or smooth muscle cells. Thus, longer incubations were required to achieve a net increment in cell cholesterol content or to suppress endogenous sterol synthesis; after 18–24 h incubation in the presence of LDL at 100 μg LDL protein/ml inhibition was greater than 80% relative to the rate in cells incubated in the absence of lipoproteins.

THE POSITIONAL DISTRIBUTION OF A SERIES OF POSITIONAL ISOMERS OF CIS-OCTADECENOIC ACID IN PHOSPHATIDYLGLYCEROL FROM ACHOLEPLASMA LAIDLAWII. B.Y. Saito and R.N. McElhaney, *Biochim. Biophys. Acta* 529, 224–9 (1978). The positional distributions of a series of fifteen positional isomers of *cis*-octadecenoic acid in the phosphatidylglycerol synthesized by *Acholeplasma laidlawii* B were determined. The specificity for the 2-position generally increased (and that for the 1-position decreased) as the position of the double bond moved

from the methyl terminus toward the carbonyl group of the hydrocarbon chain.

EFFECT OF HIGH DENSITY LIPOPROTEINS ON THE CHOLESTEROL UPTAKE BY ISOLATED PIG CORONARY ARTERIES. J.S.M. Sarma, G.V. Tschurtschenthaler, and R.J. Bing, *Artery* 4(3), 214–23 (1978). Isolated pig coronary arteries perfused with isologous plasma in the presence of added HDL took up significantly lesser amounts from the ^{3}H-labelled plasma pool compared with the paired controls. The mean cholesterol uptake by control arteries was 180 ± 34 n moles/g whereas the mean cholesterol uptake by arteries perfused in the presence of added HDL was only 118 ± 22 n moles/g ($p < 0.001$). The results presented here complement the epidemiological and cell culture studies by others and seem to fit into the general hypothesis that HDL promote efflux of cholesterol from tissue.

LIPOXYGENASE-LIKE ENZYME IN RAT TESTIS MICROSOMES. I. Shahin, S. Grossman and B. Sredni, *Biochim. Biophys. Acta* 529, 300–8 (1978). Microsomes, separated from rat testes, were found capable of oxidizing linoleate and arachidonate. The enzyme activity was solubilized with 1% Triton X-100 in acetate buffer (pH 5.0) and purified by affinity chromatography. Three types of compounds separated by thin-layer chromatography were generally present in the lipoxygenase-like enzyme reaction on linoleic acid: substrate fatty acid, polar by-products and hydroperoxides. The hydroperoxides were analyzed by infrared spectra and mass spectrometry and showed the presence of both 9- and 13-hydroxy isomers.

LIPOGENESIS IN IRON-DEFICIENT ADULT RATS. A.R. Sherman, *Lipids* 13, 473–8 (1978). Iron deficient (5 ppm Fe) or control (307 ppm Fe) diets were fed ad libitum to female rats for 7 weeks, and then meal-fed for 4 weeks. Body weights, hemoglobin levels, and hematocrits were lower ($p < 0.01$) in deficient group (184 ± 7, 7.1 ± 0.4, 32.7 ± 0.6) than in the control group (220 ± 10, 16.9 ± 0.3, 51.8 ± 0.8) at the end of the 11-week experiment. No significant differences were found in incorporation of ^3H_2O or (U-^{14}C) glucose into lipids or CO_2 in jejunum. Thus, iron-deficient adult rats have greater lipid synthesis from ^3H_2O and glucose in adipose tissue than rats fed adequate levels of iron.

EFFECTS OF FEEDING PROTECTED TALLOW TO DAIRY COWS IN EARLY LACTATION. N.E. Smith, W.L. Dunkley, and A.A. Franke, *J. Dairy Sci.* 61, 747–56 (1978). Mixed diets containing 0 (control), 15 (medium fat), and 30% (high fat) of a protected tallow supplement (60% formylated soybean meal and 40% tallow) were fed to Holstein cows during the first 15 wk of lactation. Calculated energy densities of the diets were 1.85, 1.85, and 2.15 Mcal net energy lactation/kg dry matter. Dry matter intakes were higher on control and medium fat than on high fat diet, but energy intakes were similar for all three diets. Treatments did not affect milk yield, but both diets containing protected tallow increased yields of fat and fat-corrected milk and energy efficiency, and decreased yields of solids-not-fat.

EFFECT OF EXCESS DIETARY L-HISTIDINE ON PLASMA CHOLESTEROL LEVELS IN WEANLING RATS. J.K. Solomon and R.L. Geison, *J. Nutr.* 108, 936–43 (1978). Supplementation of a closed formula, cereal based stock diet with excess L-histidine at a 5% or 8% level for 4 days reduced growth and induced hepatomegaly and an increase in plasma cholesterol levels in weanling rats. The enlargement of the liver was in part due to glycogen accumulation; plasma glucose concentration was unchanged. These results suggest that L-histidine and/or urocanic acid induce a hypercholesterolemia which disappears several days after the supplementation ceases.

EFFECTS OF DIET ON SWINE GLYCERIDE LIPID METABOLISM. D.G. Steffen *et al.*, *J. Nutr.* 108, 911–8 (1978). Swine were fed equal amounts of isoenergetic-isonitrogenous diets with low-fat or high-fat content. The high-fat diet, as well as starvation, suppressed the synthesis of fatty acid from glucose in adipose tissue. Diet had no effect on adipose tissue enzymes associated with glyceride synthesis; whereas starvation caused all activities expressed per g tissue to decrease. Starvation lowered the hepatic esterification of glycerol-3-phosphate but did not influence other enzymes.

REMOVAL OF CHOLESTEROL FROM FIBROBLASTS AND SMOOTH MUSCLE CELLS IN CULTURE IN THE PRESENCE AND ABSENCE OF CHOLESTEROL ESTERIFICATION IN THE MEDIUM. O. Stein, R. Goren and Y. Stein, *Biochim. Biophys. Acta* 529, 309–18 (1978). Removal of cellular cholesterol from human skin fibroblasts and rat aortic smooth muscle cells was studied in tissue culture. The cells were prelabeled with (^{3}H)cholesterol and incubated with medium containing very low density- and low density lipoprotein-free serum at concentrations of 5–20%. Labeled cholesterol was recovered in the medium containing the very low density- and low density lipoprotein-free serum and up to 40% of the label was found in the form of cholesterol ester in the presence of unheated serum. The present results indicate that lecithin:cholesterol acyltransferase activity is not indispensable for cholesterol removal from cells in culture under conditions which were designed to mimic interactions between extracellular fluid and peripheral cells in vivo.

THE FATTY ACIDS OF HUMAN SEBACEOUS GLAND PHOSPHATIDYLCHOLINE. M.E. Stewart *et al.*, *Biochim. Biophys. Acta* 529, 380–6 (1978). The fatty acids of human sebaceous gland phosphatidylcholine were examined by gas chromatography and by analysis of the double bond positions in the C-16 and C-18 monoenes. Compared to phosphatidylcholine from other organs, sebaceous gland phosphatidylcholine was found to be deficient in essential fatty acids and poly-unsaturated fatty acids. Analysis indicates that the fatty acids of sebaceous gland phospholipids are predominantly of types synthesized in sebaceous glands.

THE DEGRADATION OF VERY LOW DENSITY LIPOPROTEIN BY THE EXTRAHEPATIC TISSUES OF THE RAT. B.S. Suri, M.E. Targ and D.S. Robinson, *Biochim. Biophys. Acta* 529, 331–41 (1978). The supradiaphragmatic rat was used to investigate the metabolism by the extrahepatic tissues of endogenous plasma VLDL of $d < 1.006$ g/ml. The demonstration that, at 20, 30, and 40 min after the isolation of the supradiaphragmatic rat, the VLDL lose respectively 29, 54 and 63% of their triglyceride provides evidence for the suitability of this preparation for the investigation of VLDL degradation. At all time intervals after the isolation of the supradiaphragmatic rat, VLDL triglyceride loss was accompanied by similar losses of cholesterol, protein and phospholipid, with the result that the percentage by weight composition of the residual VLDL remained unaltered.

THE IMPORTANCE OF THE LYSOPHOSPHATIDYLCHOLINE AND CHOLINE MOIETY OF BILE PHOSPHATIDYLCHOLINE IN LYMPHATIC TRANSPORT OF FAT. P. Tso, J. Lam and W.J. Simmonds, *Biochim. Biophys. Acta* 528, 364–72 (1978). A luminal supply of biliary phosphatidylcholine is important in the translocation of absorbed fat into lymph and in the amount and composition of phosphatidylcholine concurrently synthesized. This study was undertaken to determine whether the effect was due to absorbed lysophosphatidylcholine, to a specific (1-palmitoyl) bilary lysophosphatidylcholine or to extra choline supplied by lysophosphatidylcholine. It seemed likely from the smaller effect of supplemented choline and from the fatty acid composition of lymph phosphatidylcholine that the essential requirement was a supply of absorbed lysophosphatidylcholine for rapid reacylation to phosphatidylcholine.

EFFECT OF NUTRITION ON SUBCELLULAR LOCALIZATION OF RAT FAT-CELL LIPOPROTEIN LIPASE. A. Vanhove *et al.*, *Biochem. J.* 172, 239–45 (1978). This study supports the possibility for multiple subcellular forms of lipoprotein lipase. The total activity of lipoprotein lipase per g of intact epididymal adipose tissue from fed rats is much higher than that from starved rats. The isolated fat-cells of fed and of starved rats have lipoprotein lipase of almost the same activity per g of fat-pads. The isolated fat-cells of starved rats have a much higher proportion of total activity per g of the intact tissue than do those of fed rats. In intact epididymal adipose tissue from fed rats, the activity per g of tissue of lipoprotein lipase of plasma membranes is much higher than that in the same fraction from starved rats. By contrast, the activities per g of tissue in plasma membranes obtained from starved or from fed rats by collagenase treatment were similar.

THE EFFECT OF ACYLCARNITINES ON THE OXIDATION OF BRANCHED CHAIN α-KETO ACIDS IN MITOCHONDRIA. J. Bremer and E.J. Davis, *Biochim. Biophys. Acta* 528, 269–75 (1978). The oxidation of ^{14}C-labelled branched-chain α-keto acids corresponding to the branched-chain amino acids valine, iso-

leucine and leucine has been studied in isolated mitochondria from heart, liver and skeletal muscle. Heart and liver mitochondria have similar capacities to oxidize these α-keto acids based on protein content. Skeletal muscle mitochondria also show significant activity. The results are discussed in relation to the regulation of branched-chain amino acid metabolism in the body.

ELIMINATION OF LOW STEADY-STATE CONCENTRATIONS OF (5,6-$^3H_2$)PROSTAGLANDIN E_1 IN THE PULMONARY AND THE SYSTEMIC CIRCULATIONS OF ANAESTHETIZED RATS. K. Bukhave and H.S. Hansen, *Biochim. Biophys. Acta* **489**, 403–14 (1977). The elimination of (^{3}H)prostaglandin E_1 in anaesthetized rats was studied by continuous intravenous or intraarterial infusions, producing steady-state concentrations at the level of endogenous prostaglandin E_2 in mixed venous blood. Blood samples (0.5 ml) were collected from the carotid artery or the right atrium, respectively. The levels of (^{3}H)prostaglandin E_1 were measured at different infusion time intervals and the ^{3}H-labeled hydrophobic metabolites characterized. Cardiac output was estimated by a modification of the dye infection method, using ^{125}I-labelled albumin as the marker.

THE ROLE OF DIETARY PROTEIN IN HYPERCHOLESTEROLEMIA AND ATHEROSCLEROSIS. K.K. Carroll (Dept. of Biochem., Univ. of Western Ontario, London, Ontario, Canada N6A 5C1) *Lipids* **13**, 360–5 (1978). Rabbits became hypercholesterolemic and develop atherosclerotic lesions when fed a cholesterol-free, semipurified diet. This provides a useful experimental model in which a moderate hypercholesterolemia can be maintained for long periods of time. The elevation of plasma cholesterol and development of atherosclerosis are dependent on the kind of protein in the diet and can be prevented by replacing casein with isolated soy protein. Feeding trials with enzymatic digests or mixtures of amino acids indicate that this difference is at least partly due to the differing amino acid composition of the two proteins. Rabbits on the soy protein diet showed higher rates of oxidation and turnover of cholesterol than those on the casein diet. Dietary protein has generally been considered to be of little significance in the etiology of atherosclerosis in humans, but evidence is accumulating which indicates that it can have a significant influence on human plasma cholesterol levels.

LIPOPROTEIN LIPASE OF CULTURED MESENCHYMAL RAT HEART CELLS. II. HYDROLYSIS OF LABELED VERY LOW DENSITY LIPOPROTEIN TRIACYLGLYCEROL BY MEMBRANE-SUPPORTED ENZYME. T. Chajek, O. Stein and Y. Stein, *Biochim. Biophys. Acta* **528**, 466–74 (1978). Very low density lipoprotein was isolated from rat plasma after injection of (^{14}C)palmitic acid to label the triacylglycerol. The labeled lipoprotein was added to serum-free medium containing excess albumin, and its hydrolysis was measured in the presence of cultured rat heart cells, which had been separated by preplating into F_1 cultures, consisting mainly of mesenchymal cells and M cultures, composed predominantly of cardiac myocytes. Thus, it seems that delivery of enzyme to the plasma membrane occurs after the arrest of protein synthesis and the surface activity will fall only after a significant depletion of the intracellular store.

DIFFERENCES BETWEEN LEAN AND OBESE ZUCKER RATS: THE EFFECT OF POORLY ABSORBED DIETARY LIPID ON ENERGY INTAKE AND BODY WEIGHT GAIN. K. Comai, J. Triscari and A.C. Sullivan, *J. Nutr.* **108**, 826–35 (1978). The effects of substitution of a poorly absorbable dietary lipid (hydrogenated soybean oil) for corn oil (CO) in the diets of lean and obese Zucker rats on food intake, weight gain, serum lipids, and pancreatic lipase activity were observed. During the 24-day study the rats were fed 20% fat diets. The lean female and male Zucker rats compensated for the poorly absorbed dietary hydrogenated soybean oil (HO) by increasing food consumption. Both obese and lean Zucker rats fed the HO diet exhibited decreases in serum triglycerides, cholesterol, phospholipids, and glucose compared to rats fed the CO diet. Pancreatic lipase (EC 3.1.1.3) activities were higher in obese rats compared to lean, and lower in rats fed the HO diet compared to the CO diet.

EFFECTS OF DIETARY VITAMIN E, SELENIUM, AND POLYUNSATURATED FATS ON IN VIVO LIPID PEROXIDATION IN THE RAT AS MEASURED BY PENTANE PRODUCTION. C.J. Dillard, R.E. Litov and A.L. Tappel, *Lipids* **13**, 396–402 (1978). Starting at 21 days of age, groups of six rats each were fed a basal Torula yeast diet supplemented with 0.4% L-methionine and varying amounts of vitamin E as dl-alpha tocopherol acetate, selenium as sodium selenite, and with either 10% stripped corn oil, stripped lard, or coconut oil. By 7 wk, pentane production by rats fed a corn oil diet deficient in both vitamin E and selenium was twice that by rats fed 0.1 or 1 mg of selenium per kg of the same basal diet. Blood glutathione peroxidase activity after 7 wk was proportional to the logarithm of dietary selenium.

EFFECTS OF DIETARY ANTIOXIDANTS ON IN VIVO PEROXIDATION IN THE RAT AS MEASURED BY PENTANE PRODUCTION. J.E. Downey, D.H. Irving and A.L. Tappel, *Lipids* **13**, 403–7 (1978). The hypothesis that pentane is an in vivo product of lipid peroxidation was confirmed by a study of the effects of a nonbiological antioxidant on pentane production in rats fed a diet deficient in vitamin E and supplemented with 0.01% N,N′-diphenyl-p-phenylenediamine (DPPD). Seven rats were fed a vitamin E-deficient diet starting at 3 wk of age. After 5 wk, 0.01% DPPD was added to the diets of three rats (group DPPD) while the diet of the other four rats remained unchanged (group OE). There were significant decreases in pentane production by rat groups 0 → 3.3E, 0 → 11E, and 200E within 2 wk of the change to the vitamin E-supplemented diets. After about 5 wk of being fed their respective vitamin E-supplemented diets, pentane breath levels had stabilized. Breath pentane levels were inversely proportional to the log of dietary vitamin E concentration.

HYDROLYSIS OF MONOACYLGLYCEROL IN LIPOPROTEIN REMNANTS CATALYZED BY THE LIVER PLASMA MEMBRANE MONOACYLGLYCEROL ACYLTRANSFERASE. M.R. El-Maghrabi, M. Waite, L.L. Rudel and P. Sisson, *J. Biol. Chem.* **253**, 974–81 (1978). Experiments were carried out to study the role played by the extrahepatic and hepatic lipolytic enzymes in lipoprotein catabolism. Chylomicra and very low density lipoproteins containing (2-^{3}H)glyceryl triacylglycerols radiolabeled in vivo were incubated with purified milk lipoprotein lipase to produce lipoprotein remnants rich in monoacylglycerol. These results further support the proposed role for liver plasma membrane monoacylglycerol acyltransferase in the catabolism of lipoprotein remnants by liver. In addition, the utilization of monoacylglycerol bound to albumin by liver plasma membrane monoacylglycerol acyltransferase suggests a new and alternate pathway for monoacylglycerol transport and uptake by the liver.

EFFECT OF TEMPERATURE AND PLASMA ON THE EXCHANGE OF APOLIPOPROTEINS AND PHOSPHOLIPIDS BETWEEN RAT PLASMA VERY LOW AND HIGH DENSITY LIPOPROTEINS. S. Eisenberg, *J. Lipid Res.* **19**, 229–36 (1978). The effect of temperature and plasma on the exchange of apoprotein C and phospholipids between VLDL and HDL was studied using ^{125}I-labeled and ^{32}P-labeled VLDL. Temperature affected the exchange of apoproteins and phospholipids similarly, and both were enhanced by increasing the temperature of incubation to 20° C and higher. The exchange of apoC was almost complete within 5 minutes of incubation and was not influenced by the addition of plasma to the incubation mixture.

FILTRATION OF CHYLOMICRONS BY THE LIVER MAY INFLUENCE CHOLESTEROL METABOLISM AND ATHEROSCLEROSIS. R. Fraser, A.G. Bosanquet and W.A. Day, *Atherosclerosis* **29**, 113–23 (1978). A fenestrated endothelial lining of sinusoids in rat liver has been shown to separate chylomicrons of different sizes following their injection into the portal vein. This sieving may have physiological importance, since during low dietary fat intake some intestinal lipoproteins are probably small enough to contract liver cells, but during high dietary fat loads most chylomicrons are too large to pass through the filter and must first be degraded to smaller remnants. The liver plays a central role in cholesterol metabolism since it catabolises dietary cholesterol which inhibits synthesis of cholesterol to be circulated as liver-derived very low density lipoproteins (VLDL) and low density lipoproteins. The sieving of chylomicrons, remnants and other lipoproteins by the sinusoidal endothelium of the liver may thus play an important role in lipid transport, affecting the balance of various lipoprotein moieties which in turn may affect the relationship of dietary lipids to various hyperlipidaemias and atherosclerosis.

EFFECTS OF DEOXYCHOLATE AND PHOSPHOLIPASE A_2 ON CHOLINE AND ETHANOLAMINE PHOSPHOTRANSFERASES OF CHICKEN BRAIN MICROSOMES. L. Freysz, L.A. Horrocks and P. Mandel,

Biochim. Biophys. Acta **489**, 431–9 (1977). Ethanolamine phosphotransferase (EC 2.7.8.1) and choline phosphotransferase (EC 2.7.8.2) activities were assayed in fresh microsomes from adult chicken brains with either diacylglycerols or alkylacylglycerols. Pretreatment of microsomes with 1.25 mM sodium deoxycholate, a concentration less than the critical micelle concentration, produced a slight inhibition of choline phosphotransferase activity. Decreased activities are probably due to disruption of the membrane structure. Choline and ethanolamine phosphotransferase activities are apparently in different enzymes which lack specificity for the type of diglyceride. Thus, the systematic names should include 1,2-diradyl-*sn*-glycerol instead of 1,2-diacyl-*sn*-glycerol.

LONG-TERM TRIAL WITH COLESTIPOL PLUS CLOFIBRATE IN FAMILIAL HYPERCHOLESTEROLEMIA. R. Fellin *et al.*, *Atherosclerosis* **29**, 241–9 (1978). Twenty subjects with familial hypercholesterolemia (12 Type IIa and 8 Type IIb), previously treated with Colestipol for 16 months, were subjected to therapy with Colestipol (15 g/day) + clofibrate (2 g/day) for 15 months. These results seem to indicate that, in Type IIa, clofibrate increased the resin's hypocholesterolemic effect. In Type IIb, on the other hand, the association of these drugs did not seem to be indicated since a marked hypotriglyceridemic effect was accompanied by an increase in plasma cholesterol.

SUPPRESSION OF 3-HYDROXY-3-METHYLGLUTARYL COENZYME A REDUCTASE ACTIVITY AND OF INCORPORATION OF ACETATE INTO CHOLESTEROL IN HOMOZYGOUS HYPERCHOLESTEROLEMIC FIBROBLASTS BY FERRITIN-LOW DENSITY LIPOPROTEIN CONJUGATES. C.H. Fung, C.H. Wang and A.K. Khachadurian, *Biochim. Biophys. Acta* **528**, 445–55 (1978). Conjugates of ferritin with low density lipoproteins (LDL) were prepared and separated by sucrose gradient centrifugation. These conjugates, at cholesterol concentrations of 100–132 μg/ml, caused a greater than 90% suppression of hydroxymethylglutaryl coenzyme A reductase activity and of acetate incorporation into cholesterol in cultured skin fibroblasts from a normal subject as well as from a subject with homozygous familial hypercholesterolemia. LDL reduced the ferritin · $(LDL)_2$-mediated suppression of hydroxymethylglutaryl-CoA reductase activity in homozygous cells while ferritin · $(LDL)_2$ reduced the LDL-mediated stimulation of cholesteryl ester formation in normal cells.

REGULATION OF CHOLESTEROL SYNTHESIS IN CULTURED CANINE INTESTINAL MUCOSA. R.L. Gebhard and A.D. Cooper, *J. Biol. Chem.* **253**, 2790–6 (1978). The regulation of intestinal cholesterol synthesis was studied utilizing canine ileal mucosa maintained in organ culture for 6 h. Viability was monitored by light and electron microscopy, measurement of cellular enzymes, and the ability to actively transport a glucose analogue. The activity of 3-hydroxy-3-methylglutaryl coenzyme A (HMG-CoA) reductase (EC 1.1.4.3.4), the rate-limiting enzyme of cholesterol synthesis, increased 4-fold during a 6 h culture. In contrast, dog lipoproteins separated by ultracentrifugation failed to significantly affect intestinal cholesterol synthesis in these short term organ cultures.

EFFECTS OF EXERCISE ON SERUM LIPIDS AND LIPOPROTEINS IN GIRLS, AGES 8 TO 10 YEARS. T.B. Gilliam, and M.B. Burke, *Artery* **4**(3), 203–13 (1978). The effects of a physical activity program on serum cholesterol and high density lipoprotein-cholesterol were assessed in fourteen girls ranging in ages from 8 to 10 years. Post-absorptive blood samples were taken before, 1- and 9-days following the training period. The physical activity program consisted of 40 minutes of exercise 5 times per week for six weeks. No significant differences were observed between tests on cholesterol. HDL-C values one day after the activity period were significantly ($P < .05$) higher compared to pre-exercise values (36.4 mg % vs 30 mg %). The HDL-C:cholesterol ratio one day after exercise was also significantly higher than the pre-exercise ratio and the ratio nine days after the exercise period. It was concluded that physical activity had a significant effect in raising HDL-C values in the young girls.

DIFFERENTIAL UTILIZATION OF 1-PALMITOYL AND 1-STEAROYL HOMOLOGUES OF VARIOUS UNSATURATED 1,2-DIACYL-SN-GLYCEROLS FOR PHOSPHATIDYLCHOLINE AND PHOSPHATIDYLETHANOLAMINE SYNTHESIS IN RAT LIVER MICROSOMES. B.J. Holub, *J. Biol. Chem.* **253**, 691–6 (1978). The relative utilization of the 1-palmitoyl and 1-stearoyl homologues of various unsaturated 1,2-diacyl-*sn*-glycerols for phosphatidylcholine and phosphatidylethanolamine synthesis was studied in rat liver microsomes. The present results reveal that both the choline-phosphotransferase and the ethanolaminephosphotransferase can exert significant selectivities which may be of considerable importance in maintaining the characteristic composition of fatty acyl chains in membrane phospholipids.

SULFATED GLYCEROGLYCOLIPIDS IN RAT BRAIN. STRUCTURE, SULFATION IN VIVO, AND ACCUMULATION IN WHOLE BRAIN DURING DEVELOPMENT. I. Ishizuka *et al.*, *J. Biol. Chem.* **253**, 898–907 (1978). Rats of various ages were injected intraperitoneally with inorganic (^{35}S)sulfate, and lipids were extracted from their brains 24 h later. Sulfatides (cerebroside 3-sulfate) and a less polar lipid migrating in the position of seminolipid: 1-*O*-alkyl-2-*O*-acyl-3-*O*-β-D-(3′-sulfo) galactopyranosyl-*sn*-glycerol from mammalian testes were labeled, as revealed by autoradiography after thin layer chromatography on Silica Gel G. (The stereospecific configuration of the glycerol portion was recently determined). Sulfolipids were purified by column chromatographies on Florisil and DEAE-Sephadex A-25. The less polar sulfolipid, sulfated glycero-glycolipid (SGG), was purified completely by silica bead chromatography.

CHOLESTEROL AND REPAIR PROCESSES IN ARTERIOSCLEROSIS. H. Kaunitz (Dept. of Path., Columbia Univ., 630 W. 168th St., New York, NY) *Lipids* **13**, 373–4 (1978). The high cholesterol content of the atheroma and the correlation between elevation of the serum cholesterol and myocardial infarctions gave rise to the lipid theory of arteriosclerosis, which assumes that cholesterol induces arteriosclerotic lesions and that its reduction counteracts their development. However, many facts contradict this theory. Therefore, a new hypothesis has been based on the high cholesterol content of old pathological lesions of granulomatous nature and the similarity of atheromata to granulomas. In the latter, a complicated tissue containing a high percentage of cholesterol is deposited in response to the injurious agent, which becomes walled off by this tissue. Thus, cholesterol forms part of a protective mechanism, a hypothesis compatible with the known facts about the relationship of cholesterol to arteriosclerosis.

EFFECTS OF DIETARY FOLATE DEFICIENCY ON DEVELOPMENTAL INCREASE OF MYELIN LIPIDS IN RAT BRAIN. H. Hirono and Y. Wada, *J. Nutr.* **108**, 766–72 (1978). Rats were fed a folic acid deficient purified diet from day 12 of gestation throughout the lactational period. Offsprings were fed the same diet after weaning. Control rats were given 170 g of folic acid per day per rat supplemented to the same diet, which was fed ad libitum or by pair-feeding. At 3 and 6 weeks of age, myelin was isolated from rat brains. The implications of these findings are that folic acid may play an important role in desaturation or chain elongation of polyunsaturated fatty acids in the brain of developing rats.

EFFECT OF GARLIC OIL IN EXPERIMENTAL CHOLESTEROL ATHEROSCLEROSIS. R.C. Jain and D.B. Konar, *Atherosclerosis* **29**, 125–9 (1978). Addition of cholesterol in the diet of male albino rabbits produced hypercholesterolaemia, increased tissue cholesterol, and atheromatous changes in the aorta. Supplementation of garlic oil along with cholesterol inhibited the hypercholesterolaemia, decreased tissue cholesterol and minimised the atheromatous changes in the aorta. These results show that the active constituent(s) in garlic responsible for its anti-atherogenic action is present in the oily fraction of garlic.

GANGLIOSIDES OF CULTURED CELLS OF A RAT MAMMARY CARCINOMA CELL LINE. T.W. Keenan, Erika Schmid, and W.W. Franke, *Lipids* **13**, 451–4 (1978). Ganglioside content of rat mammary carcinoma-derived cells grown in layers in vitro was nearly as high as that of apical plasma membrane-derived milk fat globule membrane and nearly four times higher than the content of normal, lactating mammary tissue on a protein basis. The major ganglioside of these carcinoma-derived cells was identified as GDla (sialic acid-Gal-GalNAc-(sialic acid)-Gal-Glc-Cer. Relative to carcinomaderived cells, rat mammary tissue and milk fat globule membrane had more complex ganglioside patterns but appeared to lack substantial quantities of GDla.

BLOOD SERUM LIPID PATTERNS OF ADOLESCENT BOYS FED CORN OIL, PEANUT OIL, OR SAFFLOWER OIL. C. Kies *et al.*, *J. Food Sci.* **43**, 1293–6 (1978). The objective of the present study was to compare the effects of feeding low-fat diets to

adolescent boys based on safflower oil, corn oil, or peanut oil on the fatty acid composition of several blood lipid fractions. Boys (aged 13–16 yr) were divided into three groups of 4–5 subjects each and fed weighed controlled diets containing 20% of calories from the test fats for 22 days. Results of this study suggest that peanut oil would be better classified with such animal fats as butter oil and beef tallow in human metabolic response than with such vegetable oils as corn oil or safflower oil.

THE EFFECT OF DIETARY ERUCIC ACID ON CARDIAC TRIGLYCERIDES AND FREE FATTY ACID LEVELS IN RATS. J.K.G. Kramer and H.W. Hulan, *Lipids* 13, 438–45 (1978). Male Sprague-Dawley rats, 3 weeks of age, were fed semisynthetic diets containing test oils at 20% by weight for 3 days, 1 week, and 16 weeks. The test oils contained up to 22.3% erucic acid. Growth retardation was evident in rats fed rapeseed oil high in erucic acid, and soybean oil and Tower rapeseed oil diets containing about 5% erucic acid. The results indicate that the accumulated erucic and eicosenoic acids, at 3 days and 1 week, accounted for the increase in cardiac free fatty acids when rats were fed the high erucic acid rapeseed oil. There appears to be no evidence that the early cardiac triglyceride or free fatty acid accumulation is related to the formation of the long term myocardial lesions.

STUDIES ON THE METABOLISM OF THE LIPOPROTEIN Lp(a) IN MAN. K. Krempler, G. Kostner, K. Bolzano and F. Sandhoffer, *Atherosclerosis* 30, 57–65 (1978). Lp(a) was isolated and labeled by reductive alkylation. Radioactivity only entered the protein moiety of the lipoprotein. No change in the immunological or physicochemical properties of Lp(a) was noted after the radiomethylation. After incubation of labeled Lp(a) with whole serum for 24 h in vitro, more than 99% of the radioactivity of the incubated sample was found in Lp(a). In 4 subjects Lp(a) was injected intravenously. A linear decline of the specific activity of Lp(a) in the serum was found when it was plotted semilogarithmically against time. Half-lives of Lp(a) in the serum were 35, 38, 53 and 58 h. In one subject, the "soluble" and the "insoluble" apoproteins of Lp(a) showed the same half-life as the whole Lp(a) molecule. This suggests that no exchange of Lp(a) apoproteins with lipoproteins of other density classes took place. At different times after the injection of Lp(a), 3–8% of the radioactivity of the serum was found in Lp B, and less than 2% of the radioactivity was detectable in VLDL and the fraction having a density of >1.110 g/ml.

FIBER, HYPERCHOLESTEREMIA, AND ATHEROSCLEROSIS. D. Kritchevsky and J.A. Story, *Lipids* 13, 366–9 (1978). Epidemiological data suggest that populations subsisting on high fiber diets are free of a number of the diseases of Western civilization, among them coronary heart disease. Studies in animals and man show that each type of fiber exerts its own specific influence. Thus, in man bran has no effect on serum lipids, but pectin lowers cholesterol levels. In animals fed atherogenic diets, alfalfa and pectin exert some measure of protection, but cellulose does not. To fully understand the mode of action of dietary fiber, it is necessary to ascertain the mechanism(s) of action of each chemical component of that fiber.

THE EFFECT OF CORTICOTROPIN ON PHOSPHOLIPID METABOLISM IN ISOLATED ADRENOCORTICAL CELLS. S.G. Laychock *et al.*, *Biochim. Biophys. Acta* 528, 355–63 (1978). Trypsin-dispersed cat adrenocortical cells were incubated at 37° C in modified Eagle's medium containing (^{14}C)arachidonic acid or sodium (^{14}C)-acetate and then in non-radioactive medium. Radioactive incorporation was obtained in all phospholipids, with the greatest amount of radioactivity in phosphatidylcholine, followed by phosphatidylethanolamine, phosphatidylserine, and phosphatidylinositol. The finding that the acute effects of corticotropin are associated with changes in specific phospholipids, including phosphatidylinositol and phosphatidic acid, conforms to the general pattern observed in other secretory systems.

RAT LIVER PEROXISOMES CATALYZE THE β OXIDATION OF FATTY ACIDS. P.B. Lazarow, *J. Biol. Chem.* 253(5), 1522–8 (1978). Peroxisomes were purified by differential and equilibrium density centrifugation from the livers of rats treated with clofibrate to enhance their peroxisomal system of fatty acid oxidation. These purified peroxisomes were tested for the presence of crotonase, β-hydroxybutyryl-CoA dehydrogenase and thiolase using spectroscopic techniques that utilize the characteristic absorption bands of the appropriate 4-carbon acyl-CoA substrates. All three enzymes were found. The peroxisomes were inactive with butyryl-CoA and less active with octanoyl-CoA than with lauroyl-CoA or palmitoyl-CoA; they appear specialized for the β oxidation of long chain fatty acids.

PURIFICATION AND PROPERTIES OF A THIOESTERASE FROM LACTATING RAT MAMMARY GLAND WHICH MODIFIES THE PRODUCT SPECIFICITY OF FATTY ACID SYNTHETASE. L.J. Libertini and S. Smith, *J. Biol. Chem.* 253(5), 1393–401 (1978). An acyl coenzyme A hydrolase (thioesterase II) has been purified to near homogeneity from lactating rat mammary gland. The enzyme is a monomer of molecular weight 33,000 and contains a single active site residue. The enzyme is specific for acyl groups, as acyl-CoA thioesters, containing eight or more carbon atoms and can also hydrolyze oxygen esters. No evidence was found of significant levels of thioesterase II in lactating rat liver. The presence of thioesterase II in the lactating mammary gland and the ability of the enzyme to hydrolyze acyl-fatty acid synthetase thioesters of intermediate chain length, are indicative of a major role for this enzyme in the synthesis of the medium chain fatty acids characteristic of milk fat.

LIPOPROTEIN-LIPASE ACTIVITY IN HUMAN SKELETAL MUSCLE AND ADIPOSE TISSUE IN THE FASTING AND THE FED STATES. H. Lithell *et al.*, *Atherosclerosis* 30, 89–94 (1978). Sixteen healthy subjects, 7 females and 9 males, with a mean age of 25 years (range 22–29 years), were studied in the fasting state in the morning and 8 h later after partaking of breakfast, lunch and two small meals. The lipoprotein-lipase activity in the adipose tissue increased significantly from 80 ± 32 to 117 ± 61 nmol fatty acid released per gram and minute (nmol FA/g/min), whereas in skeletal-muscle tissue it decreased significantly from 25 ± 11 to 17 ± 9 nmol FA/g/min. The concentration of serum triglycerides increased significantly from 0.93 ± 0.18 mmol/l (mean $\pm$ SD) in the fasting state to 1.57 ± 0.64 mmol/l in the fed state. In the fasting state the lipoprotein-lipase activity of skeletal muscle was inversely related to the ratio between the concentrations of insulin and glucagon.

INFLUENCE OF NICOTINIC ACID, NICERITROL AND β-PYRIDYLCARBINOL ON EXPERIMENTAL HYPERLIPIDEMIA AND ATHEROSCLEROSIS IN MINI-PIGS. L. Lundholm *et al.*, *Atherosclerosis* 29, 217–39 (1978). A study was undertaken to test for suitable conditions for examining the hypolipidemic and anti-atherosclerotic actions of nicotinic acid, niceritrol and β-pyridylcarbinol in hypercholesterolemic mini-pigs. Hypercholesterolemia was produced in 50 female pigs by adding 11% dried egg yolk + 0.5–0.75% cholesterol to their diet for 12–19 months. The animals were divided into 3 groups according to the response of their initial plasma cholesterol value ("low" 500; "medium" 700; "high" 1,000 mg/100 ml). The plasma triglyceride concentrations were increased in the latter two groups but not in the former.

SURFACE BEHAVIOUR OF GANGLIOSIDES AND RELATED GLYCOSPHINGOLIPIDS. B. Maggio, F.A. Cumar and R. Caputto, *Biochem. J.* 171, 559–65 (1978). The surface behaviour of six different gangliosides and eight chemically related glycosphingolipids was investigated in monolayers at the air-water interface. Mono-, di-, tri- and tetra-hexosylceramides had force-area isotherms showing similar limiting molecular areas on 145 mM-NaCl, pH 5.6. The glycosphingolipid monolayers studied had various surface potentials according to the complexity of the polar head group of the lipid. Attempts to calculate the dipolar contributions to the surface potential from each carbohydrate residue suggest that the second and third sialosyl residues in di- and tri-sialogangliosides contributed with a vertical dipole moment opposite to that of the first sialosyl residue.

EFFECT OF ALFALFA MEAL ON SHRINKAGE (REGRESSION) OF ATHEROSCLEROTIC PLAQUES DURING CHOLESTEROL FEEDING IN MONKEYS. M.R. Malinow *et al.*, *Atherosclerosis* 30, 27–43 (1978). A semipurified diet containing 1.2 mg of cholesterol/Cal was fed to cynomolgus monkeys *(Macaca fascicularis)*. At the end of 6 months, a group of 18 animals was killed for evaluation of atherosclerosis in the aorta and the coronary arteries. The remaining monkeys were assigned to three groups of 18 animals each and were fed, during the following 18 months, semipurified diets containing 0.34 mg of cholesterol/Cal with or without alfalfa meal, or a diet consisting

entirely of Monkey Chow. A decrease in cholesterolemia and plasma phospholipid levels, normalization in the distribution of plasma lipoproteins, and reduction in the extent of aortic and coronary atherosclerosis were observed in monkeys fed the semipurified diet containing alfalfa, although the intake of cholesterol remained high as in the usual American diet. These changes, also observed in monkeys fed a chow diet almost devoid of cholesterol, suggest that alfalfa counteracts the atherogenic effect of dietary cholesterol.

PHOSPHOLIPIDS IMMOBILIZED ON BEADED AGAROSE BY HYDROPHOBIC INTERACTION AS HYDROPHILIC SUBSTRATES FOR PHOSPHOLIPASE. C.M. Malmqvist, T. Malmqvist, and R. Mollby, *FEBS Lett.* 9(2), 243–6 (1978). Many different assay procedures for phospholipases have been used e.g., with egg yolk, red blood cells and thromboplastin as nonspecific substrates and liposomes, micelles and monolayers of phospholipids as more specific substrates. The results from assays based on purified phospholipids, with or without detergents, are difficult to reproduce since they are dependent on micelle charge and size. Monolayer techniques have been used for a long time but are technically demanding.

THE ACYLATION OF 1-PALMITYLGLYCEROL 3-PHOSPHATE WITH CIS AND TRANS C-16 TO C-22 MONOENOIC FATTY ACIDS IN RAT LIVER MICROSOMES. C.M. Marchand and J.L. Beare-Rogers, *Lipids* 13, 329–33 (1978). The configurational specificity of acyl-CoA:1-palmitylglycerol 3-phosphate acyltransferase from rat liver microsomes was investigated with *cis* and *trans* C-16, C-18, C-20, and C-22 monoenoic and saturated fatty acyl-CoA. Oleyl-CoA was transferred three times more readily than elaidyl-CoA. Elaidyl-CoA was more inhibitory than oleyl-CoA, especially at low protein concentrations, but did not show this effect after the addition of 1 mg/ml bovine serum albumin (BSA). BSA permitted linearity of the acyltransferase over a wide range of protein concentrations and did not seem to affect the configurational specificity of the acyltransferase. The specificity of the enzyme preparation was in the following decreasing order: 18:1 *cis* > 16:1 *cis* ≃ 16:0 > 18:0 ≃ 16:1 *trans* > 18:1 *trans* > 20:1 *cis* > 20:1 *trans*. The enzyme preparation did not react with *cis* or *trans* 22:1 acyl-CoA.

IMPORTANCE OF THE ACYL DIHYDROXYACETONE PHOSPHATE PATHWAY IN THE SYNTHESIS OF PHOSPHATIDYLGLYCEROL AND PHOSPHATIDYLCHOLINE IN ALVEOLAR TYPE II CELLS. R.J. Mason, *J. Biol. Chem.* 253, 3367–70 (1978). The importance of the acyl dihydroxyacetone phosphate pathway in the synthesis of phosphatidylcholine and phosphatidylglycerol was evaluated in alveolar type II cells isolated from rat lung. Type II cells synthesize pulmonary surface-active material, the substance that provides the low surface tension at the air-liquid interface in the lung. Surface-active material contains a high concentration of two unusual classes of phospholipids, phosphatidylglycerol and disaturated phosphatidylcholine. The design of these experiments was to incubate type II cells with (2-^{3}H, U-^{14}C)glycerol and to measure the ^{3}H/^{14}C ratio of the two glycerol components of phosphatidylglycerol.

THE ACTION OF PURIFIED LYSOPHOSPHOLIPASES ON MICROSOMAL MEMBRANE-BOUND LYSOPHOSPHATIDYLCHOLINE. H. Moonen, P. Trienekens and H. Van Den Bosch, *Biochim. Biophys. Acta* 489, 423–30 (1977). Rat liver membranes were labelled by intraperitoneal injection of (Me-^{14}C)choline chloride. Isolated microsomal membranes were briefly treated with pancreatic phospholipase A_2 to produce different levels of membrane-bound lysophosphatidylcholine. The hydrolysis of this lysophosphatidylcholine by two purified lysophospholipases from beef liver was studied. The specific activity of enzyme I at saturating membrane concentrations appear to increase linearly with the lysophosphatidylcholine level in the membranes until the lysoderivative represented 15% of the original phosphatidylcholine. In contrast, the specific activity of enzyme II was independent of the lysophosphatidylcholine level, at least in the range of 4.9–34.0% tested. These different kinetics are discussed in terms of the possible functions of both enzymes in liver.

PROSTAGLANDIN METABOLISM IN RABBIT KIDNEY. IDENTIFICATION AND PROPERTIES OF A NOVEL PROSTAGLANDIN 9-HYDROXYDEHYDROGENASE. P.K. Moore and J.R.S. Hoult, *Biochim. Biophys. Acta* 528, 276–87 (1978). Prostaglandin $F_{2\alpha}$ is metabolized in 100,000 × g supernatants of rabbit kidney by a 15-hydroxydehydrogenase and a Δ^{13}-reductase to F-series metabolites, and by a 9-hydroxydehydrogenase to E-series compounds. The reactions were measured by radiochemical and biological assays. The 15-hydroxydehydrogenase and 9-hydroxydehydrogenase are localised specifically in renal cortex, have optimal activity at alkaline pH and are effective over a wide range of substrate concentrations. The 9-hydroxydehydrogenase oxidises the 9-α hydroxyl group of prostaglandin $F_{2\alpha}$ and $F_{1\alpha}$ but not the 9-β hydroxyl group of prostaglandin $F_{2\beta}$. This enzyme is also found in rabbit stomach and ileum, but not in 8 other organs examined; the 15-hydroxydehydrogenase has a wider distribution. Unlike other 9-hydroxydehydrogenase enzymes described to date, the enzyme prepared from rabbit kidney converts prostaglandin $F_{2\alpha}$ directly to E_2 in substantial amounts; this conversion may be of importance in renal homeostasis.

TRANSFORMATION OF ARACHIDONIC ACID INTO THROMBOXANE B_2 BY THE HOMOGENATES OF ACTIVATED MACROPHAGES. S.I. Murota, M. Kawamura and I. Morita, *Biochim. Biophys. Acta* 528, 507–11 (1978). The homogenates of activated macrophages obtained from liquid paraffin-injected guinea pig peritoneum were incubated with (^{14}C)arachidonic acid or with radioactive prostaglandin endoperoxide, (^{14}C)prostaglandin H_2. The major radioactive metabolite in both cases was thromboxane B_2, which was identified by $NaBH_4$ reduction, rechromatography and autoradiography.

EFFECT OF PENTADECAN-2-ONE ON LIPID METABOLISM IN HELA CELLS. W.F. Naccarato and J.R. Gilbertson, *Lipids* 13, 344–51 (1978). HeLa cells exposed to trace amounts of pentadecan-2-one showed changes in metabolism of 1-^{14}C-palmitate. These changes consisted of an increased incorporation of radioactivity into the triglycerides and free fatty acids and a decreased ^{14}C incorporation into the ether moiety of alk-1-enyl acyl phosphoglycerides. Chemical analysis of the several lipid fractions showed a threefold increase in triglyceride content but no change in the amount of alk-1-enyl acyl or diacyl phosphoglycerides in the treated cells. Pentadecan-2-one added to the culture medium apparently gains entrance to the cell since both pentadecan-2-one and pentadecan-2-ol were detected in the ketone-treated cells and their culture medium.

EFFECT OF ETHANOL INTAKE ON LIPOPROTEIN LIPASE ACTIVITY IN ADIPOSE TISSUE OF FASTING SUBJECTS. P. Nilsson-Ehle *et al.*, *Lipids* 13, 433–7 (1978). Ethanol (ca. 1 g/kg body weight) was given alone or together with glucose or lipid (mixed triglycerides) perorally to young, fasting subjects. The changes with time (0–6 hr) of lipoprotein lipase activity (LLA) in adipose tissue, plasma glycerol, triglyceride, insulin, blood glucose, and alcohol concentrations were followed. It is suggested that ethanol intake interferes with the normal carbohydrate-induced elevation of adipose tissue LLA after a mixed meal, thereby decreasing the removal capacity for circulating dietary lipid and causing enhanced and prolonged alimentary hyperlipemia.

EXPERIMENTAL HYPER-β-LIPOPROTEINEMIA AND ITS AMELIORATION BY A NOVEL HYPOLIPIDEMIC AGENT. T. Kobayakawa, K. Osuga and H. Yasuda, *Atherosclerosis* 30, 219–25 (1978). Experimental models for hyper-β-lipoproteinemia were established in rats and the effects of certain hypolipidemic drugs were studied with these models. These results suggest that the above models may be of value in exploring hyper-β-lipoproteinemia and that Y-9738 may be more useful than clofibrate in the therapy of hyperlipemia.

THE DISSOLUTION OF CHOLESTEROL MONOHYDRATE CRYSTALS IN ATHEROSCLEROTIC PLAQUE LIPIDS. B.E. North, S.S. Katz and D.M. Small, *Atherosclerosis* 30, 211–7 (1978). Uncomplicated human atherosclerotic plaques often contain large amounts of cholesterol esters and solid cholesterol monohydrate crystals. If such plaques are to regress the crystalline cholesterol would have to dissolve and be transported out of the arterial wall. Since cholesterol is quite insoluble in water, dissolution of plaque crystals might occur through lipids in the plaque, specifically, the cholesterol esters. If transport of dissolved cholesterol could be enhanced, cholesterol monohydrate crystals could be rapidly dissolved and facilitate reversal of atherosclerotic lesions.