Gilmont To Head AIC Board of Directors

The American Institute of Chemists (AIC), in its recent annual meeting at Saddle Brook, NJ, announced the election of Dr. Ernest R. Gilmont as chairman of its board of directors. Dr. Gilmont, immediate past president of the AIC, is currently technical director of A. Gross & Company, a Kewanee Industry, Newark, NJ.

The youngest man ever elected (1971) to the office of president of the American Institute of Chemists, Dr. Gilmont had been active for years in efforts to improve the professional environment for chemists. He moved AIC headquarters from New York City to Washington, DC, recruited a staff of professional association executives, and increased the Institute's legislative activity, contributing to passage of the Pension Reform Act of 1974. While president of the AIC, Dr. Gilmont was elected chairman of the Committee of Scientific Society Presidents (CSSP), an organization comprised of the presidents of the principal U.S. scientific societies. He was reelected chairman of CSSP in 1976, thus continuing as a unique liaison man for his own group, the American Institute of Chemists.

Gilmont, who received his Ph.D. from the Massachusetts Institute of Technology in 1956, joined AOCS in 1968. ■

Dan Henry Retires from Law & Company

On June 30, Dan Lee Henry retired from the partnership of Law & Company, a group of consulting and analytical chemists located in Atlanta, GA. He had been with the firm since 1946, the same year he joined AOCS.

An active participant in Society activities for the past 31 years, Henry has served as member or chairman of the Nominating and Election Committee, Smalley Committee, Uniform Methods Committee, *Journal* Committee, Bleaching Methods and Feed Grade Fats subcommittees of the Commercial Fats and Oils Analysis Committee, Aflatoxins and Fiber Determinations subcommittees of the Seed and Meal Analysis Committee, Soap and Synthetic Detergent Analysis Committee, Determination of Fish and Marine Oils in Vegetable Oils Committee, and Intersociety Relations Committee. He was national meeting program chairman in 1950 and general chairman in 1962.

Henry received a B.S. degree in chemical engineering from the Georgia School of Technology in 1934, and spent seven years with Swift & Company's refinery in Los Angeles before entering the Armed Forces in 1941.

His partners, Jack Lynch and Bill McBee, also members of AOCS, will continue to run the business. ■

abstracts

• Fats and Oils

DIRECTED TRANSESTERIFICATION OF FATS. I. MATHEMATIC MODEL FOR CALCULATING IN TERMS OF GLYCERIDES THE COMPOSITION OF A DIRECTED TRANSESTERIFIED FAT. F.J. Nieto and A. Madarro. (Instituto de Productos Lácteos. Patronato ((Juan de la Cierva)). (C.S.I.C.). Arganda del Rey (Madrid). *Grasas Aceites (Seville)* 26, 361–6 (1975). Equations are established relating the final composition of glycerides of a directed transesterified fat to the percentage of satured fatty acids of the liquid phase at equilibrium and to the molar fraction of trisatured triglycerides in the solid phase, or selectivity factor. The proposed resolution for this equations system permits to arrive at simple expressions for calculating the pointed characteristics and the percentage of present solid phase at equilibrium, from experimental data such as the composition in the four standard glycerides.

PRODUCTION OF MARGARINE OIL FROM COTTONSEED OIL AND CORN OIL. Abdel-Hamid Youssef Abel-Rahman. (Food Technology Department, College of Agriculture Alexandria University, Alexandria, Egypt). *Grasas Aceites (Seville)* 26, 367–8 (1975). Margarine oil was produced from corn oil and cottonseed oil by using 5, 6, 7, 8 and 9% glycerine monostearate. Increasing the emulsifier concentration showed no effect on the refractive index, saponification value and the peroxide value, but the iodine value decreased and melting point increased. The peroxide value increased by increasing the storage temperature during 50 days.

THE STEADY-STATE KINETICS OF THE OXYGENATION OF LINOLEIC ACID CATALYSED BY SOYBEAN LIPOXYGENASE. M.R. Egmond, M. Brunori and P.M. Fasella (Istituto di Chimica Biologica, Universitá degli Studi di Roma e Centro di Biologia Molecolare, Consiglio Nazionale della Richerche, Roma). *Eur. J. Biochem.* 61, 93–100 (1976). The steady-state kinetics of the oxygenation of linoleic acid catalysed by soybean lipoxygenase-1 were studied. The results showed that lipoxygenase-1 is strongly inhibited by its substrate, linoleic acid. In the presence of the product of the reaction, 13-L$_S$-hydroperoxylinoleic acid, the substrate inhibition only affects the apparent affinity for O_2 and is of a hyperbolic type. A kinetic scheme of the oxygenation reaction is presented, which postulates two substrate-binding sites on the enzyme, one for linoleic acid and one for O_2, and a regulatory binding site, which can either bind the product or the fatty acid substrate. Since previous studies indicated that the product of the reaction influences the oxidation state of the iron present in protein, the steady-state kinetics of the native enzyme and of the enzyme pre-incubated with the product were compared. Pre-incubation of the enzyme with the product did not lead to altered steady-state kinetics of the reaction compared to those of the native enzyme.

ION-BINDING TO PHOSPHOLIPIDS: INTERACTION OF CALCIUM WITH PHOSPHATIDYLSERINE. H. Hauser, A. Darke and M.C. Phillips (Biosciences Division, Unilever Research Laboratory Colworth Welwyn, The Frythe, Welwyn, Herts). *Eur. J. Biochem.* 62, 335–44 (1976). The binding of Ca^{2+} to monolayers and bilayers of phosphatidylserine has been investigated as a function of pH, ionic strength (NaCl concentration) and Ca^{2+} concentration using surface and colloid chemical techniques. The molar ratio of lipid to bound calcium decreases to 2 as the Ca^{2+} concentration is increased to about 0.1 mM. At $[Ca^{2+}] > 0.1$ mM a 1:1 complex is formed. The apparent binding constant K_a ranges from about $\approx 10^6 - 10^4$ l/mol depending on the Ca^{2+} concentration. After allowing for electrostatic effects and neighbour group interactions, the intrinsic binding constant K_i of the phosphorylserine polar group at pH 7 ($I = 0.01$ M), where it carries a net negative charge of one, is $\approx 10^4$ l/mol; consistent values for K_i were obtained using several independent approaches. K_a for Ca^{2+} binding decreases with increasing NaCl concentration because the monovalent cations compete with Ca^{2+} for the same binding site. Na^+ and K^+ are equally effective in displacing $^{45}Ca^{2+}$ adsorbed to monolayers of phosphatidylserine, both with respect to the kinetics and the equilibrium of the displacement. K_a for the reaction between phosphatidylserine and monovalent cations is about 10^3-fold smaller than that of Ca^{2+}. An investigation of the binding of Mn^{2+} to phosphatidylserine by both surface chemical and nuclear magnetic resonance methods shows that this cation has a similar binding constant to that of Ca^{2+}. The Ca^{2+}-binding capabilities of monolayers containing only carboxyl groups (*i.e.* arachidic acid) and phosphodiester groups (*i.e.* dicetyl phosphate) have also been determined; the apparent pK for the $-COOH$ group in monolayers is > 9 and that for the phosphodiester group is < 4. Since these groups do not retain the same pK values when they are in close proximity in the phosphorylserine group, the relative contributions of the two groups to the binding of Ca^{2+} to phosphatidylserine is not obvious.

INTERACTIONS OF PROTEINS AND CHOLESTEROL WITH LIPIDS IN BILAYER MEMBRANES. W. Kleemann and H.M. McConnell (Stauffer Lab. for Phys. Chem., Stanford, Calif. 94305)

(Continued on page 433A)

• **Abstracts . . . (Continued from page 432A)**

Biochim. Biophys. Acta 419, 206–22 (1976). Mixtures of lipids and protein, the ATPase from rabbit sarcoplasmic reticulum, were studied by freeze-fracture electron microscopy and by measurement of the amount of fluid lipid with the spin label 2,2,6,6-tetramethylpiperidine-1-oxyl (TEMPO). In dimyristoyl phosphatidylcholine vesicles the protein molecules were randomly distributed above the transition temperature, T_t, of the lipid and aggregated below T_t. For mixtures of dimyristoyl and dipalmitoyl phosphatidylcholine the existence of fluid and solid domains was shown in the temperature interval predicted from earlier TEMPO measurements. When protein was incorporated into this lipid mixture, freeze-fracture particles were randomly distributed in fluid lipids, or aggregated when only solid lipids were present. Phase diagrams for lipid/cholesterol and lipid/protein systems are proposed which account for many of the available data. A model for increasing solidification of lipid around protein molecules or cholesterol above the transition temperature of the lipid is discussed.

HIGH PERFORMANCE PREPARATIVE COLUMN CHROMATOGRAPHY OF LIPIDS USING A NEW POROUS SILICA, IATROBEADS. I. SEPARATION OF MOLECULAR SPECIES OF SPHINGOGLYCOLIPIDS. S. Ando, M. Isobe and Y. Nagai (Dept. of Biochem., The Tokyo Metropolitan Inst. of Gerontology, 35-2 Sakaecho, Itabashiku, Tokyo, Japan). *Biochim. Biophys. Acta* 424, 98–105 (1976). Good preparative separation of neutral glycolipids of human erythrocytes was achieved by column chromatography using the totally porous silica spheres, Iatrobeads. The solvent flow through the Iatrobeads column was rapid under atmospheric pressure, and so elution bands migrated with minimal diffusion in the column. Ceramide dihexoside and cermide trihexoside were both separated into two fractions of different molecular species on the Iatrobeads column. Two ceramide tetrasaccharides, globoside I and paragloboside, were also clearly separated on the Iatrobeads column. Chemical analysis showed that separation of these molecular species was due to differences in their fatty acid and long chain base compositions. Sphingadienine and phytosphingosine were found as minor components of long chain bases in human erythrocyte glycolipids.

PROTON MAGNETIC RELAXATION STUDIES OF MIXED PHOSPHATIDYLCHOLINE/FATTY ACID AND MIXED PHOSPHATIDYLCHOLINE BIMOLECULAR BILAYERS. F. Podo and J.K. Blasie (Dept. of Biophys. and Phys. Biochem., Johnson Res. Foundation, Univ. of Pennsylvania, Philadelphia, Pa.) *Biochim. Biophys. Acta* 419, 1–18 (1976). High resolution proton spin-lattice relaxation times (T_1), spin-spin relaxation times (T_2) and resonance linewidths were measured above the gel-to-liquid crystal transition temperature (T_m) in phosphatidylcholine bilayers possessing various degrees of intramolecular motional anisotropy at the level of various alkyl chain proton groups. The experiments were designed to test the hypothesis that coupled *trans-gauche* isomerizations along the chains can be responsible for the aniostropic motion of phosphatidylcholine proton groups in bilayer membranes. Systematic series of structural perturbations of the bilayer were achieved in mixed phosphatidylcholine/fatty acid and in mixed phosphatidylcholine bilayers where the degree of motional anisotropy of the chains' proton groups was gradually reduced by progressively increasing the chain length disparity of the two components. The results confirmed in a qualitative sense the original hypothesis made by Horwitz et al.

DANGER! CARRYOVER FROM TALL OIL PERILS FISH [AND] SHOULD BE CONTROLLED. J. Drew *Pulp Pap.* 49 No 2, 116–8 (1975). Chemicals found in waste streams of kraft pulp mills and tall oil plants, notably S compounds as well as rosins and fatty acids, are known to be toxic to fish and fish food organisms. Control and improved recovery of tall oil is suggested as a financially attractive solution for this problem. Tables indicate minimum lethal concentrations of several common contaminants. (World Surface Coatings Abs. No. 401)

INFRARED STUDY OF ADSORPTION OF OLEIC AND LINOLENIC ACIDS ON TO THE SURFACE OF SILICA IMMERSED IN CARBON TETRACHLORIDE. K. Marshall and C.H. Rochester. *J. Chem. Soc., Faraday Trans. I* 71, 1754–61 (1975). The adsorption of oleic acid on to silica from carbon tetrachloride solution has been studied by IR spectroscopy. At the lowest surface coverages studied, adsorption of acid monomer on to pairs of adjacent silanol groups occurred. As the concentration of acid in solution was increased, adsorption of monomer on to isolated surface silanol groups became predominant. At high solute concentrations, some evidence was also observed for absorbed acid dimers. The primary adsorbed interaction involved the formation of hydrogen bonds between surface hydroxyl groups and the carboxylic acid groups of the adsorbate molecules. However, simultaneous interaction of the oxide surface with the alkene residues of the alkyl chains occurred. Evacuation and heat treatment of silica covered with an adsorbed layer of linolenic acid led to the elimination of molecular water and the formation of chemisorbed linolenate groups on the oxide surface. (World Surface Coatings Abs. No. 403)

PREPARATION OF WHIPPABLE EMULSIONS. J.G. van Pelt, A. Prins, J.H. von Roon, and P. Smits (Lever Bros. Co.). *U.S. 3,944,680.* A process for the preparation of an aqueous oil emulsion of prolonged storage life, which can be whipped to an overrun of 70–500%, comprises (a) preparing an aqueous phase having a pH of 4.2–5.0 and containing 0.5–4% globular protein in the substantial absence of coagulated protein, of which at least 60% is in the form of a complex with an anionic polysaccharide; (b) mixing the aqueous phase with 0.3–2.0% of an emulsifier selected from the group consisting of partial fatty esters of glycerol, partial fatty acid esters of propylene glycol, and glycerolactopalmitate and with 3–50% of a liquid fat; and (c) homogenizing the mixture at a temperature at which the fat is liquid.

COMPREHENSIVE EVALUATION OF FATTY ACIDS IN FOODS. V. UNHYDROGENATED FATS AND OILS. C.A. Brignoli, J.E. Kinsella and J.L. Weihrauch (Consumer and Food Economics Inst., A.R.S., U.S.D.A., Hyattsville, Md.). *J. Am. Diet. Assoc.* 68, 224–9 (1976). This report is another in the continuing series from U.S.D.A. Data on total lipid, fatty acid composition expressed both as g/100 g fat or oil and g/100 g seed or bean, total saturated fatty acids, and total unsaturated fatty acids are given for unprocessed vegetable oils, vegetable fats, and animal fats. A separate table of data for lauric oils is given. As hydrogenation is the only process which alters fatty acid composition, the data also apply to processed fats and oils which have not been hydrogenated. Separate values are given for zero, low, medium, and high erucic acid rapeseed oils; for high oleic and high linoleic safflower oils; and for sunflower seed oils grown in northern and in southern regions. Calculations for converting the fatty acid methyl ester data to grams fatty acid per 100 grams food are discussed.

PREPARING FLUID SHORTENING FOR USE IN YEAST RAISED BAKERY PRODUCTS. M.E. Norris (SCM Corp.). *U.S. 3,943,259.* The fluid shortening is prepared by (a) heating a mixture of 4–14 parts of soft mono- and diglycerides having an iodine value of at least 40, 2–8 parts of ester emulsifiers, and 40–100 parts of liquid vegetable oil to form a liquified molten mixture; (b) rapidly cooling the mixture to 82–88 F to initiate beta crystal formation and produce a chilled blend having dispersed fat crystals; (c) working the chilled blend at 82–88 F to develop beta crystal formation and produce a uniform dispersion of the beta fat crystals in equilibrium with the liquid oil; and (d) fluidizing the dispersion by agitating at 80–90 F for a time sufficient to complete the beta crystal formation and produce a stabilized fluid shortening.

USE OF ACIDIC HEXANE TO PROCESS OIL SEEDS FOR PROTEIN AND OIL. T.P. Hensarling, T.J. Jacks, and L.Y. Yatsu (U.S. Secy. of Agriculture). *U.S. 3,941,764.* A process for preparing protein and oil from oilseeds comprises (a) preparing a homogeneous, monophasic mixture containing 2–25% acetic acid in hexane (b) adding 3–12 ml of the mixture per gram of comminuted oilseeds; (c) stirring the resultant mixture for 2 minutes to 4 hours at room temperature to assure good contact between the components, thereby forming a suspension of marc in an oil-containing homogeneous, monophasic miscella; and (d) separating the miscella from the marc containing the protein.

OLEOMARGARINE WITH YELLOW FOOD COLORING. S.S. Jackel and M.J. Horn (Baker Research Development Service). *U.S. 3,940,504.* The yellow coloring agent comprises oleoresin turmeric, which is added to the margarine at levels of 0.006–3%. An amount of oleoresin paprika equal to 10–100% of the oleoresin turmeric is also included in order to eliminate the greenish cast which the turmeric imparts to the margarine along with the yellow color.

SIMULTANEOUS REFINING AND DEWAXING OF CRUDE VEGETABLE OIL. H.T. Young (Procter & Gamble). *U.S. 3,943,155.* A process for simultaneously removing the hydrophilic and waxy components from crude vegetable oil comprises the steps of (a) gently agitating the crude oil at 15–45 F; (b) contacting the crude oil with at least one equivalent of aqueous alkali per mole of free fatty acid present in the oil while maintaining the temperature at 15–45 F to form an emulsion of hydrophilic and waxy components; (c) mixing 0.05–0.2% of a phosphoric acid solution with the emulsion to break it into a two phase system; and (d) separating the two phases.

PROCESS FOR IMPROVING TALL OIL PITCH. C.G. Force (Westvaco Corp.). *U.S. 3,943,117.* The process comprises saponifying an aqueous solution of tall oil pitch at a solids concentration of 5–99% with at least 0.00026% of a water soluble cationic amine soap catalyst and a slight amount more of a saponifying agent than is required to form soaps from the free fatty acids and rosin acids present in the pitch.

METHOD OF ISOMERIZING FATTY ACIDS AND DISPROPORTIONATING ROSIN ACIDS. T.P. Lehtinen (Oulu Osakeyhtio). *U.S. 3,943,118.* A method of producing a disproportionated and isomerized tall oil product comprises heating the tall oil in the presence of 0.1–5% sulfur and 0.01–0.4% iodine at 180–250 C and subjecting the product obtained to an odor removal treatment.

CHANGES IN FRYING FATS WITH BATTERS CONTAINING EGG. M. Bennion, K.S. Stirk and B.H. Ball (Dept. of Food Science and Nutrition, Brigham Young Univ., Provo, Utah). *J. Am. Diet. Assoc.* 68, 234–6 (1976). The effects of whole egg or egg yolk phospholipids in a fritter-type batter on color, phosphorus content, free fatty acids, and nonurea adduct forming fatty acid esters in a corn oil and a hydrogenated vegetable shortening, both used for 7 hours of frying, was studied. A highly significant increase in free fatty acids, phosphorus content, and darkening of color in the frying fats was associated with the presence of egg or egg yolk phospholipids in the batters. Nonurea adduct forming fatty acid esters in the frying fats were not affected by the batters. These data support the suggestion that diffusion into the frying fat of phospholipids from fried batters containing egg yolk contributes to an increase in free fatty acids and a darkening of color in the frying fat.

COMPOSITION FOR MAKING HYDROCARBONS AND FATS INTO BIODEGRADABLE EMULSIONS. P. Fusey (Banque Pour L'Expansion Industrielle "Banexi"). *U.S. 3,943,066.* The process for making the composition comprises mixing more than one mole of a carboxylic acid with a mole of a primary or secondary amine or aliphatic amino-alcohol, adding ammonia to bring the pH to 7, and adding 22.5–40 parts of the neutralized mixture, 2.5–5 parts of a phospho-aminolipid, and 55–75 parts of a benzenic fraction-free petroleum solvent.

• Biochemistry & Nutrition

STUDY OF THE BIOSYNTHESIS OF PHLEIC ACIDS, POLYUNSATURATED FATTY ACIDS SYNTHESISED BY MYCOBACTERIUM PHLEI. C.P. Asselineau and H.L. Montrozier (Centre de Recherche de Biochimie et Génétique Cellulaires du Centre National de la Recherche Scientifique, Toulouse). *Eur. J. Biochem.* 63, 509–18 (1976). Because of their structures, phleic acids (general formula: CH_3–$(CH_2)_m$–(CH=CH–CH_2–$CH_2)_n$–CO_2H; main component: $m = 14$, $n = 5$) cannot be synthesized by the same kinds of enzymatic systems as other natural polyunsaturated fatty acids. By using specifically labelled ^{14}C compounds, we have tested the ability of different molecules to be incorporated in the phleate skeletons by *Mycobacterium phlei.* The localization of radioactive carbon atoms has been studied by chemical degradation of labelled phleates, isolation and purification of the degradation products, and determination of their specific radioactivity. When *M. phlei* cells are incubated with labelled acetate, the unsaturated and saturated parts of the molecules of phleic acids are unequally labelled. The radioactivity of succinate monoester on the one hand and fatty acids (mixture of myristic and palmitic acids) on the other hand, measured after oxidative degradation of phleate esters, shows a constant ratio under definite conditions. Whether [1-^{14}C]acetate or [2-^{14}C]acetate is used for incubation, the same ratio is observed. Therefore acetate is the precursor of the unsaturated part as well as of the saturated part of the phleate molecules. By using labelled fatty acid esters, it has been found that palmitic acid is the precursor of phleates with $m = 14$, while myristic acid is the precursor of phleates with $m = 12$. Stearic and eicosanoic acids are not incorporated without degradation. The hypothesis of a condensation of a saturated fatty acid with a preformed polyunsaturated molecule was examined. Search for such a molecule in the lipids of *M. phlei* gives negative results. Pentaunsaturated phleate arising from palmitate is more abundant than pentaunsaturated phleate arising from myristate, while the reverse is true for hexaunsaturated phleates. These observations make very unlikely such an hypothesis. An elongation process fits well with the observed facts provided that this process involves elongation by two acetate units simultaneously, making elongation by four carbon atoms at a time. Such a requirement would be easily satisfied if two molecules of acetate are condensed together before their utilization in the elongation process. In such an hypothetical process, crotonate would be the most probable substrate of the elongation reaction.

CATABOLISM OF CHOLESTEROL BY BOVINE ADRENAL-CORTEX ENZYMES: IN VITRO FORMATION OF OXYGENATED STEROLS AND SIDE-CHAIN CLEAVAGE PRODUCTS. E. Bosisio, G. Galli and S. Nicosia (Istituto di Farmacologia e Farmacognosia, Facoltà di Farmacia, Università di Milano), M. Gallikienle (Instituto di Chimica, Facoltà di Medicina e Chirurgia, Università di Milano). *Eur. J. Biochem.* 63, 491–7 (1976). The identification of sterols and steroids formed by incubation of [7α-^3H, 26-^{14}C]cholesterol with mitochondrial enzymes from bovine adrenal cortex is reported. Only 17% of the radioactivity associated with cholesterol metabolites was found in pregnenolone, whereas 15% was reliable to oxygenated sterols and 6% to steroid compounds. The significance of the formation of these compounds is discussed particularly as regards oxygenated cholesterol derivatives.

GANGLIOSIDES OF HEPATOMA 27, NORMAL AND REGENERATING RAT LIVER. E.V. Dyatlovitskaya, A.M. Novikov, N.P. Gorkova and L.D. Bergelson (Shemyakin Institut of Bioorganic Chemistry, USSR Academy of Sciences, Moscow). *Eur. J. Biochem.* 63, 357–64 (1976). The highly malignant rat hepatoma 27 was found to have increased amounts of lipid-bound sialic acid as compared with normal liver whereas in regenerating liver the lipid-bound sialic acid level was reduced. In contrast to the liver the hepatoma contained higher amounts of disialogangliosides and no trisialogangliosides, which are abundant in the liver. The main disialoganglioside of the hepatoma had no analogue among the liver gangliosides and was identified as Gal-GalNAc(AcNeu-AcNeu)-Glc-Cer (G_{D1b}), which in other tissues is known to be a precursor of trisialogangliosides. These findings may be explained by a reduced activity of glycosyltransferases in the hepatoma and apparently do not simply reflect differences in growth rate since the ganglioside pattern of regenerating rat liver was not altered significantly in comparison with the liver. Liver and hepatoma microsomes were found to be enriched in gangliosides as compared with whole cells, liver mitochondria were slightly poorer, while the ganglioside level of hepatoma mitochondria was much higher than that of the hepatoma cells. It thus appears that the existing image of the plasma membranes as the only sites of high ganglioside concentration may not hold true for weakly differentiated hepatomas of high malignancy.

INOPHORES X537A AND A23187. EFFECTS ON THE PERMEABILITY OF LIPID BIMOLECULAR MEMBRANES TO DOPAMINE AND CALCIUM. M. Kafka and R.W. Holz (Adult Psychiatry Branch and Lab. of Clin. Sci., Natl. Inst. of Mental Health, Bethesda, Md. 20014). *Biochim. Biophys. Acta* 426, 31–7 (1976). X537A carries dopamine across lipid bimolecular membranes. The rate of transport increases linearly with the X537A concentration and is independent of an electric field across the membrane. The evidence suggests that the permeating species is a neutral 1:1 complex between dopamine and X537A. A23187 does not transport dopamine. The permeability of the membrane to calcium increases as the square of the X537A concentration; the transport of calcium is also increased by A23187. With both ionophores, calcium is probably transported as an uncharged complex. Neither desmethylimipramine nor cocaine alters the transport of dopamine with X537A.

LYSOPHOSPHOLIPASE ACTIVITY IN CELL-WALL FRAGMENTS CONTAMINATING MITOCHONDRIAL FRACTIONS OF NEUROSPORA CRASSA. G.W. De Goede, J. Samallo, M. Holtrop and G.L. Scherphof (Lab. of Physiol. Chem., State Univ. of Groningen, Bloemsingel 10, Groningen, The Netherlands) *Biochim. Biophys. Acta* 424, 195–203 (1976). Crude mitochondrial preparations from *Neurospora crassa* contain high levels of lysophospholipase (EC 3.1.1.5) activity when assayed with

lysophosphatidylcholine as a substrate. In mitochondria purified by centrifugation on a sucrose-density gradient this activity is virtually absent. The enzyme was shown to be linked to a contaminating cell fraction which mainly consists of cell-wall material as was demonstrated by electron microscopy and chemical analysis. The enzyme has no absolute Ca^{2+} requirement but it is slightly stimulated by 10 mM $CaCl_2$. The pH optimum is 5.8 in presence of $CaCl_2$ and is shifted to 4.2 when EDTA is present. In contrast to other lysophospholipases this enzyme is only slightly inhibited by deoxycholate. This detergent is able to release part of the lysophospholipase activity from the wall fragments without producing an increase in specific activity. The enzyme is possibly secreted by the cells as high lysophospholipase activities were also found in the culture medium.

THE EFFECT OF THE PHASE TRANSITION ON THE HYDRATION AND ELECTRICAL CONDUCTIVITY OF PHOSPHOLIPIDS. G.L. Jendrasiak and J.C. Mendible (Dept. of Physiol. and Biophys., Univ. of Ill., Urbana, Ill. 61801) *Biochim. Biophys. Acta* 424, 133–48 (1976). Adsorption isotherms for various saturated phosphatidylcholines have been obtained. Lipids above and below their phase transition temperature differ only in the amount of water adsorbed and not in the nature of their adsorption isotherms. Cholesterol has an effect similar to that of increasing unsaturation in the hydrocarbon chains. Decreasing the length of the hydrocarbon chains for lipids below their phase transition temperature has no effect on the isotherms. If the chain length is short enough so that the lipids are above their transition temperature, however, a large increase in water adsorption occurs. All of the phospholipids exhibit a rapid increase of electrical conductivity for a few water molecules adsorbed per lipid molecule. The phosphatidylcholines can be characterized by different activation energies, depending both upon their physical state and the presence of unsaturation in their hydrocarbon chains.

THE PHOSPHOLIPID HEAD-GROUP ORIENTATION: EFFECT ON HYDRATION AND ELECTRICAL CONDUCTIVITY. G.L. Jendrasiak and J.C. Mendible (Dept. of Physiol. and Biophys., Univ. of Illinois, Urbana, Ill. 61801). *Biochim. Biophys. Acta* 424, 149–58 (1976). The water adsorption isotherms have been obtained for egg phosphatidylethanolamine when it is complexed to egg phosphatidylcholine and cholesterol, respectively. In the presence of phosphatidylcholine, the phosphatidylethanolamine water binding is changed to a strong binding as compared to when the phospholipid is in its uncomplexed form. Cholesterol increases the water adsorbed by the phospholipid, however, it does not change the nature of the isotherm. Phosphatidylmonomethylethanolamine also exhibits a strong water binding. The electrical conductivity of these phospholipids has been measured concurrently with their hydration. Electrical activation energies have been obtained for the fully hydrated phospholipids and are a function of both the amount of water adsorbed and the orientation of the polar head-group. The results are discussed in terms of a model for water adsorption, previously put forth by the authors.

THE METABOLISM OF LIPIDS IN MOUSE PANCREATIC ISLETS. THE BIOSYNTHESIS OF TRIACYLGLYCEROLS AND PHOSPHOLIPIDS. C. Berne (Dept. of Histol., Biomedicum, Univ. of Uppsala, Box 571, S-751 23 Uppsala, Sweden) *Biochem. J.* 152, 667–73 (1975). The rate of incorporation of [U-^{14}C]glucose and [U-^{14}C]palmitate into the lipids of the pancreatic islets of obese-hyperglycaemic mice was examined. The following main observations were made. Both glucose and palmitate were incorporated into lipids in the islets. The fraction of glucose utilized for lipid biosynthesis was calculated to be 3–6% of that oxidized at high and low glucose concentrations, whereas palmitate was about equally divided between oxidation and esterification into lipids. Glucose was primarily incorporated from *sn*-glycerol 3-phosphate. Of the total glucose carbon incorporated, only 2–4% was recovered as fatty acids. A major portion of both glucose and palmitate was incorporated into phospholipids, whereas 10–30% went into triacylglycerols, depending on the extracellular glucose concentrations. An increase in the glucose concentration from 3.5 to 17 mM caused a twofold increase in the rate of glucose incorporation into triacylglycerols and a fivefold increase in the rate of incorporation into phospholipids. Similar effects were also obtained with normal mouse islets.

THE METABOLISM OF LIPIDS IN MOUSE PANCREATIC ISLETS. THE OXIDATION OF FATTY ACIDS AND KETONE BODIES. C. Berne (Dept. of Histol., Biomedicum, Univ. of Uppsala, Box 571, S-751 23 Uppsala, Sweden) *Biochem. J.* 152, 661–66 (1975). The rate of oxidation of ^{14}C-labelled fatty acids and of ketone bodies was measured in isolated pancreatic islets of obese-hyperglycaemic mice (*ob/ob*). The following main observations were made. Octanoate, palmitate and oleate were all converted into Co_2 by the pancreatic islets. Octanoate was oxidized with the highest rate followed by palmitate and oleate. The rate of oxidation of 0.7 mM-palmitate was 3.1 pmol/h per μg dry weight. This was decreased by 50% in the presence of 16.7 mM-glucose. The rate of palmitate oxidation was also inhibited by 2-bromostearate. The palmitate oxidation showed a concentration-dependent increase, which was most marked between 0.25 and 1.0 mM. Octanoate (5 mM) had no effect on the rate of oxidation of 3.3 mM-glucose. Acetoacetate (5 mM) and D-3-hydroxybutyrate (5 mM) were oxidized at rates of 5.9 and 5.4 pmol/h per μg dry weight respectively. These rates were less than 10% of those found in kidney-cortex slices. The magnitude of the oxidation rates found for fatty acids and for ketone bodies suggests that these substrates represent important metabolic fuels for the pancreatic B-cells.

FEEDING PROTECTED AND UNPROTECTED OILS TO DAIRY COWS. H.N. Astrup, L. Vik-Mo, A. Ekern, and F. Bakke (Dept. of Animal Nutr., Agr. Univ. of Norway, Ås Norway) *J. Dairy Sci.* 59, 426–30 (1976). Feeding protected coconut oil, protected safflower oil, and protected soybean oil to dairy cows increased dry matter content of the milk. The protected soybean oil raised fat and protein whereas protected coconut oil increased the fat content in the milk to a similar extent. Due to protection of these oils, their effect appears to be at the postabsorptive stage. Protected hydrogenated soybean oil lowered the content of fat and dry matter in the milk. This suggests that the so-called milk fat depression with oil feeding is brought about by the biotransformed long chain fatty acids produced from the oil in the rumen.

EFFECT OF FEEDING PROTECTED SAFFLOWER OIL ON YIELD, COMPOSITION, FLAVOR, AND OXIDATIVE STABILITY OF MILK. H.K. Goering, C.H. Gordon, T.R. Wrenn, J. Bitman, R.L. King and F.W. Douglas, Jr. (ARS, Nutr. Inst., Ruminant Nutr. Lab., Beltsville, Md. 20705). *J. Dairy Sci.* 59, 416–25 (1976). Four Holstein cows were fed 800 g of safflower oil: casein: formaldehyde per day for 16 wk as supplement to a hay: concentrate diet. Four control Holstein cows were fed only the hay:concentrate diet. The safflower oil in the supplement was protected from hydrogenation in the rumen. The linoleic acid content of the milk fat was increased from a mean of 2.7% for nonsupplemented cows to 13.3% for supplemented cows. Recovery in milk fat of protected linoleic acid was 22%. Milk, fat, and protein yields and fat and protein percentages were not affected by the supplementation. No health or feeding problems were observed during the supplementation with the safflower oil:casein:formaldehyde material. Off-flavors, predominantly of an oxidized nature, readily developed in milk containing high linoleic acid. Supplementation of the cows with α-tocopheryl acetate or the direct addition of α-tocopherol to the milk effectively prevented development of oxidized off-flavors.

ROLE OF HEME PROTEINS IN PEROXIDATION OF MILK LIPIDS. J.F. Gregory, J.G. Babish and W.F. Shipe (Dept. of Food Sci., Cornell Univ., Ithaca, N.Y. 14850). *J. Dairy Sci.* 59, 364–8 (1976). The heme proteins of the milk fat globule membrane were examined for their role in the oxidative degradation of milk lipids. Treatment of milk with antibiotic antimycin A inhibited peroxidation in samples containing added copper. The specificity of antimycin A in inhibiting heme-induced lipid peroxidation and its hydrophobicity suggest involvement of membrane heme in the catalysis. Both the inhibitory effect of antimycin A and oxidative stability increased in samples aged 24 hr prior to copper addition. Spontaneous alteration of the milk fat globule membrane with aging may have been responsible. Cytochrome b_5, a membrane heme protein, and susceptibility of milk samples to lipid peroxidation were uncorrelated; however, its catalytic involvement was not precluded.

A KINETIC CONCEPT OF LIPID TRANSPORT IN RUMINANTS. A REVIEW. D.L. Palmquist (Dept. of Dairy Sci., Ohio Agr. Res. and Development Ctr., Wooster 44691) *J. Dairy Sci.* 59, 355–63 (1976). Summarization of the literature shows a strong correlation between dietary fatty acid intake and total lipid concentration in plasma in lactating cows whereas total milk fat secreted is related to neither of these. In the process of plasma triglyceride removal, chylomicra and very low density

lipoproteins are converted to low density lipoproteins. Limited kinetic data indicate that the fractional removal rates for chylomicra and very low density lipoproteins are rapid in lactating cows whereas fractional removal of low density lipoproteins is slower, resulting in accumulation of the latter in plasma. Under such conditions, low density lipoprotein concentrations of plasma would not be expected to reflect quantitatively the transfer of plasma triglyceride fatty acids to milk fat. Quantitative analysis of triglyceride fatty acid turnover in density less than 1.006 lipoproteins should delineate the role of plasma lipid transport in milk fat synthesis. High fat diets protected from rumen biohydrogenation have proven to be a useful approach in studying ruminant fat metabolism and may be used more extensively to elucidate the role of cholesterol in plasma lipid transport and the metabolism of essential fatty acids in ruminants.

RESISTANCE OF INTESTINAL TRIGLYCERIDE TRANSPORT CAPACITY IN THE RAT TO ADAPTATION TO ALTERED LUMINAL ENVIRONMENT. Ai-Lien Wu and S.B. Clark (Div. of Gastroenterol., Med. Service, St. Luke's Hospital Ctr. and Columbia Univ. Inst. of Human Nutr., New York, New York). *Am. J. Clin. Nutr.* 29, 157–68 (1976). Previous studies have shown that the transmucosal transport capacity for triolein is slower in distal compared with proximal regions of rat small intestine. The effect of altered luminal conditions on the relative capacitites for [^{14}C]triolein transport through different regions of intestinal wall were examined by determining the net accumulation of ^{14}C-lipid in the mucosa during maximal steady [^{14}C]triolein absorption. The high ^{14}C-lipid accumulation in distal mucosa was not reduced after direct distal infusion of oleic acid and monolein for 7 days before challenge (substrate induction). No decrease in distal intestinal lipid accumulation was found 1 month after removal of the proximal 40% of intestine beyond the duodenum. When proximal and distal segments were exchanged without reduction in intestinal length, by jejunoileal transposition, major ^{14}C-lipid accumulation still occurred in originally distal segments during 3 hr of [^{14}C]triolein infusion 1 month later.

EFFECTS OF ACUTE ADMINISTRATION OF TAUROCHOLIC AND TAUROCHENODEOXYCHOLIC ACID ON BILIARY LIPID EXCRETION IN THE RAT. D.L. Eaton and C.D. Klaassen (Dept. of Pharmacol., Univ. of Kansas Med. Ctr., Kansas City, Kansas 66103). *Pro. Soc. Exp. Biol. Med.* 151, 198–202 (1976). Comparison of the effects of biliary lipid excretion produced by infusion of taurochenodeoxycholate and taurocholate showed no significant difference when the bile acids were infused for a relatively short period of time. Cholesterol excretion rates measured during depletion of the bile acid pool were significantly higher than cholesterol excretion rates measured during infusion of bile acids at various rates. These data indicate that there is some mechanism in addition to bile acid excretion that is responsible for biliary excretion of cholesterol when the enterohepatic circulation is intact.

A COMPARISON OF THE ENZYME LEVELS AND THE IN VITRO UTILIZATION OF VARIOUS SUBSTRATES FOR LIPOGENESIS IN PAIR-FED LEAN AND OBESE PIGS. R.J. Martin and J.H. Herbein (Dept. of Animal Sci., The Pennsylvania State University). *Pro. Soc. Exp. Biol. Med.* 151, 231–5 (1976). In this study of spontaneous obesity of pigs, specific metabolic shifts were observed, which explain an increase in fat deposition. Liver tissue utilization of pyruvate and glucose for oxidation and lipogenesis showed no significant difference between lean and obese pigs. Adipose tissue utilization of glucose, acetate and glycerol for triglyceride and fatty acid synthesis was greater in obese pigs than lean pigs ($P < 0.01$). No significant difference in leucine incorporation into lipid fractions was found. Of the substrates utilized, glucose supplied 86 and 94% of the glyceride-glycerol synthesized in lean and obese pigs, respectively. Glycerol was not a major contributor to glyceride-glycerol synthesis (3.5 to 5.5%), in spite of the presence of adipose tissue glycerokinase. An increase ($P < 0.05$) in alanine incorporation into glucose was observed in liver tissue from obese pigs. In general, the levels of enzyme activities associated with gluconeogenesis, glycolysis, and lipogenesis supported the findings of *in vitro* utilization of these substrates.

EFFECT OF BILE SALTS ON THE HEPATIC REGULATION OF SERUM LECITHIN:CHOLESTEROL ACYLTRANSFERASE ACTIVITY. K.J. Ho, R. Cisternas and G.S. Boyd (Dept. of Pathol. (KJH), Univ. of Alabama in Birmingham, Birmingham, Ala.) *Atherosclerosis* 23, 145–53 (1976). The effect of bile salts on lecithin:cholesterol acyltransferase (LCAT) activity was studied in three groups of Wistar rats. Thirty percent increase of serum LCAT activity was observed in rats fed a 4% cholestyramine diet for 15 days which was accompanied by a simultaneous decrease of the serum esterified cholesterol concentration but the serum free cholesterol concentration remained unchanged. These studies revealed a remarkable degree of non-enzymic degradation of the enzyme during perfusion. Perfusion of livers from rats previously fed a 4% cholestyramine diet resulted in a delay of the initial decline of perfusate LCAT activity associated with the maintenance of a steady state during the third and fourth hours of the perfusion.

LIPID METABOLISM IN ATHEROSCLEROSIS. FATTY ACID SYNTHESIS IN AORTIC MITOCHONDRIA OF CHOLESTEROL-FED AND ESTROGEN-TREATED RABBITS. R. Cathcart and T.I. Pynadath (Dept. of Chem., Kent State Univ., Kent, Ohio 44242) *Atherosclerosis* 23, 191–9 (1976). The effects of cholesterol feeding and estrogen administration on synthesis of fatty acids in aortic mitochondria of male rabbits were investigated. Fatty acid synthesis was measured by the incorporation of [1-^{14}C]acetyl CoA into long chain fatty acids under optimal conditions. It was found that atherogenesis had no significant effect on the synthesis of fatty acids in aortic mitochondria. Estrogen administration to cholesterol-fed rabbits, although retarded development of aortic lesions, did not seem to affect the fatty acid synthesis. It was concluded that under optimal conditions which included optimum concentration of primer and disrupted mitochondria, neither atherosclerosis nor estrogen had any significant influence on the synthesis of fatty acids in aorta.

REGULATION OF LIPID METABOLISM IN THE NORMAL PIG AORTA. PART 1. INFLUENCE OF INSULIN AND EPINEPHRINE ON LIPID SYNTHESIS FROM [U-^{14}C] GLUCOSE. J.B. Somer and C.J. Schwartz (Dept. of Pathol., Faculty of Hlth. Sci., McMaster Univ. and The Chedoke Hosp., Hamilton, Ont., Canada). *Atherosclerosis* 23, 201–13 (1976). The influence of insulin and epinephrine on the incorporation of uniformly labelled [^{14}C]glucose into lipid of normal young pig aorta in vitro has been studied. Both the incorporation of [U-^{14}C]glucose into aortic lipids, and the influence of insulin showed considerable variation. Over a concentration range from 0 to 10,000 μU/ml, insulin stimulated glucose incorporation into aortic total lipid. Stimulation was not constant, but appeared to be biphasic with a maximum at 100 μU/ml, a minimum at 1,000 μU/ml, followed by increasing stimulation to 10,000 μU/ml.

REGULATION OF LIPID METABOLISM IN THE NORMAL PIG AORTA. PART 2. INFLUENCE OF INSULIN AND EPINEPHRINE ON LIPID SYNTHESIS FROM [1-^{14}C]ACETATE. J.B. Somer and C.J. Schwartz (Dept. of Pathol., Faculty of Health Sci., McMaster Univ., Ontario, Canada). *Atherosclerosis* 23, 215–25 (1976). The influence of insulin and epinephrine on the incorporation of [1-^{14}C]acetate into lipid of normal young pig aorta in vitro has been examined. Both the incorporation of [1-^{14}C] acetate into aortic lipids and the influence of insulin on incorporation exhibited considerable experimental variation. Insulin, at a physiological concentration of 25 μU/ml, significantly increased [1-^{14}C]acetate incorporation into aortic total lipid. This stimulation was apparently not uniform for all individual lipid fractions. Incorporation in the presence of insulin was statistically significantly greater in free fatty acid, triglyceride and total phospholipid, but not in the free sterol plus diglyceride fraction or cholesteryl ester. Additionally, the degree of stimulation of labelled acetate incorporation was significantly greater for total phospholipid than for free fatty acid or triglyceride. Epinephrine, at 10^{-8} *M*, did not significantly influence labelled acetate incorporation into aortic lipid.

EFFECTS OF PLANT STEROLS ON CHOLESTEROL METABOLISM IN MAN. B.J. Kudchodkar, L. Horlick and H.S. Sodhi (Dept. of Med., Univ. of Saskatchewan, Sakatoon, Saskatchewan S7N OWO, Canada). *Atherosclerosis* 23, 239–48 (1976). Plant sterols (Cytellin, 3 g t.i.d.) were administered to 3 normal and 3 hyperlipemic subjects for periods of 12 or 15 days. There was a moderate decrease (9 ± 4%) in plasma cholesterol; and in 5 of 6 subjects there was a modest increase (6 ± 1%) in plasma triglycerides, and in the sixth, the levels were decreased by 20%. On cessation of treatment, plasma lipids returned gradually to pretreatment levels. Treatment with plant sterols increased the fecal excretion of metabolites of endogenous cholesterol by 35–73% over the control values. The increment was generally limited to the neutral metabolites except in one normal subject who showed

significant increases both in neutral sterols and bile acids.

THYROID HORMONE AND EXPERIMENTAL ATHEROSCLEROSIS IN RABBITS. D. Kritchevsky, S.A. Tepper and J.A. Story (The Wistar Inst. of Anat. and Biol., 36th Street at Spruce, Philadelphia, Pa. 19104). *Atherosclerosis* 23, 249–52 (1976). Rabbits were fed a diet containing 2% added cholesterol but not fat for 60 days. When the diet contained D-thyroxine (0.5 mg/day) or L-thyroxine (0.05 mg/day) both serum cholesterol and atheromata were lower than they were in control rabbits. Of 10 studies in the literature relating to thyroid hormone and atherosclerosis, 7 report reduced atherosclerosis and 3 report increased atherosclerosis in drug-treated rabbits. The data are collected and the suggestion made that some ingredient present or absent in commercial rabbit ration may be responsible for the reported effects.

TURNOVER OF CHOLESTEROL IN AORTA OF RABBITS PREVIOUSLY FED A CHOLESTEROL-ENRICHED DIET. S. Stender (Dept. of Clin. Chem. A, Rigshospitalet, Univ. Hospital, Blegdamsvej, 9. DK-2100 Copenhagen, Denmark). *Atherosclerosis* 23, 275–88 (1976). Three groups of 18 rabbits were killed, 0, 16 and 32 weeks respectively after they had been fed a cholesterol-enriched diet for 8 weeks. [^{3}H]Cholesterol was injected intravenously 3 weeks before addition of cholesterol to the diet was discontinued. [^{14}C]Cholesterol was injected 11 weeks after the addition of cholesterol to the diet had ceased. A number of the cholesterol-fed and the previously-cholesterol-fed rabbits were injected with labeled cholesterol 3 days before they were killed. Cholesterol content and radioactivity in inner aorta, liver and serum samples were measured. The 3-day influx of cholesterol from serum into inner aorta did not decrease proportionally with the concentration of serum cholesterol. During the last normocholesterolemic period a reduction of the total activity of previously injected labeled cholesterol was observed.

INCREASED COMPLEXING OF PLASMATIC LIPIDS WITH FIBRINS IN HYPERLIPOPROTEINAEMIAS. F. Kunz, H. Hortnagl, D. Egg and H.J. Lisch (Dept. of Internal Med., Univ. of Innsbruck, Austria). *Atherosclerosis* 23, 289–95 (1976). Plasma was brought to coagulation by different reagents under differing conditions. The clots were then squeezed out and washed under standardized conditions and the lipid content of the resulting fibrins and the corresponding plasmas were analyzed. In hyperlipoproteinaemic patients the amount of plasmatic lipids complexed with fibrins was significantly greater than in normal subjects; and the percentage was greater in hypertriglyceridaemic patients. Increased amounts of lipids complexed with fibrins might inhibit fibrinolytic enzymes from reaching their substrate and therefore be partly responsible for the increased tendency to atherosclerosis and to thrombotic complications in hyperlipoproteinaemia. In normal subjects there was a positive correlation between plasma and fibrin triglycerides. No other correlations between lipid and coagulation parameters were observed.

INVESTIGATIONS IN EXPERIMENTAL ATHEROSCLEROSIS. PART 1. THE EFFECTS OF PHOSPHATIDYLCHOLINE (EPL) ON EXPERIMENTAL ATHEROSCLEROSIS IN WHITE RATS. L. Samochowiec, D. Kadlubowska and L. Rozewicka (Depts. of Pharmacology, and Histol. and Embryol., Pomeranian Med. Academy, Powstáncow Wlkp. 72, 70–111 Szczecin, Poland). *Atherosclerosis* 23, 305–17 (1976). The influence of atherogenic diet and "essential" phospholipids (EPL) both on the course and development of atherosclerotic changes in rats was investigated. The atherogenic diet elicits lesions in the cardiovascular system and serum of white rats corresponding to experimental atherosclerosis. EPL, administered in doses of 280–2,800 mg/kg, has a preventive and curative action on experimental atherosclerosis in white rats.

THE ENZYMIC FORMATION OF LONG CHAIN ALDEHYDES AND ALCOHOLS BY α-OXIDATION OF FATTY ACIDS IN EXTRACTS OF CUCUMBER FRUIT (CUCUMIS SATIVUS). T. Galliard and J.A. Matthew (Agr. Res. Council, Food Res. Inst., Colney Lane, Norwich NR4 7UA, U.K.). *Biochim. Biophys. Acta* 424, 26–35 (1976). An enzyme system that catalyses the α-oxidation of fatty acids to shorter chain products is present in acetone powders of cucumber fruits. In the absence of NAD^+, the predominant product from palmitic acid is pentadecanal. Addition of NAD^+ gives rise to a homologous series of *n*-alkanals, the concentrations of which are in the same order as that reported in the volatile products formed on homogenization of cucumbers, i.e. $C_{15} > C_{14} > C_{13} > C_{12}$. Pentadecan-1-ol is also formed from palmitic acid in the absence of added NAD^+; C_{15}, C_{14} and C_{13} *n*-alkanols are produced in the presence of NAD^+. The substrate specificity for saturated fatty acids is in the order $C_{12} << C_{14} > C_{16} >> C_{18}$. Unsaturated C_{18} acids are oxidized more readily than stearic acid. The α-oxidation system is inhibited by dithiothreitol, cysteine, imidazole and certain metal ligands (CN^-, N_3^-, diphenylthiocarbazone) but not by EDTA. Differences between the α-oxidation system in cucumber and those previously reported in other plants are discussed.

FORMATION OF 5α-REDUCED C_{19} STEROIDS FROM PROGESTERONE IN VIVO BY 5α-REDUCED PATHWAY IN OLDER PREPUBERTAL RAT TESTIS. M. Yamada, H. Miyaji, H. Kasai and K. Matsumoto (Dept. of Pathol., Hyōgo College of Med., Nishinomiya, Hyōgo, Japan). *Biochim. Biophys. Acta* 424, 82–9 (1976). Either [^{3}H]progesterone (0.5 or 5 nmol/5 μCi), 5α-[^{3}H]pregnane-3,20-dione (5 nmol/5 μCi) or [^{14}C]progesterone (6.6 nmol/0.2 μCi) plus 5α-[^{3}H]-pregnane-3,20-dione (1 or 6.6 nmol/0.6 μCi), suspended in 0.05 ml of physiological saline solution, was injected into each testis of 32- and 90-day-old rats. Following injection, radioactive metabolites in testis and spermatic vein blood were extracted, isolated, measured and identified by column and paper chromatographies, with derivative formation and recrystallization to constant specific activity.

MISE EN EVIDENCE ET ROLE DES DIACYLGLYCEROLS DE L'ENVELOPPE DES CHLOROPLASTES D'EPINARD. J. Joyard and R. Douce (Lab. de Biol. Végétale, Dépt. de Recherche Fondamentale, Centre d'Etudes Nucléaires et Univ. Scientifique et Médicale de Grenoble, BP 85 Centre de Tri 38041 Grenoble Cedex, France). *Biochim. Biophys. Acta* 424, 125–31 (1976). Galactolipids synthesis occurs in the envelope of spinach chloroplasts by galactosylation of a large endogenous pool of diacylglycerols.

IMMUNOLOGICAL COMPARISON OF PHOSPHATIDYLINOSITOL AND PHOSPHATIDYLCHOLINE EXCHANGE PROTEINS IN BOVINE BRAIN, LIVER AND HEART. G.M. Helmkamp, Jr., S.A. Nelemans and K.W.A. Wirtz (Lab. of Biochem., State Univ. of Utrecht, Universiteitcentrum "De Uithof", Padualaan 8, Utrecht, The Netherlands). *Biochim. Biophys. Acta* 424, 168–82 (1976). The two phosphatidylinositol exchange proteins isolated from bovine cerebral cortex, I (isoelectric point pH 5.2) and II (isoelectric point pH 5.5), had essentially identical amino acid compositions. Rabbit antisera preparations specific to each of these brain proteins were equally effective in inhibiting the phosphatidylinositol transfer activity of both protein I and II. Judged by double diffusion on agar gels, immunoprecipitation was not observed between either of the brain phosphatidylinositol exchange proteins and anti-liver phosphatidylcholine exchange protein antibody or between liver phosphatidylcholine exchange protein and anti-brain phosphatidylinositol exchange protein antibody. A protein which was chemically, immunologically, and catalytically similar to liver phosphatidylcholine exchange protein was identified in brain and contributed about 20% of the phosphatidylcholine transfer activity in that tissue.

EFFECT OF MATERNAL DIET ON FETAL HEPATIC LIPOGENESIS. S.G. Miguel and S. Abraham (Bruce Lyon Memorial Res. Lab., Children's Hospital Med. Ctr. of Northern Calif., 51st and Grove Streets, Oakland, Calif. 94609). *Biochim. Biophys. Acta* 424, 213–34 (1976). The effects of: maternal diet; cyclic-3′,5′-adenosinemonophosphate (cyclic AMP) and clofibrate on hepatic lipogenesis in fetal rats were studied. The experimental diets contained 22% protein, 40–50% carbohydrate, adequate vitamins, and minerals. In addition, the fat-containing diets were supplemented with either 15% corn oil, 25% corn oil, or 5% cholesterol + 10% oleic acid. In the clofibrate feeding studies, 0.3% (w/v) of the ethyl ester was added to a stock ration or to fat-free diet. Lipogenesis was measured in liver slices incubated with [2-^{14}C]pyruvate, [1-^{14}C]acetate, or ^3H_2O. In addition, activities of lipogenic enzymes were measured in cytosol fraction from liver homogenates. The effects of the experimental diets on liver composition were also examined. Changes in enzyme activities paralleled alterations in lipogenesis in maternal but not in fetal liver. Corn oil feeding or fasting increased the rate of transfer of linoleate from the dam to the fetus. However, accumulation of linoleate in fetal liver did not correlate with a decreased rate of fatty acid synthesis as it did in maternal liver. Maternal hepatic glycogen stores were depleted by fasting, but glycogen levels in fetal liver remained high under these conditions.

SYNTHESIS OF 1α-HYDROXY[6-^{3}H]VITAMIN D_3 AND ITS METABOLISM TO 1α,25-DIHYDROXY[6-^{3}H]VITAMIN D_3 IN THE RAT. M.F. Holick, T.E. Tavela, S.A. Holick, H.K. Schnoes, H.F. DeLuca

and B.M. Gallagher (Dept. of Biochem., College of Agr. and Life Sci., Univ. of Wisconsin, Madison, Wis. 53706). *J. Biol. Chem.* 251, 1020–4 (1976). 1α-Hydroxy[6-^{3}H]vitamin D_3 has been synthesized with a specific activity of 4 Ci/mmol, and its metabolism in rats has been studied. It is rapidly converted to 1α,25-dihydroxy[6-^{3}H]vitamin D_3 *in vivo*. Following an intravenous or oral dose, a maximal concentration of 1α,25-dihydroxy[6-^{3}H]vitamin D_3 is found 2 and 4 hours, respectively, before the maximal intestinal calcium transport response is observed. Similarly, 1α,25-dihydroxy[6-^{3}H]vitamin D_3 accumulation in bone precedes the bone calcium mobilization response. It appears, therefore, that the biological activity of 1α-hydroxyvitamin D_3 is largely, if not exclusively, due to its conversion to 1α,25-dihydroxy[6-^{3}H]vitamin D_3. 1α-Hydroxy[6-^{3}H]vitamin D_3 and 1α,25-dihydroxy[6-^{3}H]vitamin D_3 appear in intestine equally well after an oral or an intravenous dose of 1α-hydroxy[6-^{3}H]vitamin D_3.

METABOLISM OF 1α-HYDROXYVITAMIN D_3 IN THE CHICK. S.A. Holick, M.F. Holick, T.E. Tavela, H.K. Schnoes and H.F. DeLuca (Dept. of Biochem., College of Ag. and Life Sci., Univ. of Wisconsin, Madison, Wisconsin 53706). *J. Biol. Chem.* 251, 1025–8 (1976). Chicks convert both orally and intravenously administered 1α-hydroxy[6-^{3}H]vitamin D_3 rapidly to 1α,25-dihydroxy[6-^{3}H]vitamin D_3. The maximal accumulation of 1α,25-dihydroxy[6-^{3}H]vitamin D_3 in intestine precedes the intestinal absorption response to 1α-hydroxyvitamin D_3 by at least 2 hours. Oral administration results in the highest concentrations of 1α,25-dihydroxy[6-^{3}H]vitamin D_3 in intestine, giving a level about 1.5 times that achieved with an intravenous dose. Liver homogenates from both rat and chick convert 1α-hydroxy[6-^{3}H]vitamin D_3 to 1α,25-dihydroxy[6-^{3}H]vitamin D_3. However, intestinal homogenates from chick, but not rat, can also carry out this conversion, which may account for the higher concentration of 1α,25-dihydroxy[6-^{3}H]vitamin D_3 found in the intestine of chicks given an oral dose of 1α-hydroxy [6-^{3}H]vitamin D_3.

AN ACTIVATOR STIMULATING THE ENZYMIC HYDROLYSIS OF SPHINGOGLYCOLIPIDS. Su-Chen Li and Yu-Teh Li (Delta Reg. Primate Res. Ctr., Covington, Louisiana 70433). *J. Biol. Chem.* 251, 1159–63 (1976). An activator stimulating the enzymic hydrolysis of sphingoglycolipids has been purified from human liver. The purity of the activator, as examined by disc gel electrophoresis, showed one major band stained with both amido black and periodate-Schiff reagent. Chemical analyses identify the activator as a glycoprotein. An antibody against the activator was developed from rabbits. The specificity of the antibody to the activator has been established. The antibody was used to make the affinity column for isolation of the activator. It was also used to develop a sensitive immunodiffusion method to detect the activator.

LIPOPROTEIN LIPASE: EVIDENCE FOR HIGH- AND LOW-AFFINITY ENZYME SITES. C.J. Fielding (Cardiovascular Res. Inst., Univ. of Calif., San Francisco, Calif. 94143). *Biochemistry* 15, 879–84 (1976). The kinetic constants for membrane-supported lipoprotein lipase have been determined for the enzyme active in lipoprotein triglyceride catabolism in perfused heart and adipose tissues, using a nonrecirculating system. Heart endothelial lipoprotein lipase reacted as a single population of high-affinity substrate binding sites (K_m' 0.07 mM triglyceride). K_m' (apparent Michaelis constant for the supported enzyme species) was independent of flow rate and the enzyme was rapidly released by heparin, suggestive of a superficial membrane binding site. Lipoprotein lipase active in perfused adipose tissue had significantly different kinetic properties, including a low substrate affinity (K_m' 0.70 mM triglyceride), diffusion dependence of K_m' at low flow rates, and slow release of enzyme by heparin. Adipose tissue may contain a small proportion of high affinity sites. While only a small proportion of total heart tissue lipoprotein lipase was directly active in triglyceride hydrolysis, this study suggests that the major part of lipoprotein lipase in adipose tissue may be involved in the hydrolysis of circulating lipoprotein triglyceride.

CHARACTERIZATION OF THE EHRLICH ASCITES TUMOR PLASMA LIPOPROTEINS. S.N. Mathur and A.A. Spector (Depts. of Biochem. and Internal Med., Univ. of Iowa, Iowa City, Ia. 52242). *Biochim. Biophys. Acta* 424, 45–56 (1976). The lipoproteins of the Ehrlich ascites tumor plasma were separated into 3 distinct fractions, very low density, low density and high density lipoproteins by preparative ultracentrifugation combined with agarose column chromatography. High density lipoproteins contained 74% of the total protein in the lipoproteins. By contrast, most of the lipids were present in the very low density lipoprotein fraction. The fatty acid compositions of the cholesteryl esters were appreciably different in the very low, low and high density lipoproteins, whereas phospholipid and triacylglycerol fatty acid compositions were quite similar in the 3 lipoprotein fractions.

THE METABOLISM OF [1-^{14}C]STEARIC ACID IN RAT TESTICULAR TISSUE. A.R. Whorton, T. Antalis and J.G. Coniglio (Dept. of Biochem., Vanderbilt Univ., Nashville, Tenn. 37232). *Biochim. Biophys. Acta* 424, 66–72 (1976). The metabolism of stearic acid was studied in vivo following intratesticular injection of [1-^{14}C]stearate. Soon after injection ^{14}C activity was found mainly in the free fatty acid pool. This was followed at later time periods by transfer of label primarily to the phosphatide pool. During each time period significant amounts of label were recovered as $^{14}CO_2$. Analysis of ^{14}C-labeled fatty acids from the injected testes demonstrated an initial rapid rate of oxidation and desaturation of [1-^{14}C] stearate followed by a slower steady state rate. It was concluded that the initial rate was due to the rapid turnover of the highly labeled free fatty acid pool followed by a much slower rate as [^{14}C]stearate was esterified to the more metabolically stable phospholipids. Elongation of the labeled stearic or its desaturated derivative was not observed. The rate of desaturation in vitro of stearic acid was measured in microsomal preparations from rat testes and found to be 12.0 ± 0.5 pmol/min/mg compared to the estimated in vivo value of 22 pmol/min/mg and the value of 390 pmol/min/mg for hepatic microsomal desaturase.

COMPARATIVE STUDIES ON CHEMICAL, HEMOLYTIC AND DIFFUSION-IN-GEL PRECIPITATION PROPERTIES OF VARIOUS LYSOSPHINGOLIPIDS. T. Taketomi, N. Kawamura, A. Hara and S. Murakami (Dept. of Biochem., Inst. of Adaptation Med., Shinshu Univ., Matsumoto 390, Japan). *Biochim. Biophys. Acta* 424, 106–13 (1976). Various lysosphingolipids were prepared and their chemical structures were confirmed by thin layer chromatography, infrared spectroscopy, proton magnetic resonance spectroscopy and chemical analyses of sugars, amino-sugars, fatty acids and long chain bases by gas-liquid chromatography. Some hemolytic and diffusion-in-gel precipitation properties of these substances were compared with each other. Almost all of deacylated sphingolipids had approximately the same hemolytic activity. These hemolytic activities were inhibited with equal amounts of cholesterol. Aqueous solutions of digalactosylglucosylsphingosine, galactosaminyldigalactosylglucosylsphingosine and digalactosaminyldigalactolsylglucosylsphingosine gave rise to nonimmune precipitation lines with normal animal sera, particularly with their low density lipoproteins on agarose gel double diffusion, whereas sphingosylphosphorylcholine and neuraminylgalactosylglucosylsphingosine gave no precipitation lines at all. High concentration of lactosylsphingosine, galactosylsphingosine and glucosylsphingosine, respectively, gave rise to a slightly faint precipitation line.

INFLUENCE OF ENVIRONMENTAL TEMPERATURE ON THE FATTY ACID DESATURATION AND ELONGATION ACTIVITY OF FISH (PIMELODUS MACULATUS) LIVER MICROSOMES. M.P. De Torrengo and R.R. Brenner (Cátedra de Bioquímica, Inst. de Fisiología, Facultad de Ciencias Med., Univ. Nacional de La Plata, Calle 60 y 120, La Plata, Argentina). *Biochim. Biophys. Acta* 424, 36–44 (1976). The effect of environmental temperature on the activity of liver microsomes of fish *(Pimelodus maculatus)* to desaturate and elongate oleic, linoleic, and α-linolenic acids was studied. It was found that: Fish kept at 14–15°C had higher desaturation and elongation activity than animals kept at 29–30°C. The ratio of activity was the same for the three fatty acids. A decrease of the environmental temperature increased the V of linoleic acid desaturation to γ-linolenic acid, but did not modify the approximate K_m of the reaction. The inactivation of the Δ^6-desaturase of microsomes separated from fish kept at 29–30°C and 14–15°C was the same when heated at 40°C. However, the enzyme was deactivated faster when heated at 29–30°C than at 14–15°C. The increase of the Δ^6-desaturation activity of the microsomes evoked by the decrease of the temperature of the aquarium was mostly compensated for by the correlative decrease of the specific reaction rate of the reaction. For this reason it is assumed that the adaptive change of the desaturation activity of the microsomes with the environmental temperature does not greatly modify the fatty acid composition of the fish.

INFLUENCE OF EXCESS VITAMIN E ON VITAMIN A TOXICITY IN RATS. M.Y. Jenkins and G.V. Mitchell (Div. of Nutr., Food

and Drug Admin., Dept. of Hlth., Education and Welfare, Washington, D.C. 20204). *J. Nutr.* 105, 1600–6 (1975). Male Holtzman rats (78 g) were fed semipurified 16% protein diets for 8 weeks using a food grade soy protein concentrate as the protein source. The basal diet contained added DL-methionine (0.26%) and adequate amounts of vitamins A (14,535 IU/kg as retinyl acetate) and E (60 IU/kg as DL-α-tocopheryl acetate) and all other required nutrients. Experimental diets included: basal plus 600 IU of vitamin E/kg; basal plus 6,000 IU of vitamin E/kg; basal plus 2.9×10^6 IU of vitamin A/kg; basal plus 2.9×10^6 IU of vitamin A plus 600 IU of vitamin E/kg; and basal plus 2.9×10^6 IU of vitamin A plus 6,000 IU of vitamin E/kg. Both vitamin A and vitamin E had a significant ($P < 0.05$) effect on growth. There was an increase in growth with vitamin E intake and a decrease in growth with vitamin A intake. The net result of these two effects was that the groups fed both vitamins tended to be quite close in mean values to the group fed only the basal diet.

SPHINGOLIPIDS OF INFLUENZA VIRUSES. R.T. Huang. (Inst. of Virology Justus Liebig–Univ. of Giessen). *Biochim. Biophys. Acta* 424, 90–7 (1976). Total lipid of four egg grown influenza viruses (A_2-Asia, A_2-England, A_2-Taiwan and fowl plague virus) were extracted with chloroform-methanol. After mild alkali treatment of the extracts, glycosphingolipids and sphingomyelin were separated by a silicic acid column, and finally purified by thin layer chromatography. Fatty acid, sphingosine and carbohydrate components of individual lipid classes were then analysed by gas-lipid chromatography. Nearly identical results were obtained with all viruses investigated. Approximately 20% of the total lipid was monohexosylceramide, distributed equally between glucosyl- and galactosyl-analogues. Lactosylceramide and oligohexosylceramides were found in much smaller concentratons (approx. 2%). About 15% of the total lipid was attributed to sphingomyelin. A large proportion of fatty acids (around 25% in sphingomyelin and 60% in glycolipids) belonged to the long chain (C_{19}–C_{26}) normal- and 2-hydroxy series. C_{18}-sphingosine was found to be the only base present in all lipid classes investigated.

REGULATION OF LIPOPROTEIN LIPASE. INDUCTION BY INSULIN. A.S. Garfinkel, P. Nilsson-Ehle and M.C. Schotz (Res. Service, Vet. Admin. Wadsworth Hosp. Ctr., Los Angeles, Calif. 90073). *Biochim. Biophys. Acta* 424, 264–73 (1976). Lipoprotein lipase activity in intact epididymal adipose tissue of fasted rats increased rapidly after treatment with insulin in vivo. In contrast, lipoprotein lipase activity in adipocytes isolated from the contralateral fat pads remained essentially unchanged. When adipocytes were incubated for 30 min at ambient temperature in vitro, about 2 times more lipoprotein lipase activity was found in the medium of cells from insulin-treated rats than in medium from cells of control animals. Following insulin treatment, extracts of tissue acetone powders separated by gel chromatography showed increases in both enzyme activity fractions obtained (designated lipoprotein lipase a and b). However, no consistent differences were observed between fractions derived from adipocyte acetone powders of insulin-treated and control animals. All the observed effects of insulin on lipoprotein lipase activity were abolished by cycloheximide treatment in vivo. These data indicate that following insulin treatment, increased lipoprotein lipase activity in adipose tissue results from enhanced enzyme secretion by the fat cell and subsequent accumulation in the tissue, thus implicating the adipocyte secretory mechanism as a major site of regulation of lipoprotein lipase activity in adipose tissue.

PURIFICATION AND PROPERTIES OF CHOLESTEROL ESTER HYDROLASE FROM HUMAN AORTIC ITIMA AND MEDIA. T. Sakurada, H. Okabe, A. Noma and M. Murakami (Dept. of Clin. Biochem. and Dept. of Med., Tokyo Metropolitan Geriatric Hosp., Tokyo, Japan). *Biochim. Biophys. Acta* 424, 204–12 (1976). Cholesterol ester hydrolase of human aortic intima and media was isolated and purified about 650-fold with 10–15% recovery of the original activity by sequential precipitation with 35% acetone, gel filtration on Sephadex G-75 and DEAE-cellulose column chromatography. Two pH optima of 4.5–5.0 and 7.0–7.5 were consistently observed for the partially purified cholesterol ester hydrolase of human aortic intima and media. In the system used in the present study, the increasing concentration of emulsifiers, sodium taurocholate and phosphatidylcholine, inhibited the activity of the neutral enzymes but not on the acid enzymes. On the contrary, reaction products, cholesterol and oleic acid, were much more inhibitory on the acid enzymes than on the neutral ones. Results of studies on the effect of presentation of substrate on the enzyme activity and on the difference between acid and neutral enzymes are also discussed.

PHOSPHOLIPASES A_1 AND A_2 IN BOVINE THYROID. M. De Wolf, A. Lagrou, H.J. Hilderson and W. Dierick (RUCA-Laboratory for Human Biochem., Univ. of Antwerp, Belgium). *Biochim. Biophys. Acta* 424, 183–94 (1976). In both supernatant and sediment of thyroid tissue homogenate phospholipase and lysophospholipase activities were demonstrated. In the supernatant, using 1-acyl-2[1-^{14}C] linoleoyl-*sn*-glycero-3- phosphorocholine in the presence of sodium taurocholate, phospholipase A_1 activity with pH optima at 3.6 and 4.8 and phospholipase A_2 activity with pH optima at 3.6 and 5.7 were found. The sediment showed mainly phospholipase A_2 activity with a pH optimum at pH 6.5. Lysophospholipase activity (optimum pH 7–8), using 1-[9,10-^{3}H] stearyl-*sn*-glycero-3-phosphorocholine as a substrate was present in both supernatant and sediment. Enzyme assays performed on subcellular fractions suggest the soluble phospholipases to be of lysosomal origin and the solubilized phospholipase A_2 activity of homogenate sediment to be of microsomal origin. Incubations with ^{3}H-^{14}C mixed labelled phosphatidylcholine further confirmed the above observations.

IN VITRO AND IN VIVO SYNTHESIS OF LONG-CHAIN FATTY ACIDS FROM [1-^{14}C] ACETATE IN THE RENAL PAPILLAE OF RATS. I. Bojesen, E. Bojesen and K. Capito (Inst. of Eksperimental Hormone Res., Univ. of Copenhagen, 71, Norre Alle, DK-2100, Copenhagen, Denmark). *Biochim. Biophys. Acta* 424, 8–16 (1976). The relationship between the rate of [1-^{14}C] acetate incorporation into the fatty acids of renal papillary lipids and the acetate concentration in the medium has been measured. [1-^{14}C] acetate was incorporated mainly into fatty acids of phospholipids and triacylglycerols. Only a few per cent of the radioactivity was found in the free fatty acid fraction. The major part of the [1-^{14}C] acetate was found to be incorporated by a chain elongation of prevalent fatty acids. The major component of the polyunsaturated fatty acids in triacylglycerols and the major product of fatty acid synthesis from [1-^{14}C] acetate in vitro was demonstrated by mass spectrometry to be docosa-7,10,13,16,-tetraenoic acid. The radioactivity of docosa-7,10,13,16,-tetraenoic acid accounted for 40% of total radioactivity in triacylglycerol fatty acids (lipid droplet fraction) and 20% of total radioactivity in membrane phospholipid fatty acids.

SYNTHESIS OF CHOLESTEROL ESTERS IN THE PLASMA AND LIVER OF SHEEP. R.C. Noble, M.L. Crouchman and J.H. Moore (The Hannah Res. Inst., Ayr, Scotland KA6 5HL) . *Lipids* 10, 790–9 (1975). A study was made with sheep on the formation in vitro of long chain fatty acid esters of cholesterol by the lecithin-cholesterol-acyltransferase system present in the plasma and the acyl CoA-cholesterol-acyltransferase system present in the liver. The rate of cholesterol esterification in the plasma was 0.024 μmoles/ml/hr. The relative pattern of fatty acids esterified during incubation of the plasma remained constant over the 8 hr period of incubation and was similar to fatty acids in the plasma cholesteryl esters before incubation began and to the fatty acids in the 2-position of the plasma lecithin. In the liver, the predominant cholesteryl esters synthesized contained saturated and monoenoic fatty acids; cholesteryl linoleate was synthesized to a very much less extent. There was considerable similarity between the composition of the unesterified fatty acid fraction of the liver before incubation began and the fatty acid composition of the cholesteryl esters synthesized during incubation.

A POSSIBLE ESSENTIAL ROLE FOR DIETARY LINOLENIC ACID IN THE DEVELOPMENT OF THE YOUNG RAT. M.S. Lamptey and B.L. Walker (Dept. of Nutr., Univ. of Guelph, Guelph, Ontario, NIG 2W1, Canada). *J. Nutr.* 106, 86–93 (1976). Female rats were fed semi-purified diets containing 10% safflower oil or 10% soybean oil for six weeks prior to mating and throughout pregnancy and lactation. The progeny were weaned to the diet of the dam. Physical, neuromotor and reflex development was monitored in the progeny prior to weaning and learning ability of the mature progeny was assessed in a simple Y-maze test. Brain lipid analyses were conducted in the progeny at birth, 21 and 210 days of age. Inclusion of soybean oil in the diet resulted in higher levels of 22:6ω3 and lower level of 22:5ω6 in the brain ethanolamine glycerophosphatides. The nature of the dietary fat exerted no effect on the physical development, onset of reflexologic responses or onset of neuromotor co-ordination in the pups. The soybean oil-fed animals spent more time in certain neuromotor activities possibly aossociated with explorative drive than did their

safflower oil-fed counterparts. The performance of the mature soybean oil-fed progeny in the discrimination-learning test was superior to that of progeny fed safflower oil. The association of superior learning capacity with dietary soybean oil-induced incorporation of ω3 fatty acids into the brain glycerphosphatides is offered as support for an essential role for dietary linolenic acid for the young rat.

TUMOR EXTRACELLULAR TRIGLYCERIDES IN MICE DURING GROWTH OF EHRLICH ASCITES CARCINOMA. R. Kannan and N. Baker (Radioisotope Res., Veterans Admin. Wadsworth Hospital Ctr., Los Angeles, Calif. 90073). *Lipids* 10, 770–2 (1975). Our earlier work with Swiss-Webster mice has shown that most of the lipid in Ehrlich ascites tumor extracellular fluid is in the form of free fatty acids. This finding is in direct contradiction to earlier and subsequent reports from another laboratory that has found free fatty acids to be a very minor component and triglycerides to be the major lipid of Ehrlich ascites tumor extracellular fluid. In light of these contradictory reports, we have carried out a study patterned after that of other workers, but using our Swiss-Webster mice. As predicted from our earlier study, we have found very little triglyceride in Ehrlich ascites tumor extracellular fluid. Although we could demonstrate a significant, transient hypertriglyceridemia during tumor growth, maximum plasma triglyceride concentrations were an order of magnitude lower than those reported by other workers. In addition, and again in contrast to other reports, we found that plasma triglyceride and tumor extracellular fluid triglyceride levels in tumorous mice fell significantly with fasting. Thus, interesting differences in triglyceride metabolism between mouse and/or tumor strains seem to exist.

ELONGATION OF FATTY ACIDS BY MICROSOMAL FRACTIONS FROM THE BRAIN OF THE DEVELOPING RAT. P.J. Brophy and D.E. Vance (Dept. of Biochem., Univ. of British Columbia, Vancouver, British Columbia V6T1W5, Canada). *Biochem. J.* 152, 495–501 (1975). Elongation of fatty acids by microsomal fractions obtained from rat brain was measured by the incorporation of [2-^{14}C] malonyl-CoA into fatty acids in the presence of palmitoyl-CoA or stearoyl-CoA. Soluble and microsomal fractions were prepared from 21-day-old rats; density-gradient centrifugation demonstrated that the stearoyl-CoA elongation system was localized in the microsomal fraction whereas fatty acid biosynthesis *de novo* from acetyl-CoA occurred in the soluble fraction. The residual activity *de novo* in the microsomal fraction was attributed to minor contamination by the soluble fraction. The optimum concentration of [2-^{14}C] malonyl-CoA for elongation of fatty acids was 25μM for palmitoyl-CoA or stearoyl-CoA, and the corresponding optimum concentrations for the two primer acyl-CoA esters were 8.0 and 7.5μm respectively. NADPH was the preferred cofactor for fatty acid formation from palmitoyl-CoA or stearoyl-CoA, although NADH could partially replace it. The stearoyl-CoA elongation system required a potassium phosphate buffer concentration of 0.075M for maximum activity; CoA (1μM) inhibited this elongation system by approx. 30%.

INTERACTION OF THE POLYENE ANTIBIOTICS WITH LIPID BILAYER VESICLES CONTAINING CHOLESTEROL. M.N. Gent and J.H. Prestegard (Dept. of Chem., Yale Univ., New Haven, Conn. 06520). *Biochim. Biophys. Acta* 426, 17–30 (1976). The interaction of the polyene antibiotics, amphotericin B, nystatin and filipin with cholesterol-containing single bilayer lipid vesicles has been characterized using gel permeation chromatography and proton magnetic resonance. All three antibiotics bind to vesicles at low concentrations without causing a large amount of vesicle destruction. The strength of binding as determined by gel permeation studies is greater for filipin and amphotericin than for nystatin. Nystatin and amphotericin B at these low concentrations induce a rapid loss of internal vesicle contents consistent with pore formation. Filipin induces no leakage beyond that expected from partial vesicle destruction or general detergent action. At antibiotic levels above 1:1 antibiotic: cholesterol ratios the NMR results show all three antibiotics to cause extensive vesicle destruction. The onset of this behavior, which appears to be independent of the total antibiotic concentration, indicates a well defined antibiotic: cholesterol interaction stoichiometry. Despite the fact that cholesterol is required for antibiotic activity, the NMR spectra prior to vesicle destruction show no changes indicative of an antibiotic-induced reversal of cholesterol restriction of phosphatidyl choline mobility.

SPECIFIC TRANSFORMATIONS AT THE N-TERMINAL REGION OF PHOSPHOLIPASE A_2. A.J. Slotboom and G.H. de Haas (Lab. of Biochem., State Univ. of Utrecht, Transitorium 3, Univ. Centre "De Uithof", Padualaan 8, Utrecht, Netherlands). *Biochemistry* 14, 5394–9 (1975). Treatment of porcine pancreatic prophospholipase A_2 with methyl acetimidate converted all lysine residues into ε-acetimidolysine residues. Enzymatically active ε-amidinated phospholipase A_2 (AMPA) was obtained from the ε-amidinated zymogen by limited tryptic proteolysis cleaving the Arg_7-Ala_8 bond. AMP was used to prepare des-Ala^8-, des-(Ala^8,Leu^9)- and des-(Ala^8,Leu^9,Trp^{10})-AMPA by successive Edman degradations, and des-(Ala^8-Arg^{13})-AMPA by selective splitting of the Arg_{13}-Ser_{14} bond by trypsin. Structural analogues of AMPA with different N-terminal amino acid residues, viz., D-Ala, β-Ala, and Gly, have been prepared by reacting des-Ala^8-AMPA with the corresponding *N-t*-Boc-*N*-hydroxysuccinimide esters of these amino acids. Similarly, the only Trp_{10} residue has been substituted for Phe by coupling of des-(Ala^8,-Leu^9,Trp^{10})-AMPA with *N-t*-Boc-L-Ala-L-Leu-L-Phe-*N*-hydroxysuccinimide ester. The feasibility of these substitutions has been proven unambiguously by the retroconversion of des-Ala^8-AMPA and of [Ala^7] AMPA having identical enzymatic activity as the starting AMPA.

UPTAKE AND METABOLISM OF α-MONOPALMITIN BY RAT LUNG IN VITRO. M.C. Wang and H.C. Meng (Dept. of Physiol., Vanderbilt Univ. Schl. of Med., Nashville, Tenn. 37232). *Lipids* 10, 721–5 (1975). CO_2 production from and uptake of α-glyceryl mono palmitate-1-^{14}C were studied in an in vitro system using minced rat lung. Monoglyceride radioactivity was readily incorporated into lung tissue lipids. In a time course of 5–120 min, ca. 2.9–21.9% of the initial medium ^{14}C-radioactivity was recovered in tissue lipids, including free fatty acid and monoglyceride, per one g of tissue. From 93 to 72% of the initial radioactivity remained in the medium during the same incubation periods. The ratio of tissue neutral lipid to phospholipid radioactivity decreased from 2:1 at 5 min to ca. 1:2.1 at 120 min. Most of the phospholipid-^{14}C was in phosphatidyl choline, and this accounted for 80% of phospholipid-^{14}C.

HEPATOMA, HOST LIVER, AND NORMAL RAT LIVER PHOSPHOLIPIDS AS AFFECTED BY DIET. R. Wood (Div. of Gastroenterology, Depts. of Med. and Biochem., Univ. of Missouri Schl. of Med., Columbia, Mo. 65201). *Lipids* 10, 736–45 (1975). Individual phospholipid classes derived from hepatoma, host liver, and normal liver of rats maintained on chow and fat free diets were examined in detail and the sphingomyelin and phosphoglyceride structures compared. The concentration of hepatoma sphingomyelin was higher while phosphatidylcholine, phosphatidylethanolamine, phosphatidylinositol, phosphatidylserine, and diphosphatidylglycerol were only one-fourth to one-half normal liver concentrations, irrespective of diet. Hepatoma phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, and phosphatidylinositol contained higher percentages of 18:1 and, except phosphatidylinositol, much lower percentages of most polyunsaturated fatty acids than liver. The 1-position of host liver phosphatidylcholine and phosphatidylethanolamine, normal liver phosphatidylcholine and phosphatidylethanolamine, and hepatoma phosphatidylcholine from animals on both diets had the same approximate fatty acid composition, but the percentage of 16:0 in hepatoma phosphatidylethanolamine was reduced dramatically.

EFFECTS OF DIETARY TRIGLYCERIDE ON THE PROPERTIES AND LIPID COMPOSITION OF PLASMA LIPOPROTEINS: ACUTE EXPERIMENTS IN RATS FED SAFFLOWER OIL. G.D. Dunn, H.G. Wilcox, M. Heinberg (Dept. of Pharmacology and Med., Vanderbilt Univ., Nashville, Tenn. 37232). *Lipids* 10, 773–82 (1975). Male rats were administed 1.5 ml safflower oil by gastric intubation 0, 4, and 8 hr after a 16 hr fast. Plasma, liver, and adipose tissue were collected 16 hr after the last fatty meal. Rats fasted for 16 hr served as controls. Following fat feeding, the fatty acid composition of the very low density lipoprotein, triglyceride, and hepatic triglyceride were similar, as were the percentages of 18:2 in the very low density lipoprotein and hepatic cholesteryl esters. The phospholipids of liver and plasma lipoproteins were similar in the control groups, except that more 16:0 was present in the plasma lipoproteins. Clearly, esterified lipids of liver and plasma lipoprotein (very low density lipoprotein, low density lipoprotein, and high density lipoprotein), and to a lesser extent, adipose tissue, were enriched with 18:2 derived from dietary triglyceride fatty acid even 16 hr after the terminal meal. A major proportion of the very low density lipoprotein isolated by ultracentrifugation in zonal rotors from plasma of fat fed animals had a faster rate-zonal mobility than did the very low density lipoprotein isolated from plasma of control animals.

INVESTIGATION BY IMMUNOFLUORESCENCE OF ARTERIAL LESIONS IN RABBITS ON TWO DIFFERENT LIPID SUPPLEMENTS AND TREATED WITH PYRIDINOL CARBAMATE. K.W. Walton, D.J. Dunkerley, A.G. Johnson, M.K. Khan, C. Morris and R.B. Watts (Dept. of Exper. Pathol., Univ. of Birmingham, Birmingham, Great Britain). *Atherosclerosis* 23, 117–39 (1976). Rabbits maintained on a pellet diet supplemented with cholesterol, or on a semi-synthetic diet containing beef fat but no added cholesterol, have been studied in relation to their development of hyperlipidaemia and of lipid-filled arterial lesions. The influence of pyridinol carbamate on animals on both diets was also examined but found to produce no significant effect. Animals on both diets developed a hyperlipoproteinaemia. In cholesterol-fed animals this developed quickly, became gross, and was characterized by the presence of an anomalous lipoprotein of very low density, large molecular size and abnormally high cholesterol content. Beef fat fed animals showed a more moderate hyperlipidaemia which developed more slowly and the lipoproteins qualitatively resembled those in normal rabbits. Differences in the rate and severity of development of aortic lesions between the two different dietary supplements were found to reflect differences in the duration and intensity of hyperlipoproteinaemia between the groups.

DISTRIBUTION OF CHOLESTEROL AND TRIGLYCERIDES AMONG LIPOPROTEIN FRACTIONS IN FAT-FED RABBITS AT DIFFERENT LEVELS OF SERUM CHOLESTEROL. R. Brattsand (AB Bofors Nobel-Pharma and Astra Lakemedel AB, Molndal, and the Dept. of Pharmacol., School of Med., Linkoping, Sweden). *Atherosclerosis* 23, 97–110 (1976). The serum lipoproteins of rabbits given semisynthetic cholesterol-free diets containing coconut oil or butter or a conventional rabbit chow supplemented with cholesterol, were studied by preparative ultracentrifugation and electrophoresis. All three diets elevated the total cholesterol level but only the coconut oil diet markedly increased the triglyceride (TG) content in addition. All ultracentrifugation fractions showed elevated cholesterol/TG ratios, and this was especially evident for the cholesterol diet. In the hyperlipidemic rabbits cholesterol was therefore mainly transported in lipoproteins with a changed lipid composition. With semisynthetic diets in the whole cholesterol range 250–400 mg/100 ml it was possible, with respect to cholesterol, to induce fairly similar concentrations and distributions to those seen in man, with about 60% transported as "LDL", 30% as "VLDL" and 10% as "HDL" cholesterol with the coconut oil and 65%, 20% and 15%, respectively, with the butter diet.

VERY LOW DENSITY LIPOPROTEINS IN NORMAL AND CHOLESTEROL-FED RABBITS: LIPID AND PROTEIN COMPOSITION AND METABOLISM. PART 2. METABOLISM OF VERY LOW DENSITY LIPOPROTEINS IN RABBITS. J.L. Rodriguez, A. Catapano, G.C. Ghiselli and C.R. Sirtori (Cetr. "E. Grossi Paoletti" for the Study of Metabolic Diseases and Hyperlipidemias, Univ. of Milan, 20129, Milan, Italy). *Atherosclerosis* 23, 85–96 (1976). The metabolic fate of very low density lipoproteins (VLDL) in normal and hypercholesteremic (h.c.) rabbits has been investigated. VLDL were labelled with ^{125}I in the protein moieties and injected into normal and h.c. animals. The turnover of h.c. VLDL is markedly delayed as compared to that of normal VLDL, and conversion into lipoprotein classes of higher density is considerably decreased. This is observed when h.c. VLDL are injected either into h.c., or into normal rabbits. Arterial uptake of radioactivity is much higher with h.c. VLDL than with the normal lipoproteins, and it is highest when h.c. VLDL are injected into normal recipients.

780 SE: A NEW TYPE OF HYPOLIPEMIC AGENT. COMPARATIVE ASSAYS IN RATS. J. Duhault, M. Boulanger, L. Beregi, N. Sicot and F. Bouvier (Inst. de Recherches Servier, 14, rue du Val d'Or, 92150—Suresnes, France). *Atherosclerosis* 23, 63–72 (1976). The effect of 1-(*m*-trifluoromethylphenyl)-2-(*β*-benzoyloxyethyl)-amino-propane hydrochloride (780 SE) on serum lipids, blood glucose and liver weight was studied in 4 experimental models, and compared with that of clofibrate and tiadenol. When rats were given a daily oral dose of 25 mg/kg or 50 mg/kg of 780 SE for 5 days a marked reduction of serum triglycerides and liver weight was observed. The decreases were more pronounced than those in rats treated with 50 mg/kg or 100 mg/kg of clofibrate or tiadenol. On the other hand, a reduction of serum cholesterol was only observed in the groups given clofibrate and tiadenol. These differences could be explained on the basis of the mechanism of action of the different drugs. Only 780 SE induced a decrease in blood sugar level, a reduction of plasma insulin concentration and restored the insulin sensitivity to a normal value in obese animals. There was a significant decrease in liver weight of 780 SE treated rats, whereas clofibrate and tiadenol cause hepatomegaly.

SHORT-CHAIN FATTY ACID SYNTHASES IN BRAIN, SUBCELLULAR LOCALIZATION AND CHANGES DURING DEVELOPMENT. G.L. Reijnierse, H. Veldstra, and C.J. Van Den Berg. (Dept of Biochem-, Univ. of Leiden, Leiden, Netherlands). *Biochem. J.* 152, 477–84 (1975). Acetyl-CoA synthase (EC6.2.1.1), propionyl-CoA synthase (EC6.2.1.-) and butyryl-CoA synthase (EC6.2.1.2) were measured in subcellular fractions prepared by primary and density-gradient fractionation from adult rat brain by a method resulting in recoveries close to 100%. Most of the activity of the three enzymes was recovered in the crude mitochondrial fraction. On subfractionation of this crude mitochondrial fraction with continuous sucrose density gradients, most of the activity of the three enzymes was found at a higher density than NAD^+-isocitrate dehydrogenase and at about the same density as glutamate dehydrogenase, confirming earlier reported data for acetyl-CoA synthase. The three synthase activities were found to differ from each other in their rate of change and their subcellular localization during rat brain development.

THE INFLUENCE OF A HIGH LEVEL OF CORN OIL ON RAT SERUM LIPOPROTEINS. K.A. Narayan, J.J. McCullen, D.P. Butler, T. Wakefield, and W.K. Calhoun (Nutr. Group, Microbiol. and Nutr. Div., Food Sci. Lab., U.S. Army Natick Development Ctr., Natick, Mass. 01760). *Atherosclerosis* 23, 1–17 (1976). Although the stated requirement for linoleic acid in humans is less than 2% of the dietary calories, recently there has been considerable emphasis on the necessity to substitute dietary polyunsaturates for saturates in order to reduce serum cholesterol levels. In this study we have sought to determine the nutritional consequences of feeding a very high level of linoleate to rats. Three groups of thirty adult animals each were fed a semipurified diet consisting by weight of casein 17%; mineral mixture 5.5%; vitamin mixture in glucose 2.2%; cellulose fiber 3.0%; and corn oil 0% (group A), 10% (group B) or 40% (group C), which was provided at the expense of glucose. At the end of four weeks on the diets, blood was obtained in the fasting state from 16 rats in each group. In view of the magnitude of the changes observed in LDL_2-cholesterol as well as in the liver cholesterol and triglycerides due to the ingestion of a 40% corn oil diet in a usually resistant species, namely the rat, further work along these lines with other species including human and nonhuman primates merits our attention.

EFFECTS OF CHOLECALCIFEROL ON THE TRANSLOCATION OF CALCIUM BY NON-EVERTED CHICK ILEUM IN VITRO. E.S. Holdsworth, J.E. Jordan and E. Keenan (Dept. of Biochem., Univ. of Tasmania, Hobart, Tasmania 7001, Australia). *Biochem. J.* 152, 181–90 (1975). An apparatus is described that allows perfusion of a non-everted segment of intestine *in vitro* and the study of the accumulation of substances within the mucosal cells. Pretreatment of the chick with cholecalciferol causes increased permeability of the microvillus to Ca^{2+} in both directions (lumen to cell, cell to lumen). The increased transport brought about by cholecalciferol *in vivo* can be partially mimicked by sodium dodecyl sulphate added *in vitro*. Exit of Ca^{2+} from the mucosal cell is temperature-sensitive, requires metabolic energy and Na^+. Pretreatment with cholecalciferol caused increased movement of Ca^{2+} out of the cell across the basement membranes. This effect of cholecalciferol given *in vivo* could be markedly increased by the presence of dicyclohexylcarbodi-imide in the perfusion fluid.

COMPLETE RETENTION OF PHOSPHOLIPID ACYL GROUPS BY MAMMALIAN CELLS IN CULTURE. R.D. Lynch, E. Schneeberger, and R.P. Geyer (Dept. of Nutr., Harvard Schl. of Public Hlth., Boston, Mass 02115). *Biochemistry* 15, 193–200 (1976). Radiolabeled phosphate, actate, and glycerol are incorporated into strain L-fibroblast phospholipids. The acetate and glycerol specifically label the fatty acid and glycerol moieties, respectively, of the phospholipids. To study the metabolic fate of the various moieties of phospholipids, cells incubated with the above radiolabeled compounds were transferred to unlabeled medium, and the rate at which phospholipid radioactivity per 10^6 cells decreased was determined. The rate of decrease expected on the basis of cell division alone was estimated either by monitoring increases in cell number, or by measuring the rate at which radiolabeled DNA per 10^6 cells decreased. Both phospholipid phosphorus and glycerol are lost at a rate greater than can be accounted for by cell division alone. By contrast, nearly all phospholipid acyl chains were retained by the cell to the same extent as radiolabeled DNA.

REGULATORY FUNCTION OF PYRUVATE DEHYDROGENASE AND THE MITOCHONDRION IN LIPOGENESIS. J.P. Mapes and R. A. Harris (Dept. of Biochem., Indiana Univ. School of Med., Indianapolis, Indiana 46202). *Lipids* 10, 757–64 (1975). The activity of pyruvate dehydrogenase from freshly isolated mitochondria was shown to be dependent upon the nutritional and metabolic state of the animal prior to sacrifice, such that mitochondria from the livers of 48 hr. starved, diabetic, or high fat fed rats had lower enzyme activity than normal, chow fed rats. The activity of pyruvate dehydrogenase and the rate of lipogenesis were shown to correlate to a certain extent when a reconstituted, cell free system consisting of 105,000 × g supernatant of rat liver and isolated mitochondria was used. This system was employed so that the role of the mitochondrion and pyruvate dehydrogenase in lipogenesis could be investigated. Furthermore, the cytoplasmic adenosine triphosphate/adenosine diphosphate ratios and phosphorylation potentials (ATP/ADP × Pi) maintained in the reconstituted system by mitochondria isolated from starved animals were found to be significantly lower than those maintained by mitochondria isolated from chow fed animals.

PHOSPHOLIPASE A_2 AS A PROBE OF PHOSPHOLIPID DISTRIBUTION IN ERYTHROCYTE MEMBRANES. FACTORS INFLUENCING THE APPARENT SPECIFICITY OF THE REACTION. J.K. Martin, M.G. Luthra, M.A. Wells, R.P. Watts and D.J. Hanahan (Dept. of Biochem., Col. of Med., Univ. of Arizona, Tucson, Ariz. 85724). *Biochemistry* 14, 5400–8 (1975). The action of snake venom phospholipases A_2 on intact human erythrocytes was investigated in detail. The basic phospholipase from *Agkistrodon halys blomhofii* was found to induce both hydrolysis of membrane phospholipids and total cell hemloysis under certain experimental conditions. The hydrolytic action of the basic enzyme was found to consist of two sequential events: hydrolysis of 70% of the total cell phosphatidylcholine without any evident hemolysis; and complete hydrolysis of the remaining phosphatidylcholine, followed closely by extensive phosphatidylethanolamine hydrolysis and finally with onset of hemolysis, attack on the phosphatidylserine. Other species of erythrocytes, e.g., guinea pig, monkey, pig, and rat, were tested but only those from guinea pig behaved similarly to the human cells. Pig, monkey, and rat erythrocytes underwent very limited hydrolysis and hemolysis. It is evident that the use of these phospholipases to probe the localization of phospholipids in erythrocyte membranes must be approached with caution.

BIOLOGICAL ACTIVITY OF 1,25-DIHYDROXYVITAMIN D_2 IN THE CHICK. G. Jones, L.A. Baxter, H.F. DeLuca and H.K. Schnoes (Dept. of Biochem., College of Agricul. and Life Sci., Univ. of Wis.–Madison, Madison, Wis. 53706). *Biochemistry* 15, 713–6 (1976). 1,25-Dihydroxyvitamin D_2 has been prepared from 25-hydroxyvitamin D_2 using rachitic chick kidney mitochondria. This metabolite was highly purified by Sephadex LH-20 chromatography and by preparative high-pressure liquid chromatography. Its purity was assessed by analytical high-pressure liquid chromatography which revealed no other 254-nm absorbing material and by mass spectrometry. The concentration of dilute solutions of 1,25-dihydroxyvitamin D_2 was determined by high-pressure liquid chromatography and deflection of the 254-nm column monitor. The 1,25-dihydroxyvitamin D_2 was then shown to be 1/5 to 1/10 as active as 1,25-dihydroxyvitamin D_3 in the chick while it had previously been shown to be equal in activity in the rat. Thus, discrimination against the vitamin D_2 side chain by the chick persists in the metabolically active 1,25-dihydroxyvitamin D compounds.

RELATIONSHIPS BETWEEN FATTY ACID COMPOSITION OF LAMB FAT AND DIETARY INGREDIENTS. E.E. Ray, R.P. Kromann and E.J. Cosma (New Mexico State Univ., Las Cruces 88003). *J. Anim. Sci.* 41, 1767–74 (1975). One hundred thirteen wether feeder lambs were individually fed to study the effects of ration and location of fat in the carcass upon fatty acid composition. The rations consisted of dehydrated alfalfa (17% protein) and corn. The proportions of alfalfa and corn varied from 0% to 100% in the 21 different rations by 5% increments. A urea-mineral supplement was added to rations containing 50% corn or more. The lambs were slaughtered after a feeding period of 105 days. Loin, dock, and kidney fat samples were obtained from chilled (48 hr) carcasses. Fat samples were extracted, esterified and analyzed by gas-liquid chromatography. Data were statistically analyzed by analysis of variance and orthogonal polynomial regression. There were no difference in saturated fatty acids, myristic and palmitic, but there was a curvilinear decrease in stearic. Saturated acids were deposited in the following order: kidney, dock and loin, whereas odd-chained acids and unsaturates, except linolenic, were deposited in reverse order. There were no differences in linolenic between loin and kidney and kidney and dock samples.

THE ROLE OF LIPID IN REGULATION OF MITOCHONDRIAL ADENOSINE TRIPHOSPHATASE. E. Bertoli, J.B. Finean and D.E. Griffiths (Dept. of Molecular Sci., Univ. of Warwick, England). *FEBS Lett.* 61, 163–5 (1976). The activity of the isolated OS-ATPase was studied as a function of temperature and the break (at 15 to 19°C) in the Arrhenius plot proved to be identical with that of the membrane bound activity. This observation suggests that the change in the activation energy of the membrane-bound OS-ATPase activity is a reflection of the phase transition of phospholipid microenvironment surrounding the enzyme.

EFFECT OF PHASE TRANSITION ON THE KINETICS OF DYE TRANSPORT IN PHOSPHOLIPID BILAYER STRUCTURES. T.Y. Tsong (Dept. of Physiol. Chem., The Johns Hopkins Univ. Schl. of Med., Baltimore, Md. 21205). *Biochemistry* 14, 5409–14 (1975). Binding of 8-anilino-1-naphthalenesulfonate to dimyristoyl-L-α-lecithin bilayers enhances the fluorescence quantum yield of the dye molecule by 100-fold. By following the generation of fluorescence after a rapid mixing in a stopped-flow apparatus (mixing time 2 msec), kinetics of the binding of the fluorescence probe to the phospholipid vesicles has been investigated in the temperature range where the crystal-liquid crystal phase transition of the bilayer structures occurs. No reactions depending on the dye or the vesicle concentrations were detected. In the phase transition region the slower reaction becomes the major kinetic phase. It also increases the apparent concentration of bound dye by a factor of 2. Since the kinetics of the transport of 8-anilino-1-naphthalenesulfonate is sensitive to the physical state of the phospholipid bilayers this reaction may be used for probing membrane structures.

STOPPAGE OF GLYCOGENESIS AND "OVER-SHOOT" OF INDUCTION OF LIPOGENESIS AND ITS RELATED ENZYME ACTIVITIES IN THE LAYER OF FASTED-REFED RATS. M.L.W. Chang and M.A. Johnson. (Nutr. Inst., Agr. Res. Service, U.S. Dept. Agr., Beltsville, Md. 20705). *J. Nutr.* 106, 136–41 (1976). To elucidate the causes of changes of carbohydrate metabolic pathways, the time course of utilization of dietary [U-^{14}C]sucrose and induction of enzyme activities in the livers of rats were investigated. Adult male rats of BHE strain were refed after a fast of 2 days. The nutritionally complete refeeding diet contained 60% of sucrose as the only source of carbohydrate. [U-^{14}C]Sucrose was included in the diet on either day 1 or day 2, or both of refeeding. During the first day of refeeding, the radioactivity was incorporated mainly into liver glycogen which rose to over 100 mg/g. During the second day, little ^{14}C appeared in the liver glycogen, which decreased sharply while glucose-6-phosphatase activity increased. The glycogenic pathway thus appeared to be blocked. On the other hand, ^{14}C incorporation in the liver fat was minimal during the first day, but was quite extensive during the second day of refeeding. Results clearly indicate that the carbohydrate load in the liver of intact animals was initially metabolized by the glycogenic pathway.

BIOSYNTHESIS AND HYDROLYSIS OF CHOLESTERYL ESTERS BY RAT SKIN SUBCELLULAR FRACTIONS. V.A. Ziboh and M.A. Dreize (Dept. of Dermatology and Biochem., Univ. of Miami Schl. of Med., Miami. Fla. 33152). *Biochem. J.* 152, 281–9 (1975). The properties and subcellular distribution of the enzymes involved with the synthesis and hydrolysis of cholesteryl esters were investigated in skin of normal and essential fatty acid-deficient rats. Most of the activity of the cholesterol-esterifying enzyme(s) is associated with the 12,000g and 105,000g particulate fractions. Although the activity of the cholesterol-esterifying enzymes(s) was elevated in skin preparations from essential fatty acid-deficient rats, the activity of hydrolase was significantly decreased. These observations may explain in part the elevated concentrations of sterol esters in the skin of these animals. Prostaglandin E_2 at low concentrations exerted marked inhibitory effect on the activity of the cholesterol-esterifying enzyme(s), whereas no effect was observed on the activity of the hydrolase at similar concentrations. However, at high concentrations prostaglandin E_2 exerted moderate stimulatory effect on the activity of the hydrolase.

THE ANALYSIS OF THE MOLECULAR SPECIES OF FETAL RABBIT LUNG PHOSPHATIDYLCHOLINE BY CONSECUTIVE CHROMATOGRAPHIC TECHNIQUES. J.F. Soodsma, L.C. Mims and R.D. Harlow (The

William K. Warren Med. Res. Ctr., Suite 1010, 6465 South Yale Ave., Tulsa, Okla. 74136). *Biochim. Biophys. Acta* 424, 159–67 (1976). The major molecular species of pulmonary phosphatidylcholine in the fetal rabbit were analyzed as the diacylglycerol acetate derivatives. After fractionation by Ag^+ thin-layer chromatography according to the degree of unsaturation, the intact diacylglycerol acetates were analyzed by gas-liquid chromatography to obtain the carbon number composition. The methyl esters of these acetates were used to obtain the fatty acid profiles. The composition of the molecular species was derived from these sets of data. The proportions of 16:0/16:0,14:0/16: 0 and 16:0/16:1 increased with gestation, while 16:0/18:1 decreased. The concentration of 16:0/16:0 increased about 50% the last two days of gestation while 16:0/16:1 increased about 300%. The possibility that 16:0/16:1 is a precursor of 16:0/16:0 via biohydrogenation is discussed.

EFFECT OF NUTRITIONAL STATUS ON RAT ADIPOSE TISSUE, MUSCLE AND POST-HEPARIN PLASMA CLEARING FACTOR LIPASE ACTIVITIES: THEIR RELATIONSHIP TO TRIGLYCERIDE FATTY ACID UPTAKE BY FAT-CELLS AND TO PLASMA INSULIN CONCENTRATIONS. A. Cryer, S.E. Riley, E.R. Williams and D.S. Robinson (Dept. of Biochem., Univ. of Leeds, Leeds). *Clin. Sci. Molec. Med.* 50, 213–21 (1976). In rats in a variety of nutritional states, the adipose tissue clearing factor lipase activity is strongly, positively correlated with fat-cell triglyceride fatty acid uptake. In the same animals, muscle clearing factor lipase activity is inversely correlated with the activity of the enzyme in adipose tissue and with the plasma insulin concentration. In starved animals that are given glucose, adipose tissue clearing factor lipase activity is positively correlated with the plasma insulin concentration. The effect of changes in nutritional status on the activity of clearing factor lipase in rat post-heparin plasma depends on the heparin dosage used. The administration of glucose, but not of fructose or sucrose, to starved rats alters the response to heparin injection towards that found in rats in the fed state.

LA β-HYDROXYBUTYRATE DESHYDROGENASE DE LA MEMBRANE INTERNE DES MITOCHONDRIES DE FOIE DE RAT. SON ISOLEMENT, SES CARACTERISTIQUES, SA REACTIVATION PAR DES LECITHINES PRESENTANT DES GROUPEMENTS APOLAIRES DIFFERENTS: INFLUENCE DE L'ADJONCTION DE CHOLESTEROL SUR SON DEGRE DE REACTIVATION. M. Levy, M. Joncourt and J. Thiessard (Lab. des Membranes Biologiques, Univ. Paris VII, 2, place Jussieu, 75221 Paris Cedex 05, France). *Biochim. Biophys. Acta* 424, 57–65 (1976). β-hydroxybutyrate dehydrogenase of rat liver inner mitochondrial membrane. Its isolation, characterization, and reactivation by lecithins differing in their apolar regions. The influence of the addition of cholesterol on its level of reactivation. The β-hydroxybutyrate dehydrogenase has been isolated and purified from the inner mitochondrial membrane of the rat liver. It consists in a dimer of molecular weight 77,000 composed by two subunits of molecular weight 38,000 each. The level of its reactivation by lecithin is influenced by the length and degree of unsaturation of their aliphatic chains. The addition of cholesterol inhibits the reactivation.

NERVONIC ACID BIOSYNTHESIS BY ERUCYL-CoA ELONGATION IN NORMAL AND QUAKING MOUSE BRAIN MICROSOMES. ELONGATION OF OTHER UNSATURATED FATTY ACYL-CoAS (MONO AND POLYUNSATURITED). J. Bourre, O. Daudu and N. Baumann (Lab. de Neurochimie, INSERM U. 134, Hopital de la Salpetriere, 47, bld de l'Hopital, 75634—Paris Cedex 13, France). *Biochim. Biophys. Acta* 424, 1–7 (1976). Biosynthesis of nervonic acid by enzymatic elongation of erucyl-CoA has been studied in mouse brain microsomes. The substrate and cofactor requirements have been measured. Malonyl-CoA and reduced nicotine-adenine-dinucleotide phosphate are required, but not FMN, FAD or NADH. The effect of protein concentration, incubation time, ATP and CoA has been determined; the reaction products were checked by gas-liquid chromatography with automatic counting of the eluate. Very little activity was found in hydroxylated fatty acids. In the presence of phosphotransacetylase (which impedes the de novo microsomal system), the main reaction product was nervonic acid. It is concluded that nervonic acid is biosynthesized by elongation using a two-carbon unit from malonyl-CoA. The elongation capacity of "quaking" microsomes is reduced to 30% of the normal value with both erucyl-CoA and behenyl-CoA.

ASSEMBLY OF PHOSPHOLIPID VESICLES BEARING SIALOGLYCOPROTEIN FROM ERYTHROCYTE MEMBRANE. R.I. MacDonald and R.C. MacDonald (Dept. of Biol. Sci., Northwestern Univ., Evanston, Ill. 60201). *J. Biol. Chem.* 250, 9206–14 (1975). We have incorporated purified and intact glycophorin, the major red cell sialoglycoprotein with virus and lectin receptor activity, into phospholipid vesicles, which should be useful models for the study of membrane receptor function. Reconstitution was achieved by mixing glycophorin and phospholipid in chloroform/methanol/water, removing the organic solvent, and hydrating the protein-lipid film. Because it features the important practical advantages of saving time and avoiding the possibility of contamination by residual detergent, this novel procedure may be preferable for certain purposes to the detergent method of inserting membrane proteins, and particularly membrane glycoproteins, into bilayered lipid vesicles.

CHOLESTEROL CONTENTS OF VARIOUS TISSUES OF CHICKENS WITH EXOGENOUS OR ENDOGENOUS HYPERCHOLESTEREMIA. K. Ho (Dept. of Pathology, Univ. of Ala., Birmingham Med. Ctr., Birmingham, Ala. 35294). *Am. J. Clin. Nutr.* 29, 187–91 (1976). Cholesterol contents of 16 different tissues were determined in 12 normal roosters, 12 roosters with diet-induced, exogenous hypercholesteremia, 10 actively laying hens with minimal endogenous hypercholesteremia, and 12 nonlaying hens with hereditable extreme hyperlipidemia. The tissue cholesterol contents of the normal roosters were strikingly similar to that of the corresponding tissues of the mammals except for a low cholesterol content of the brain in chickens. The hypercholesteremia in the roosters fed a 2% cholesterol diet for 2 months was associated with an increase of cholesterol content in all tissues except the brain, muscle, and adipose tissue. The actively laying hens, on the other hand, had a decreased cholesterol content in most tissues, despite the persistence of a minimal hypercholesteremia for 18 months and significant aortic cholesterol accumulation with mild atherosclerosis. The nonlaying hens developed extreme hypercholesteremia and severe atherosclerosis but only a moderately expanded cholesterol pool in most tissues. The results indicated a remarkable difference in tissue response to diet-induced exogenous hypercholesteremia and endogenous hyperlipidemia associated with laying activity in chickens and the propensity of their aortas to accumulate excessive cholesterol in the presence of either endogenous or exogenous hyperlipidemia.

RELATIONSHIP BETWEEN INTRALIPID-INDUCED HYPERLIPEMIA AND PULMONARY FUNCTION. H.L. Greene, D. Hazlett and R. Demaree (Dept. of Pediatrics, Vanderbilt Univ. Schl. of Med., Nashville, Tenn. 37232). *Amer. J. Clin. Nutr.* 29, 127–35 (1976). One unit (500 ml) of 10% Intralipid (an intravenous soy bean oil-egg yolk lecithin preparation) was infused into 20 normal subjects over 4 hr. Serum triglyceride concentration and plasma optic density (at 700 nm) increased to maximal levels of 339 ± 102 mg/100 ml and 1.14 ± 0.41, respectively, at the completion of the infusion, and returned to basal levels in most subjects within 4 hr. Pulmonary membrane diffusion was decreased in six subjects at rest and with exercise at 25 and 50% maximum oxygen uptake. Only one subject showed a minor change in PO_2 and none showed clinical signs of ischemia. The changes in pulmonary diffusion reverted to basal levels when serum lipids were cleared. Heparin (60 IU/kg) prevented the marked increase in serum lipids and, as a consequence, the changes in pulmonary function. Changes in pulmonary function from Intralipid-induced lipemia are similar to those known to result from diet-induced lipemia. The findings suggest that in the presence of normal vasculature and pulmonary function, Intralipid-induced lipemia should cause no clinical consequences. However, patients with preexisting pulmonary or vascular disease may be at greater risk after Intralipid-induced lipemia.

METABOLISM OF [^{14}C]ARACHIDONIC ACID BY HUMAN PLATELETS. T.K. Bills, J.B. Smith and M.J. Silver (Cardeza Foundation and Dept. of Pharmacol. Thomas Jefferson Univ., Philadelphia, Pa. 19107). *Biochim. Biophys. Acta* 424, 303–14 (1976). A time dependent incorporation of [1-^{14}C]arachidonic acid into platelet phosphatidylcholine, phosphatidylinositol, phosphatidylethanolamine, and phosphatidylserine was observed in platelet-rich plasma. When platelets, so labelled, were washed and treated with thrombin, there was a major decrease in the radioactivity of phosphatidylcholine and phosphatidylinositol. This decrease was accounted for by the appearance of several previously identified ^{14}C-labelled oxygenated products of arachidonic acid. ■