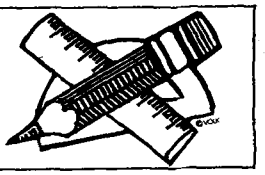
Abstracts



• Drying Oils and Paints

A RAPID METHOD FOR ESTIMATION OF FATTY ACID LEVELS IN VEGETABLE OILS. B.W. Simpson and W.J. Osborne. *Lab. Pract.* 27, 642 (1978). A rapid method for estimating fatty acids levels in vegetable oils is outlined. Sample preparation including saponification, methylation and extraction is carried out in a single tube prior to GLC analysis. Methylation is accomplished using either a boron trifluoride/methanol or sulphuric acid/methanol. (World Surface Coatings Abs. No. 441)

INFRARED STUDY OF THE ADSORPTION OF LINOLEIC ACID ON ALUMINA IMMERSED IN CARBON TETRACHLORIDE. S.N.W. Cross and C.H. Rochester. *J. Chem. Soc, Far. Trans. I* 74, 2141–5 (1978). IR spectra are reported of alumina discs immersed in solutions of linoleic acid in carbon tetrachloride. Both associative molecular adsorption and dissociative chemisorption of linoleic acid on alumina occurred. The chemisorption reaction led to the formation of adsorbed linoleate species and surface hydroxyl groups or molecular water. At least some of the adsorbed linoleate species were orientated such that segments of their hydrocarbon chains were close to the alumina surface. (World Surface Coatings Abs. No. 442)

DRYING OILS AND PAINTS BASED ON CIS-BUTADIENE RUBBER WITH OILS. N.S. Abissova et al. *Lakokras. Mat.* 1978(2), 13–5. Synthetic drying oils have been produced by heating linseed oil or sunflower seed oil with 25–30% of cis-butadiene rubber at about 160 C in the presence of oxygen. Paints based on these new drying oils can be used on wood or metal for interior use, and are now undergoing extended tests of suitability for exterior use. (World Surface Coatings Abs. No. 441)

EMULSION POLYMERISATION OF LINSEED AND SAFFLOWER VINYL ESTERS. S.K. Joshi and P.C. Chatterjee. *Pig. Resin Tech.* 7(10), 9–10 (1978). Vinyl esters of mixed fatty acids derived from linseed and safflower oils were emulsion polymerised to yield oligomers that gave hard, glossy films with excellent flexibility and good water and chemical resistance. (World Surface Coatings Abs. No. 442)

COATINGS UPDATE. XVIII. OIL-BASED COATINGS TECHNOLOGY (PART I). W. Brushwell, *Am. Paint J.* 63, 60–3 (1978). Linseed oil and tung oil form the basis of this brief literature survey between 1969 and 1977.

COATINGS UPDATE: XVIII. OIL-BASED COATINGS TECHNOLOGY. (CONTINUED). *Am. Paint J.* 63, 52–5. Fatty acids of soya bean and tall oil as well as castor, safflower and oiticica oil are the subjects of this literature review, covering the period between 1969 and 1975. (World Surface Coatings Abs. No. 442)

• Fats and Oils

LASER-RAMAN INVESTIGATION OF PHOSPHOLIPID-POLYPEPTIDE INTERACTIONS IN MODEL MEMBRANES. H. Susi, J. Sampugna, J. W. Hampson and J. S. Ard, *Biochemistry* 18, 297–301 (1979). The interaction of aqueous dimyristoyl-phosphatidylcholine liposomes with the polypeptides gramicidin A, poly-*L*-lysine, valinomycin, and gramicidin S was investigated by means of laser-Raman spectroscopy. Three different types of phospholipid-polypeptide interactions were indicated by the observed Raman data. They are interpreted as (a) orderly penetration of the phospholipid bilayer by a hydrophobic polypeptide; (b) polar interactions involving primarily the head groups of the phospholipid; and (c) disorderly hydrophobic binding between a polypeptide and the hydrocarbon domain of the phospholipid.

QUANTITATIVE ASSAY OF CONJUGATED AND FREE BILE ACIDS AS HEPTAFLUOROBUTYRATE DERIVATIVES BY GAS-LIQUID CHROMATOGRAPHY. B.C. Musial and C.N. Williams, *J. Lipid Res.* 20, 78–85 (1979). Quantitative analyses of individual bile acids in biological samples are limited by the lengthy multistep preparations necessary. Using heptafluorobutyric acid anhydride in pyridine as a derivatizing agent, we reduced several steps to one. Bile acids and their glycine and taurine conjugates form stable heptafluorobutyrate derivatives, eliminating the need for deconjugation and preparation of methyl esters. The procedure was applied to a quantitative analysis of artificial mixtures of bile acids and bile conjugates, and also of human bile.

SATURATED AND UNSATURATED LIPID SPIN LABELS WITH TERMINALLY LOCATED NITROXIDE GROUPS. J.F.W. Keana and L.E. LaFleur, *Chem. Phys. Lipids* 23, 253–65 (1979). Synthetic routes are described to a new series of nitroxide lipid spin labels useful for studying the effects of unsaturation and chain length on motion experienced by nitroxide spin labels in biological membrane systems. The labels incorporate a terminally-located proxyl nitroxide group on a saturated or unsaturated fatty acid chain. Syntheses utilize as the key step either an alkylation of an acetylide anion with a nitroxide iodide or else a Wittig coupling between a nitroxide ylid and an aldehyde. Spin labels described include 17-proxylstearolic acid, 17-peroxylstearic acid, 17-proxyloleic acid, 16-proxylheptadecanoic acid, 9-proxyldecanoic acid and two phosphatidyl choline derivatives.

THE CRYSTAL STRUCTURE OF CHOLESTERYL DODECANOATE: CO-PACKING OF STEROID SKELETA AND HYDROCARBON CHAINS. Birgitta Dahlén, *Chem. Phys. Lipids* 23, 179–88 (1979). The crystal structure of cholesteryl dodecanoate has been determined. The compound shows a co-packing of cholesterol skeleta and hydrocarbon chains. There are two molecules in the asymmetric unit both almost fully extended. The hydrocarbon chain axes are however somewhat bent in order to get a good close-packing side by side with the rigid cholesterol skeleta. The two non-asymmetry related skeleta show different packing surrounding. One skeleton packs with both hydrocarbon chains and other skeleta while the other skeleton is completely surrounded by hydrocarbon chains. The latter packing is of particular interest as it is considered to indicate important packing principles in biological lipid bilayers.

ANALYSIS AND QUANTITATION OF FREE CERAMIDE CONTAINING NONHYDROXY AND 2-HYDROXY FATTY ACIDS, AND PHYTOSPHINGOSINE BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY. M. Iwamori, C. Costello and H.W. Moser, *J. Lipid Res.* 20, 86–96 (1979). Reaction of ceramides containing nonhydroxy fatty acids with benzoyl chloride in pyridine at 70°C for 1 hr resulted in *N*-benzoylation to form *N,N*-acyl, benzoyl derivatives; *O*-benzoylation also occurred. This procedure was applied to measurement of the ceramide levels in the brain, liver, and kidney of rats during development. The levels of ceramides containing nonhydroxy and 2-hydroxy fatty acids in the brain, liver, and kidney increased to the adult levels and then remained unchanged.

ON THE RECOLOURATION OF DISTILLED FATTY ACIDS. J. Graille, P. Perfetti, C. Dimitriades and M. Naudet, *Rev. Fr. Corps Gras*, 26, 129–34, (1979). The spontaneous recolouration of distilled fatty acids and the important increase of colouration caused by heating result from the presence of minor products quantitatively separable by adsorption by silicic acid. These minor products which come from oxidation of fatty acids before or after their distillation are complex mixtures of neutral or acid components. These consist of monomers and polymers. The colouring power in the cold and in the hot of only a few non identified compounds is differently distributed between the different revealed fractions. The metal traces, sometimes abundant in distilled fatty acids do not pratically affect the exaltation of colouration by heating or the formation of minor products after distillation.

THE INDUSTRIAL EXTRACTION OF PALM-OIL. E. Fonade, *Rev. Fr. Corps Gras*, 26, 59–62 (1979). The processes for extracting

palm-oil which are truly industrial are recent enough. They consist in a few operations: sterilization of palm clusters, stalking, extraction in two steps: mixing and pressing, clarification. The treatments of kernels which give the palm-kernel oil are more complex and need more equipment. The factory produces its own energy from the excellent fuels which are the waste fruit fibers and the nut shells.

EQUIPMENT AND TECHNOLOGY FOR TROPICAL OILSEEDS. J. Canat, *Rev. Fr. Corps Gras*, 26, 63–72 (1979). Three processes are used for extracting oil from tropical oilseeds, cotton and peanut: pressing only, extraction only, extraction after prepressing. The different steps of manufacture are discussed with regard to peculiar characteristics of these seeds. Several factors must be considered to choose a process: tonnage of seeds, yield in oil, cost, recovery of proteins for edible foods. The problem of energy and the use of shells is also reviewed.

QUANTITATIVE TRIGLYCERIDE DETERMINATION BY GLASS CAPILLARY COLUMN CHROMATOGRAPHY. A. Monseigny, P.Y. Vigneron, M. Levaco and F. Zwobada, *Rev. Fr. Corps Gras*, 26, 107–20 (1979). Various parameters affecting quantitation and resolution have been studied in order to apply glass capillary columns to fats and oils determination: column treatment, stationary phases, coating thickness, column length, gas flow and temperature programming rates. Optimum conditions are proposed. Generally, quantitative triglyceride composition is obtained without correcting factor. Progress in glyceride analysis by using glass capillary columns are revealed by various examples. So, certain determinations, which were difficult, can be now realized without problems, for example partial glyceride determination, triglyceride composition and distribution.

ON THE ANIMAL FATS VISCOSITY. E. Sambuc and G. Reymond, *Rev. Fr. Corps Gras*, 26, 73–5 (1979). The scientific literature give little data for the viscosity of animal fats at relatively high temperatures, particularly 150–250°C. This value has been determinated on 11 different animal fats by the viscosimeter Baume at 7 temperatures included between 40 and 211°C. The values expressed in centistokes are at the same temperature, very similar for the 3 kinds of fats studied. An equation between viscosity and temperature has been established as well as an empirical equation allowing to predict approximatively the viscosity when the temperature is known.

THE IMPORTANCE OF THE PHASE BEHAVIOUR OF PHOSPHOLIPIDS FOR EMULSION STABILITY. L. Rydhag, *Fette, Seifen, Anstrichm.* 81, 168 (1979). The relationship between the phase behaviour for different combinations of neutral and charged surface active lipids was investigated with regard to the dispersion and stabilization of emulsified systems. When the negatively charged lipids were combined with neutral phospholipids lamellar liquid crystalline phases were formed with large repeat-distances depending on the incorporation of water between the lipid bilayers. Studies of phase equilibria in a water-oil-phospholipid system showed that the lamellar phase was present in that concentration area where the o/w emulsions investigated were produced. The investigation made clear that both the degree of dispersion and the emulsion stability could be brought to optimum values by the addition to neutral phospholipids of negatively charged lipids or by selecting commercial lecithins in which a certain amount of negatively charged phospholipids were present.

ANALYSIS OF CONDENSATION PRODUCTS OF FATTY ACIDS OR THEIR METHYL ESTERS WITH AMINOETHYLETHANOLAMINE. G. Schwarz, P. Leenders and U. Ploog, *Fette, Seifen, Anstrichm.* 81, 154 (1979). Imidazoline derivatives, formed by the aforesaid condensation, react with sodium monochloroacetate to yield products having interesting properties, whose structures are now believed to be of the imidazolinium-betaine-type. This can not be the case, since the latter would exhibit a UV-absorption that is not found in the commercial products. Therefore, the composition of the starting product, i.e. the imidazolines, and their products of hydrolysis was investigated. For this purpose, the quantitative oxidation of the hydroxyethylaminoethyl group with periodate for the direct determination of this secondary basic nitrogen was successfully used for the first time. It was found that the imidazolines derived from fatty acid and amine as well as their hydrolysis products are simple mixtures, whereas a product prepared from methyl esters according to USP. 3 941 817 was found to be composed of several components in similar proportions.

FIFTY YEARS OF LIGHT COLORED MONTANA WAX—STATE OF MONTANA WAX REFINING SINCE 50 YEARS OF DEVELOPMENT. K.-H. Stetter, *Fette, Siefen, Anstrichm.* 81, 158 (1979). For 50 years, light colored montana waxes are technically prepared by refining of crude montana wax which occurs in certain varieties of lignite. By this process, the dark colored crude montana wax, which is of limited use, is converted into valuable light colored wax products. Since many years of development work, process are now available for montana wax refining that permit the production of wax products which are suitable for every field of application. According to these processes, the crude montana wax having complex composition is depolymerized and bleached. Subsequently, the product can be modified by a variety of chemical transformations. The processes known for the refining of montana wax are reviewed.

• Biochemistry and Nutrition

THE RELATIONSHIP BETWEEN SERUM CHOLESTEROL AND FECAL 7α-DEHYDROXYLASE ACTIVITY IN THREE ETHNIC GROUPS IN SOUTH AFRICA. P. Samuel, G. Watermeyer, E. Meilman and S. Fehrsen, *Atherosclerosis* 31, 177–84 (1978). The ability of fecal bacteria to 7α-dehydroxylate primary bile acids was measured in vitro by incubating stool homogenates with labeled primary bile acids, and was compared to serum cholesterol levels in 4 South African groups: Rural Bantu (50 subjects), Urban White (20), Urban Bantu (17) and Urban Coloured (16). Mean serum cholesterol levels were 137 ± 23, 213 ± 51, 199 ± 62 and 206 ± 46 mg/100 ml, respectively. These data suggest that the activity of the intestinal bacterial flora to convert primary bile acids was significantly reduced in the Rural Bantu as compared to the other groups, corresponding with lower serum cholesterol levels. However, by the time the stools were excreted the degree of conversion was comparable in each group.

VITAMIN E, ANTIOXIDANTS AND LIPID PEROXIDATION IN EXPERIMENTAL ATHEROSCLEROSIS OF RABBITS. R.B. Wilson, C.C. Middleton and G.Y. Sun, *J. Nutr.* 108, 1858–67 (1978). The purpose of this study was to evaluate the effects of large amounts of dietary vitamin E and butylated hydroxyanisole (BHA) and butylated hydroxytoluene (BHT) in rabbits fed a low-cholesterol, atherogenic diet, and to seek for evidence of lipid peroxidation in the atherosclerotic lesions. Aortic and coronary atherosclerosis were more frequent and extensive in rabbits fed either the basal diet or the basal diet supplemented with BHA and BHT than in rabbits fed either the basal diet supplemented with vitamin E or the negative control diet. Dietary vitamin E inhibited atherogenesis by preventing hypercholesterolemia. No evidence of lipid peroxidation was detected in the arterial lesions.

STEROL METABOLISM. XLIII. THE OXIDATION OF CHOLEST-4-EN-3β-OL BY SINGLET MOLECULAR OXYGEN. J.I. Teng, C.E. Low and L.L. Smith, *Chem. Phys. Lipids* 22, 63–70 (1978). The photosensitized oxidation of cholest-4-en-3β-ol in which singlet molecular oxygen is implicated yielded cholest-4-en-3-one and the isomeric epoxides 4α,5-epoxy-5α-cholestan-3-one and 4β,5-epoxy-5β-cholestan-3-one, the epoxides being formed in the ratio 3:1. These data establish that it is unwarranted to infer the action of single molecular oxygen in systems containing cholest-4-en-3β-ol merely by product analysis where the product 4α,5-epoxy-5α-cholestan-3-one is formed.

ROLE OF THE LYSINE RESIDUES OF PLASMA LIPOPROTEINS IN HIGH AFFINITY BINDING TO CELL SURFACE RECEPTORS ON HUMAN FIBROBLASTS. K.H. Weisgraber, T.L. Innerarity and R.W. Mahley, *J. Biol. Chem.* 253, 9053–62 (1978). The low density lipoprotein (LDL) cell surface receptors on human fibroblasts grown in culture bind specific plasma lipoproteins, initiating a series of events which regulate intracellular cholesterol metabolism. The precise role of lysine remains to be defined, but its function may be to establish and maintain the conformation of the recognition site or the alignment of reactive residues, or both, or to chemically react, through its ε-amino group, with the receptor (hydrogen bond formation would be such a possibility.

LACTATE AS A PRECURSOR OF FATTY ACIDS IN BOVINE ADIPOSE TISSUE. G.B. Whitehurst, D.C. Beitz, M.A. Pothoven, W.R. Ellison and M.H. Crump, *J. Nutr.* 108, 1806–11 (1978). In vitro experiments were conducted to determine the rates of lactate, acetate, and glucose conversions to glycerol, CO_2, and fatty acids by subcutaneous adipose tissue of cattle. To study the pathway for lactate utilization as carbon source for lipo-

genesis, the effect of each of four substrates (lactate, acetate, pyruvate, and glucose) on the rate of conversion of the other three was determined. Our results clearly demonstrated that lactate can be used for fatty acid synthesis as well as for glycerogenesis by bovine adipose tissue.

ACCESSIBILITY OF PHOSPHOLIPIDS IN THE CHROMAFFIN GRANULE MEMBRANE. R.M. Buckland, G.K. Radda and C.D. Shennan, *Biochim. Biophys. Acta* 513, 321–37 (1978). The accessibility of phospholipids in the membrane of the adrenomedullary storage vesicles (chromaffin granules) has been studied. In the intact granules the various treatments led to varying amounts of lysis although again no evidence was obtained that such lysis in any way increased the amount of accessible phospholipid. It is also shown that, unlike in the enzymatic treatment, all the phosphatidylcholine can be exchanged in the presence of a phospholipid exchange protein (prepared from beef liver). It is concluded that transmembrane movement of phosphatidylcholine is slow in isolated membranes of chromaffin granules. The presence of the exchange protein, however, in conjunction with membrane proteins and specific phospholipid arrangements may catalyse this transmembrane movement.

THE ISOLATION AND PARTIAL CHARACTERIZATION OF THE SERUM LIPOPROTEINS AND APOLIPOPROTEINS OF THE RAINBOW TROUT. E.R. Skinner and A. Rogie, *Biochem. J.* 173, 507–20 (1978). VLD (very-low-density), LD (low-density) and HD (high-density) lipoproteins were isolated from the serum of trout (*Salmo gairdneri* Richardson). Each lipoprotein class resembled that of the human in immunological reactivity, electrophoretic behaviour and appearance in the electron microscope. Trout LD lipoprotein, however, was of greater density than human LD lipoprotein. The major apoprotein of trout HD lipoprotein showed features which resemble human apoprotein A-1. The broad similarity between the trout and human lipoprotein systems suggest that both arose from common ancestral genes early in evolutionary history.

INSECT STEROID METABOLISM. J.A. Svoboda, M.J. Thompson, W.E. Robbins and J.N. Kaplanis, *Lipids* 13, 742–53 (1978). Insects are unable to biosynthesize the steroid nucleus and generally require an exogenous source of sterols. Two salient areas of insect steroid metabolism are the dealkylation and conversion of dietary C_{28} and C_{29} plant sterols to cholesterol and other C_{27} sterols, and the biosynthesis and metabolism of the steroidal insect molting hormones. Certain azasteroids and nonsteroidal amines block this conversion of 24-alkyl sterols to cholesterol and/or disrupt molting and development in insects. Research on sterol metabolism in insects provides important information on the comparative biochemistry and physiological functions of steroids in living systems.

UTILIZATION OF METHYLMALONATE FOR THE SYNTHESIS OF BRANCHED-CHAIN FATTY ACIDS BY PREPARATION OF CHICKEN LIVER AND SHEEP ADIPOSE TISSUE. J.R. Scaife, K.W.J. Wahle and G.A. Garton, *Biochem. J.* 176, 799–804 (1978). The utilization of methyl (2-^{14}C)malonyl-CoA for fatty acid synthesis was investigated using synthetase preparations from chicken liver and sheep adipose tissue. The rate of fatty acid synthesis from acetyl-CoA and malonyl-CoA was greatly diminished in the presence of methylmalonyl-CoA. In the absence of malonyl-CoA, methylmalonyl-CoA was utilized for fatty acid synthesis only very slowly by the synthetase from sheep adipose tissue and not at all by that from chicken liver. Despite the inhibitory effect of methylmalonyl-CoA on fatty acid synthesis from malonyl-CoA, it was utilized by the synthetase preparations from both species to produce a complex mixture of methyl-branched fatty acids.

EFFECT OF AGE AND DIETARY FAT LEVEL ON FATTY ACID OXIDATION IN THE NEONATAL PIG. R.G. Wolfe, C.V. Maxwell and E.C. Nelson, *J. Nutr.* 108, 1621–34 (1978). A total of 35 pigs were obtained by cesarean section, placed in individual sterile isolators, and randomly allotted to treatment groups. Thirty pigs received purified, isoenergetic liquid diets containing 2 or 32% butterfat (dry matter basis) and were killed at 1, 7, or 21 days of age. Five pigs were killed at 2 hours post delivery and received no diet. Twenty-one-day old pigs showed a tendency for higher weight gain and feed consumption when consuming the 32% fat diet although the differences were not significant. Changes in the rate of palmitate oxidation with age tended to parallel changes in the level of mitochondrial protein per g of wet tissue and suggested an increased ability to utilize fat as an energy substrate during early development of the neonatal pig.

LIPID-LINKED OLIGOSACCHARIDES CONTAINING GLUCOSE IN LACTATING RABBIT MAMMARY GLAND. B.K. Speake and D.A. White, *Biochem. J.* 176, 993–9 (1978). Microsomal fractions of lactating rabbit mammary gland incubated with UDP-glucose formed lipid-linked mono- and oligo-saccharides. The lipid-linked monosaccharide had chromatographic properties similar to those of dolichol phosphate mannose and yielded glucose on acid hydrolysis. Incubation of the microsomal fraction with GDP-U^{14}C-mannose yielded an oligosaccharide lipid of approximately seven monosaccharide units. Further incubation with UDP-glucose increased the size of the oligosaccharide by approximately two units.

THE INTERACTION OF 1,25-DIHYDROXYVITAMIN D_3 WITH ITS INTESTINAL MUCOSA RECEPTOR: KINETIC PARAMETERS AND STRUCTURAL REQUIREMENTS. J.A. Putkey, W.R. Wecksler and A.W. Norman, *Lipids* 13, 723–9 (1978). Vitamin D_3 and its metabolites comprise an endocrine system which plays a critical role in calcium homeostasis. The active form of vitamin D_3 is 1,25-dihydroxyvitamin D_3 (1,25(OH)$_2$D$_3$). Chromatin localization of 1,25(OH)$_2$D$_3$ and sucrose density gradient centrifugation have demonstrated the presence of an intestinal mucosa cytosol receptor which specifically binds 1,25(OH)$_2$D$_3$. Utilization of these assays has also permitted a determination of the precise structural requirements of the vitamin D ligand for the intestinal receptor. Furthermore, it has been possible to propose two receptor-ligand models which are capable of accommodating the conformationaly modile A ring of the vitamin D seco-steroids.

LOW ERUCIC ACID, LOW GLUCOSINOLATE RAPESEED MEAL, WITH AND WITHOUT ADDED GUMS IN THE LAYER DIET. B.E. March, D.B. Bragg, and R. Soong, *Poult. Sci.* 57, 1599–604 (1978). White Leghorn pullets of two strains were fed 20% of Tower rapeseed meal in the laying diet for one year. The rapeseed meal was manufactured with and without addition of 2% of either Tower or Midas gums. Control birds were fed a soybean meal diet. The birds fed the rapeseed meal with Midas gums had the highest mortality. The incidence of haemorrhagic lesions in various tissues was significantly affected by diet, being lowest in the birds fed the soybean meal diet and highest in the birds fed the rapeseed meal with added Midas gums.

STUDIES ON TETRAHYMENA MEMBRANES. SUBSTRATES FOR DESATURATION OF FATTY ACYL CHAINS IN TETRAHYMENA PYRIFORMIS MICROSOMES. S. Nagao, H. Fukushima and Y. Nozawa, *Biochim. Biophys. Acta* 530, 165–74 (1978). (1-^{14}C) Palmitoyl-CoA was incubated with *Tetrahymena* microsomes containing the complete enzyme system for desaturation during various time periods. The level of (1-^{14}C)palmitoleoyl-CoA increased to a maximum during the 1–3 min incubation time, while (1-^{14}C)palmitoleic acid in the phospholipid reached a maximum level during 6–7 min incubation time. The radioactivity of (1-^{14}C)palmitoleic acid in free fatty acid and the triglyceride fraction was not significantly observed upon 3 min incubation. From these results it can be concluded that the enzyme involving desaturation of palmitic acid to palmitoleic acid requires palmitoyl-CoA as the substrate. However, the possibility of oleoyl and linoleoyl phospholipids being substrates in the desaturation of *Tetrahymena* microsomes was suggested.

TREATMENT OF ESTABLISHED ATHEROSCLEROSIS DURING CHOLESTEROL FEEDING IN MONKEYS. M.R. Malinow, P. McLaughlin, W.P. McNulty, H.K. Naito and L.A. Lewis, *Atherosclerosis* 31, 185–93 (1978). A semipurified diet containing 43% of the calories as fat and 1.2 mg of cholesterol/cal was fed to cynomolgus monkeys (*Macaca fascicularis*) for 6 months; the cholesterol content was reduced to 0.34 mg/cal for the next 18 months. Cholestyramine normalized plasma lipid levels and reduced the size of aortic and coronary atherosclerotic lesions in spite of the high-fat, high-cholesterol intake. Dextrothyroxine reduced cholesterolemia but did not modify the extent of arterial lesions. Wy-14,643 changed neither plasma cholesterol levels nor the extent of atherosclerosis.

CONTROL OF STEROL METABOLISM IN RAT ADRENAL MITOCHONDRIA. J.I. Mason, J.R. Arthur, and G.S. Boyd, *Biochem. J.* 173, 1045–51 (1978). Steroidogenesis by adrenal mitochondria from endogenous precursors is stimulated by corticotropin (ACTH) and is sensitive to the protein-synthesis inhibitor cycloheximide.

In the present investigation the effect of cycloheximide treatment on the metabolism of a number of analogues of the normal steroidogenic substrate, i.e. cholesterol, by rat adrenal mitochondria was studied. The cycloheximide-sensitive process in sterol metabolism appeared related to the transfer of nonpolar sterols such as cholesterol within the mitochondria to a region in close proximity to the enzyme. The importance, and possible mechanism of action, of the cycloheximide-sensitive factor in the control of adrenal steroidogenesis is discussed.

CHOLESTEROL UPTAKE IS DEPENDENT ON MEMBRANE FLUIDITY IN MYCOPLASMAS. S. Razin, *Biochim. Biophys. Acta* 513, 401–4 (1978). The transfer of elaidate-enriched *Acholeplasma laidlawii* cells in culture from 37°C to 4°C virtually arrested exogenous cholesterol incorporation into the cell membrane. Cholesterol uptake continued, though at a slower rate, in oleate-enriched *A. laidlawii* cells undergoing similar temperature shift-down. It is concluded that the incorporation of exogenous cholesterol into the cell membrane of living mycoplasmas is rapid when the membrane lipid bilayer is in the liquid-crystalline state and very slow when the lipid bilayer is in the gel state.

ADIPOSE TISSUE DEVELOPMENT, GROWTH, AND FOOD CONSUMPTION IN PROTEIN-MALNOURISHED RATS. O. Tulp, S. Gambert, and E.S. Horton, *J. Lipid Res.* 20, 47–54 (1979). Effects of protein malnutrition on adipose tissue development were studied in weanling male Sprague-Dawley rats fed isocaloric diets ad libitum containing either 22% (controls) or 8% (protein-malnourished rats) casein, and in rats pair-fed to the protein-malnourished rats with the 22% casein diet. It is concluded that severe restriction of dietary protein during the post-weaning period of growth in rats results in decreased epididymal adipocyte proliferation and/or differentiation concomitant with generalized growth retardation, whereas isocaloric feeding of a diet of normal protein content is associated with only a transient delay in adipose tissue development.

BILIARY LIPID SECRETION IN HYPERCHOLESTEROLEMIA. T.N. Tangedahl, A.F. Hofmann and B.A. Kottke, *J. Lipid Res.* 20, 125–33 (1979). A report on the effects of primary bile acid ingestion alone or in combination with plant sterols on serum cholesterol levels, biliary lipid secretion, and bile acid metabolism. Biliary bile acid and cholesterol secretion were measured in four patients with type IIa hypercholesterolemia before and after randomized treatment periods. We conclude that the abnormally low rate of bile acid synthesis in patients with type IIa hyperlipoproteinemia does not influence biliary lipid secretion; that increasing the input of the two primary bile acids into the enterohepatic circulation does not increase biliary cholesterol secretion or lower serum cholesterol levels in such patients; and that the usual increase in cholesterol synthesis induced by β-sitosterol feeding does not occur if bile acids are administered simultaneously.

THE METABOLIC CONVERSION OF VERY-LOW-DENSITY LIPOPROTEIN INTO LOW-DENSITY LIPOPROTEIN BY THE EXTRAHEPATIC TISSUES OF THE RAT. B.S. Suri, M.E. Targ and D.S. Robinson, *Biochem. J.* 178, 455–66 (1979). The work reported was designed to provide quantitative information about the capacity of the extrahepatic tissues of the rat to degrade injected VLD lipoproteins (very-low-density lipoproteins, d 1.006) to LD lipoproteins (low-density lipoproteins, d 1.006–1.063) and to study the fate of the different VLD-lipoprotein apoproteins during the degradative process. The apoproteins of each of the lipoprotein classes were resolved by gel-filtration chromatography into three main fractions, designated peaks I, II and III. Injection of the liver VLD lipoproteins into the circulation of the supradiaphragmatic rat resulted in the transfer of about 15% of the total VLD-lipoprotein radioactivity to the LD lipoproteins.

METABOLISM OF POTENTIAL PRECURSORS OF CHENODEOXYCHOLIC ACID IN CEREBROTENDINOUS XANTHOMATOSIS (CTX). G. Salen, S. Shefer, E.H. Mosbach, S. Hauser, B.I. Cohen and G. Nicolau, *J. Lipid Res.* 20, 22–30 (1979). In patients with cerebrotendinous xanthomatosis (CTX) diminished cholic acid production is associated with incomplete oxidation of the cholesterol side chain and the excretion of C_{25}-hydroxy bile alcohols. The aims of this investigation were 1) to provide quantitative information on the pool size and production of chenodeoxycholic acid by the isotope dilution technique; and 2) to investigate the possible existence of a block in chenodeoxycholic acid synthesis and explain the absence of chenodeoxycholic acid precursors in CTX.

STUDY OF THE ATHEROGENIC DYSLIPOPROTEINEMIA INDUCED BY DIETARY CHOLESTEROL IN RHESUS MONKEYS (MACACA MULATTA). L.L. Rudel, R. Shah and Dianne G. Greene, *J. Lipid Res.* 20, 55–65 (1979). Hypercholesterolemia was induced in adult male rhesus monkeys with a high-fat diet containing an elevated cholesterol level (0.5%). Plasma lipoproteins were chromatographically separated into four size populations (regions) that were subdivided by density until fractions with single electrophoretic mobilities were obtained. The region III lipoprotein (LDL) contained 80% of plasma cholesterol and were present in the highest concentration of all fractions.

EFFECTS OF VARYING MATERNAL DIETARY FATTY ACIDS IN LACTATING WOMEN AND THEIR INFANTS. M.J. Mellies, T.T. Ishikawa, P.S. Gartside, K. Burton, J. MacGee, K. Allen, P.M. Steiner, D. Brady and C.J. Glueck, *Am. J. Clin. Nutr.* 32, 299–303 (1979). This report evaluates the effects of variation of maternal dietary polyunsaturated and saturated fats on maternal plasma and milk fatty acids, and subsequently on infant plasma fatty acids. The 14 mothers took an ad libitum diet for 30 days after delivery and then were randomized to one of two diets: one (polyunsaturate-rich) with a P/S of 1.8 and 190 mg cholesterol per day; the second (saturate-rich) with a P/S of 0.12 and 520 mg cholesterol per day. By partaking of a polyunsaturate-rich diet, the lactating mother can provide polyunsaturate-rich breast milk, and sharply increase the polyunsaturated fatty acid levels in her infant. The physiological significance of maternal-infant fatty acid relationships on varied diets is difficult to define.

COMPARATIVE EFFECTS OF PURIFIED AND HUMAN-TYPE DIETS ON CHOLESTEROL METABOLISM IN THE RAT. B.C. O'Brien and R. Reiser, *J. Nutr.* 109, 98–104 (1979). Purified diets and others composed of foods commonly eaten by humans either low or 0.5% in cholesterol and low in fiber or containing plant or animal acid polysaccharides and 0.5% cholesterol were fed to adult female Sprague-Dawley rats for 10 weeks. The average serum cholesterol level of the rats which consumed the high cholesterol diet without added acid polysaccharides was 187 mg/dl. Without added cholesterol it was significantly lower (95 mg/dl). There was no difference in average serum cholesterol levels among the four groups of rats ingesting the human-type diets, they being equal to that of rats fed the low cholesterol, low fiber purified diet.

AVAILABILITY OF ADIPOSE TISSUE TOCOPHEROL IN THE GUINEA PIG. L.J. Machlin, J. Keating, J. Nelson, M. Brin, R. Filipski and O.N. Miller, *J. Nutr.* 109, 105–9 (1979). Young guinea pigs were fed a purified diet containing vitamin E for 3 weeks and then fed the diet without vitamin E for 8 weeks. Levels of vitamin E in plasma and liver decreased to low values within a week. Depletion rates for heart and muscle were much slower, whereas the rate of loss from fat was negligible. Even during fasting, adipose tissue tocopherol was not mobilized readily. During a 4 day fast, adipose tissue mass diminished considerably, but there was no appreciable loss of tocopherol.

INFLUENCE OF SAPOGENINS ON CHOLESTEROL METABOLISM IN RATS. D. Kritchevsky, S.A. Tepper and J.A. Story, *Proc. Soc. Exp. Biol. Med.* 160, 126–9 (1979). Rats were fed for four weeks on a basal fiber-free diet (B) or the same diet augmented with 1% cholesterol (BC). Diosgenin, tigogenin, hecogenin, β-sitosterol and their acetates (1%) were added to diet BC. Liver cholesterol and triglyceride levels of rats fed BC were significantly elevated compared to rats fed diet B (474 and 165%, respectively). The acetates of hecogenin, tigogenin and β-sitosterol were more effective than the unesterified steroids in inhibiting cholesterol accumulation in liver.

MECHANISM OF INSULIN RESISTANCE IN ADIPOCYTES OF RATS FED A HIGH-FAT DIET. M. Lavau, S.K. Fried, C. Susini and P. Freychet, *J. Lipid Res.* 20, 8–16 (1979). Insulin's ability to stimulate glucose metabolism is severely diminished in the adipose tissue of rats fed a high-fat diet as compared to that of rats fed a low-fat diet. To elucidate the mechanism for this effect we have measured the binding of insulin, the hormone effect on 2-deoxyglucose uptake and the major pathways of (1-^{14}C)glucose metabolism, and the activity of lipogenesis-related enzymes in adipocytes of rats fed a low- or high-fat diet for 7 days. The data therefore strongly suggest that the blunted response of glucose metabolism to insulin in adipocytes of high-fat-fed rats is a result of a decreased intracellular capacity to utilize glucose for lipogenesis.

TISSUE CARNITINE DEFICIENCY DUE TO DIETARY LYSINE DEFICIENCY: TRIGLYCERIDE ACCUMULATION AND CONCOMITANT IMPAIRMENT IN FATTY ACID OXIDATION. L. Khan and M.S. Bamji, *J. Nutr.* **109**, 24–31 (1979). Since the essential amino acid lysine is a precursor of carnitine, the effects of a cereal diet unsupplemented or supplemented with limiting amino acids or carnitine, on carnitine and lipid levels in tissues and fatty acid oxidation in heart of rats were examined. Male weanling rats were fed either a diet providing approximately 5% protein from wheat or 16% protein from casein for a period of 10 weeks. Data suggest that carnitine is an essential nutrient, and its supply has to be ensured either through adequate intake of precursor amino acids lysine and methionine or through preformed carnitine.

ROLE OF VITAMIN A IN THE ABSORPTION, RETENTION AND DISTRIBUTION OF IRON IN THE RAT. L.A. Mejia, R.E. Hodges and R.B. Rucker, *J. Nutr.* **109**, 129–37 (1979). The effects of vitamin A deficiency on the absorption, retention and distribution of ^{59}Fe were studied in Sprague-Dawley rats. There were no differences between the vitamin A supplemented and deficient rats with respect to the initial estimates for iron turnover and rate of ^{59}Fe clearance from plasma. Red cell incorporation of ^{59}Fe, however, was significantly reduced in the deficient animals (40 to 50% of control values). There also was a significant reduction in plasma and blood volumes of vitamin A-deficient rats. Moreover, there was a significantly greater isotope accumulation in the liver and spleen of the vitamin A-deficient rats.

LIPID ANALYSIS AND FREEZE-FRACTURE STUDIES ON ISOLATED TRANSVERSE TUBULES AND SARCOPLASMIC RETICULUM SUBFRACTIONS OF SKELETAL MUSCLE. Y.H. Lau, A.H. Caswell, J.-P. Brunschwig, R.J. Baerwald and M. Garcia, *J. Biol. Chem.* **254**, 540–6 (1979). Comparative studies on the properties of isolated vesicles from the transverse tubules, longitudinal sarcoplasmic reticulum, and the light and heavy bands of the terminal cisternae are presented in this report. Freeze-fracture studies reveal that the isolated transverse tubular vesicles have a disc shape. Stereological analysis of freeze-fracture replicas reveals that the sarcoplasmic reticulum contamination in the transverse tubular fraction is approximately 12.5% on a milligram of protein basis.

LYSOPHOSPHATIDYLCHOLINES CAN MODULATE THE ACTIVITY OF THE GLUCAGON-STIMULATED ADENYLATE CYCLASE FROM RAT LIVER PLASMA MEMBRANES. M.D. Houslay and R.W. Palmer, *Biochem. J.* **178**, 217–21 (1979). Synthetic lysophosphatidylcholines inhibit the glucagon-stimulated adenylate cyclase activity of rat liver plasma membranes at concentrations two to five times lower than those needed to inhibit the fluoride-stimulated activity. We conclude that the increased sensitivity of glucagon-stimulated adenylate cyclase to inhibition may be due to the lysophosphatidylcholines interfering with the physical coupling between the hormone receptor and catalytic unit of adenylate cyclase. We suggest that, *in vivo*, it is possible that lysophosphatidylcholines may modulate the activity of adenylate cyclase only when it is in the hormone-stimulated state.

GLYCOLIPIDS AND FATTY ACIDS OF TWO DOG KIDNEY CELL LINES. A.E. Hougland, C.R. Gaush and W.R. Mayberry, *Biochem. J.* **177**, 311–7 (1979). Glycolipid and fatty acid compositions were studied in whole cells and plasma membranes from two dog kidney cell lines (Madin-Darby and SV40-transformed cells) grown in monolayer and suspension cultures. Glycolipids, which account for 5% or less of the total lipids in dog kidney cells, were substantially increased in plasma membranes relative to whole cells. Ceramide trihexoside was found in Madin-Darby cultures, but not in transformed cultures. The values for short-chain fatty acids from neutral glycolipids and for saturated fatty acids were generally higher than the values for these fatty acids in calf serum.

DIETARY PROTEIN AND PLASMA CHOLESTEROL IN CHICKENS. P. Hevia and W.J. Visek, *J. Nutr.* **109**, 32–8 (1979). The effects of the dietary protein source on plasma cholesterol in chickens consuming diets low in fat and without added cholesterol were studied in cockerels weighing approximately 1.5 kg. The diets contained lactalbumin, soybean protein, or egg white solids fed at 25 and 50% of the diet for 4 and 3 weeks respectively. Only minor differences in plasma lipids were observed. The data indicate that alterations in plasma cholesterol caused by different dietary proteins are smaller in chickens than in rabbits. However, the changes in plasma cholesterol in both species seem to be similar during starvation and refeeding.

LOW DENSITY LIPOPROTEIN METABOLISM AND LIPOPROTEIN CHOLESTEROL CONTENT IN SOUTHWESTERN AMERICAN INDIANS. M.B. Garnick, P.H. Bennett and T. Langer, *J. Lipid Res.* **20**, 31–9 (1979). The prevalence of ischemic heart disease is significantly lower in southwestern American Indians than in Caucasians. To investigate this difference, the metabolism of low density lipoprotein apoprotein (apo-LDL) and plasma lipoprotein cholesterol composition were studied in 10 southwestern American Indians and 5 Caucasian controls. These data indicate that the lower levels of plasma LDL cholesterol and apo-LDL in American Indians are due to a reduced rate of apo-LDL synthesis rather than to differences in fractional catabolic rates.

UTILIZATION OF ENDOGENOUS AND EXOGENOUS SOURCES OF SUBSTRATE FOR CHOLESTEROL BIOSYNTHESIS BY ISOLATED HEPATOCYTES. G.F. Gibbons and C.R. Pullinger, *Biochem. J.* **177**, 255–63 (1979). The rates of cholesterol biosynthesis in isolated rat hepatocytes were determined by using a method based on measurement of the rate of formation of desmosterol (cholesta-5,24-dien-3β-ol), which accumulates during inhibition of cholesterogenesis by the drug triparanol. These studies suggest that, although exogenous substrates were capable of expanding an intracellular pool of cholesterol precursor, the normal supply of intermediary metabolites was not rate-limiting for cholesterogenesis.

THE EFFECT OF GLUCAGON, NOREPINEPHRINE, AND DIBUTYRYL CYCLIC AMP ON CHOLESTEROL EFFLUX AND ON THE ACTIVITY OF 3-HYDROXY-3-METHYLGLUTARYL CoA REDUCTASE IN RAT HEPATOCYTES. P.A. Edwards, D. Lemongello and A.M. Fogelman, *J. Lipid Res.* **20**, 2–7 (1979). Incubation of rat hepatocytes for 3 hours in a sterol-free medium containing 1.5% albumin resulted in efflux of cellular sterol into the medium and an increased activity of 3-hydroxy-3-methylglutaryl CoA reductase. The secretion of cholesterol was inhibited when cells were incubated with glucagon, norepinephrine, or dibutyryl cyclic AMP.

IN VITRO STUDIES OF FATTY ACID METABOLISM IN VITAMIN B_6 DEFICIENT RATS. P. Dussault and M. Lepage, *J. Nutr.* **109**, 138–41 (1979). The oxidation of (1-^{14}C)palmitate, (1-^{14}C)-linoleate, and (1-^{14}C)arachidonate as well as their incorporation into lipids was investigated in vitamin B_6 deficient rats using liver slices and isolated mitochondria. In experiments on fatty acid oxidation in liver slices, we observed a decrease in the production of $^{14}CO_2$ from radioactive palmitate and linoleate, but not from arachidonate. These experiments showed that major changes occurred in metabolism of palmitate and linoleate and strongly suggested that the decrease in the arachidonate content previously observed in rat tissues could not be explained by alteration in the metabolism of this fatty acid.

MEMBRANES AND BILE FORMATION. COMPOSITION OF SEVERAL MAMMALIAN BILES AND THEIR MEMBRANE-DAMAGING PROPERTIES. R. Coleman, S. Iqbal, P.P. Godfrey and D. Billington, *Biochem. J.* **178**, 201–8 (1979). The total content and profile of bile salts and phospholipids are reported for several mammalian biles. Rabbit and guinea-pig biles are characterized by high proportions of conjugated dihydroxy bile salts with respect to trihydroxy bile salts, but contain relatively little phospholipid. Perhaps the most significant observation is that these biles, and their predominant bile salts, are dramatically less lytic towards sheep erythrocytes, indicating that some factor(s) in membrane composition and structure may partly explain the resistance of membranes of the biliary tract to the presence of high concentrations of potentially membrane-damaging bile salts.

INTERACTION BETWEEN UNILAMELLAR EGG YOLK LECITHIN VESICLES AND HUMAN HIGH DENSITY LIPOPROTEIN. J.V. Chobanian, A.R. Tall and P.I. Brecher, *Biochemistry* **18**, 180–7 (1979). The interaction between unilamellar egg yolk lecithin vesicles and human plasma lipoproteins was studied in vitro as a model system for examining the mechanisms by which vesicles are modified in plasma. Detailed studies of the interaction between HDL and vesicles indicated the rate of transformation to be temperature dependent and influenced by the relative concentration of reactants. The transfer of lipids from unilamellar vesicles to an HDL-like particle suggests that analogous mechanisms for the mobilization of lipoprotein or membrane-associated lipids may occur in biological systems.

PROSTAGLANDIN SYNTHESIS IN RAT ADRENOCORTICAL CELLS. R.

Chanderbhan, V.A. Hodges, C.R. Treadwell and G.V. Vahouny, *J. Lipid Res.* 20, 116–24 (1979). The biosynthesis of prostaglandins by isolated rat adrenocortical cells has been studied by determinations of products formed during incubations with labeled arachidonic acid and by radioimmunoassays. Analysis by thin-layer chromatographic separation of silicic acid column fractions indicated that PGE_2, PGA_2 (B_2) and $PGF_{2\alpha}$ were the predominant prostaglandins formed by rat adrenocortical cells.

FEEDING FREE FATTY ACIDS TO STUDY LIPID METABOLISM IN RATS. S.C.-H. Chen, *J. Nutr.* 109, 39–47 (1979). A 12-week rat feeding study was conducted to test the feasibility of feeding dietary fat in the form of free fatty acids (FFA) in large quantities, over an extended period of time. Male weanling rats were fed 3 diets consisting of different forms and levels: diet 15CO contained corn oil at 15% by weight, diet 35CO contained 35% corn oil, and diet 35FA contained 35% FFA isolated from corn oil. Results from this study suggest that FFA in large quantities can be used by rats as the sole source of fat. Feeding FFA may be a useful approach to long term studies of 1) lipid metabolism as influenced by quantity and quality of dietary fatty acids, 2) the intestinal reesterification mechanism and 3) the dietary treatment of malabsorption syndromes due to diseases of the pancreas.

RESPONSE OF RAT HEPATIC FATTY ACID SYNTHESIS AND ACTIVITIES OF RELATED ENZYMES TO CHANGES IN LEVEL OF DIETARY FAT. G. Carrozza, G. Livrea, R. Caponetti and L. Manasseri, *J. Nutr.* 109, 162–70 (1970). The rate of in vivo fatty acid synthesis as well as the levels of glucose-6-phosphate dehydrogenase (G6PD), 6-phosphogluconate dehydrogenase (6PGD), malic enzyme (ME), citrate cleavage enzyme (CCE), acetyl-CoA carboxylase (ACX) and fatty acid synthetase (FAS) activities, have been studied in the liver of rats fed a fat-free diet for 7 days, followed by diets containing different amounts of soybean oil (0 to 24.79 kcal%) for 7 days. These findings, as well as the pattern of decrement of enzyme activities and of lipogenesis, suggest a close correlation of fat feeding to ACX activity and fatty acid synthesis.

EFFECTS OF WHOLE WHEAT FLOUR AND MILL-FRACTIONS ON LIPID METABOLISM IN RATS. M.L.W. Chang, M.A. Johnson and D. Baker, *Proc. Soc. Exp. Biol. Med.* 160, 88–93 (1979). Effects on lipid metabolism in rats were studied of (1) commercially available whole wheat flour (WW) and (2) hard-red winter (HRW) whole wheat and mill-fractions in cholesterol-free diets. For similar food intake, dietary WW as compared with white flour (WF) increased bile acid excretion, fecal dry weight, pellet number and size. The results suggest that a factor in wheat affected the levels of cholesterol in serum and liver and was concentrated in the low-grade flour fraction and also that dietary fiber from wheat did not alter cholesterol levels in serum and liver.

THE CHOLESTEROL TURNOVER, SYNTHESIS, AND ABSORPTION IN TWO SISTERS WITH FAMILIAL HYPERCHOLESTEROLEMIA (TYPE IIA). G.A. Carter, W.E. Connor, A.K. Bhattacharyya and D.S. Lin, *J. Lipid Res.* 20, 66–77 (1979). To explore the mechanisms of the profound plasma cholesterol elevations in familial homozygous hypercholesterolemia (type IIa), cholesterol turnover, sterol balance, cholesterol absorption, and low density lipoprotein studies were carried out under controlled dietary conditions in two sisters (aged 13 and 16). These composite data indicated that the definable metabolic defects of these two sisters with homozygous familial hypercholesterolemia were the sluggish clearance of cholesterol from the body coupled with low total body synthesis of cholesterol.

HUMAN SERUM ALBUMIN. SPECTROSCOPIC STUDIES OF BINDING AND PROXIMITY RELATIONSHIPS FOR FATTY ACIDS AND BILIRUBIN. C.B. Berde, B.S. Hudson, R.D. Simoni and L.A. Sklar, *J. Biol. Chem.* 254, 391–400 (1979). Binding and proximity relationships of hydrophobic ligands on human serum albumin have been studied using absorption, fluorescence, circular dichroism, and electron paramagnetic resonance spectroscopy. The ligands studied were bilirubin, two conjugated linear polyene fatty acids, *cis*-parinaric acid and *cis*-eleostearic acid, and three nitroxide derivatives of stearic acid with doxyl groups at position 5, 10, and 12, respectively. It is suggested that the first two fatty acids bind side-by-side in an antiparallel fashion in domain III of human serum albumin.

INHIBITION OF PHOSPHATIDYLINOSITOL SYNTHESIS AND THE INACTIVATION OF CALCIUM ENTRY AFTER PROLONGED EXPOSURE OF THE BLOWFLY SALIVARY GLAND TO 5-HYDROXYTRYPTAMINE. M.J. Berridge and J.N. Fain, *Biochem. J.* 178, 59–69 (1979). The incorporation of $(^{32}P)P_i$ into all salivary-gland phospholipids except phosphatidic acid was inhibited by 5-hydroxytryptamine. The accumulation of $(^{32}P)P_i$ into phosphatidic acid was actually enhanced by 5-hydroxytryptamine. These results support the hypothesis that the hydrolysis of phosphatidylinositol plays some role in either the opening or closing of calcium 'gates.'

HETEROGENEOUS EFFECT OF DIETARY CHOLESTEROL ON ACETYLCHOLINESTERASE AND ATPASES OF RAT ERYTHROCYTES: ARRHENIUS PLOTS. B. Bloj, M.G. Galo, R.D. Morero and R.N. Farias, *J. Nutr.* 109, 63–9 (1979). The influence of cholesterol on the Arrhenius plot of acetylcholinesterase was studied in erythrocytes from five groups of male rats fed different fat-supplemented diets. The heterogeneous response of cholesterol to different enzymes in rats fed the same diet and to the same enzyme from rats fed different diets is related to the heterogeneous distribution of lipids in the membrane and the asymmetric localization of the enzymes in the membrane.

QUANTITATION OF DIFFERENT CELLS IN THE EPIDIDYMAL FAT PAD OF THE RAT. P. Bjorntorp, M. Karlsson, L. Gustafsson, U. Smith, L. Sjostrom, M. Cigolini, G. Storck and P. Pettersson, *J. Lipid Res.* 20, 97–106 (1979). To determine the number of adipocytes and cells developing into adipocytes (preadipocytes) in the epididymal fat pad of normal Sprague-Dawley rats, two methods were developed. Liberation of all cells from the tissue was obtained by a combination of lytic enzymes and mechanical treatment with only a limited loss of cell integrity; with large tissue masses, an initial perfusion was necessary. With increasing weight and age the mature adipocytes increased while the number of preadipocytes seemed to be constant up to a weight of about 150 g, after which they continuously diminished and could not be found in rats weighing more than 300 g.

NEUROPHYSIN · LIPID COMPLEXES. CHARACTERIZATION OF LIPID-CONTAINING NEUROPHYSIN FROM RAT POSTERIOR PITUITARY DELIPIDATION, AND REAGGREGATION. T.K. Audhya and R. Walter, *J. Biol. Chem.* 254, 291–8 (1979). A lipid-rich fraction associated with neurophysin proteins was isolated from lyophilized rat posterior pituitary by acid extraction, salt precipitation, and ultrafiltration. The lipid-containing neurophysin was separated from neurophysin proteins and other unrelated acidic proteins by affinity chromatography on a heparin-agarose column. The lipid-containing neurophysin was found to be composed of noncovalent aggregates of neurophysins, cholesterol, and phospholipids such as phosphatidylcholine, phosphatidylethanolamine, phosphatidylserine, sphingomylin, and lysophosphatidylcholine.

STUDIES ON HEPATIC AND EXTRAHEPATIC LIPOPROTEIN LIPASES IN PROTEIN-CALORIE MALNUTRITION. E.O. Agbedana, A.O. Johnson and G.O. Taylor, *Am. J. Clin. Nutr.* 32, 292–8 (1979). Postheparin serum lipolytic activities (hepatic and extrahepatic), serum free fatty acid, and triglyceride levels were measured in 16 kwashiorkor, 14 marasmic, and 14 control children. The results showed that the reduction in total postheparin lipolytic activity in kwashiorkor was in the activity of hepatic origin. These findings suggest that the defective production of hepatic lipoprotein lipase, as well as increased influx of free fatty acid into the liver, could account for the accumulation of fat in the liver of kwashiorkor and not in that of marasmic children.

EFFECT OF MEMBRANE CHOLESTEROL ENRICHMENT OR DEPLETION ON THE PARTITION BEHAVIOR OF HUMAN ERYTHROCYTES IN DEXTRAN-POLY(ETHYLENE GLYCOL) AQUEOUS PHASES. H. Walter, E.J. Krob, T.J. Webber, G.S. Ascher and R.J. Morin, *Biochim. Biophys. Acta* 550, 138–44 (1979). It has previously been shown that by appropriate manipulation of polymer concentrations and ionic composition and concentration one can select whether charge-associated or lipid-related membrane surface properties are reflected by cell partition in dextran-poly (ethylene glycol) aqueous two-phase systems. Results further indicate that, just as cell partition in charged phase systems reflects membrane charge-associated properties not readily measured by means other than partition, cell partition in uncharged phases reflects membrane lipid-related properties also not readily measured by other means.

CAN REGULAR SOLUTION THEORY BE APPLIED TO LIPID BILAYER MEMBRANES? S.A. Simon, W.L. Stone and P.B. Bennett, *Biochim. Biophys. Acta* 550, 38–47 (1979). Direct measure-

ment of the partition coefficient of *n*-hexane into phosphatidylcholine and phosphatidylcholine-cholesterol bilayers showed that (a) isotropic liquids are not good models for lipid bilayers and (b), Regular Solution Theory cannot, in general, be applied to lipid bilayer membranes at temperatures above their phase transition. Theoretical and experimental evidence is given.

A SPIN LABEL STUDY OF THE EFFECTS OF STEROLS ON EGG LECITHIN BILAYERS. R. Semer and E. Gelerinter, *Chem. Phys. Lipids* 23, 201-11 (1979). Paramagnetic resonance of cholestane and three fatty acid probes is used to measure the effects of the addition of cholesterol, 7-dehydrocholesterol and ergosterol to egg phosphatidylcholine bilayers. At low concentrations we find that all three sterols effectively align the bilayers. However, concentrations of ergosterol above 15 mol% disorder and disrupt the bilayers. The observed behavior is explained in terms of a steric model in which the steroid nucleus organizes the bilayer and the bulky ergosterol tail disorganizes the bilayer. The three fatty acid spin labels are used to probe the layers at different depths, and the data observed are in agreement with the normal presented.

KINETICS OF LIPID-PROTEIN INTERACTIONS: EFFECT OF CHOLESTEROL ON THE ASSOCIATION OF HUMAN PLASMA HIGH-DENSITY APOLIPOPROTEIN A-I WITH L-α-DIMYRISTOYLPHOSPHATIDYLCHOLINE. H.J. Pownall, J.B. Massey, S.K. Kusserow and A.M. Gotto, Jr., *Biochemistry* 18, 574–9 (1979). Apolipoprotein A-I (apoA-I) binds to cholesterol containing liposomes of L-α-dimyristoylphosphatidylcholine (DMPC) to give stable lipid-protein complexes which are readily isolated by gel filtration or by centrifugation in a density gradient of CsCl. We propose that apoA-I preferentially inserts into channel or hole defects at the boundary between coexisting gel and liquid crystalline phases. In our model the initial interaction of apoA-I with cholesterol-DMPC liposomes occurs at the interface of coexisting phases of 1:3 cholesterol-DMPC and pure DMPC.

THE PERMEABILITY OF BILAYER LIPID MEMBRANES ON THE INCORPORATION OF ERYTHROCYTE MEMBRANE EXTRACTS AND THE IDENTIFICATION OF THE MONOSACCHARIDE TRANSPORT PROTEINS. S. Phutrakul and M.N. Jones, *Biochim. Biophys. Acta* 550, 188-200 (1979). Extracts of the human erythrocyte membrane have been prepared by five different procedures involving Triton X-100 solubilization and gel chromatography. Incorporation of zone 4.5 polypeptides into bilayer lipid membranes increases their permeability to D-glucose at 27 and 5°C. It is suggested that the components of the monosaccharide system are present in band 3 polypeptides but that they can undergo proteolysis with some retention of transport activity.

STRUCTURE OF THE DIMYRISTOYLPHOSPHATIDYLCHOLINE VESICLE AND THE COMPLEX FORMED BY ITS INTERACTION WITH APOLIPOPROTEIN C-III: X-RAY SMALL-ANGLE SCATTERING STUDIES. P. Lagguer, A.M. Gotto, Jr., and J.D. Morrisett, *Biochemistry* 18, 164–71 (1979). Single bilayer vesicles of dimyristoylphosphatidylcholine have been investigated by small-angle X-ray scattering at 28°C. The results indicate that these vesicles are hollow spherical shell structures with an outer radius of approximately 12 nm and a molecular weight of $(3.2 \pm 0.5) \times 10^6$. The shape analysis indicates a highly asymmetric particle with an internal partition of low and high electron density resembling that produced by a bilayer structure.

FUSION OF PHOSPHATIDIC ACID-PHOSPHATIDYLCHOLINE MIXED LIPID VESICLES. M.-J. Liao and J.H. Prestegard, *Biochim. Biophys. Acta* 550, 157–73 (1979). Ca^{2+}-induced transformation of phosphatidylcholine-phosphatidic acid vesicles to larger bilayer structures has been examined using nuclear magnetic resonance, electron microscopy, gel permeation and radioisotope tracer techniques. During transformation bilayer composition remains unchanged and internal contents are retained in the final structure. These properties are indicative of concerted two vesicle and multiple vesicle fusions. The controllable and concerted fusion make the phosphatidic acid system suitable for further mechanistic studies. ●