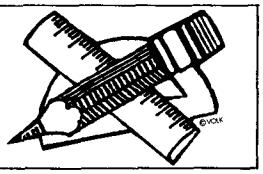
Abstracts



• Edible Proteins

ACIDIC BUTANOL REMOVAL OF COLOR-FORMING PHENOLS FROM SUNFLOWER MEAL. G. Sondini and M. Canella (Lab. Richerche di Base, Snamprogetti S.p.A., Monterotondo, Rome, Italy). *J. Agric. Food Chem.* 25, 822–5 (1977). This paper describes the ability of acidic 1-butanol to remove color-forming phenols (chlorogenic and caffeic acid) and oligosaccharides from sunflower meal without detectable protein denaturation. Defatted sunflower meal of Ala variety was repeatedly extracted with a solution of 1-butanol and 0.0005 N HCl (92.8, v/v), giving a protein concentrate (70% protein) with a low chlorogenic residual content ($\leqslant 0.05\%$). Protein extraction of this product at pH 9.5 and subsequent precipitation at pH 5.0 yielded a colorless protein isolate (93.5% protein). The amino acid composition of sunflower meal, concentrate, isolate were similar. The phenol-free isolate and the untreated isolate exhibited identical minimum solubility points (pH 5.0) but the former showed a higher protein extractability above pH 7.0 than the latter. No significant differences appeared among electrophortic patterns of albumin and globulin fractions from meal and protein concentrate.

• Fats and Oils

MONODIMENSIONAL THIN-LAYER CHROMATOGRAPHY OF POLAR LIPIDS ON SILICA GEL WITH A DISCONTINUOUS GRADIENT OF MOISTURE. A. Nouvelot, G. Sezille, P. Dewailly and J.C. Fruchart. *Rev. Fr. Corps Gras* 24(7), 365–6 (1977). The separation of polar lipids by thin-layer chromatography is difficult, on account of number and variety of these compounds. A monodimensional method with accurate control of the relative moisture is described; the separation of main tissue phospholipids is very good and the reproducibility is excellent.

NEW REQUIREMENTS FOR EDIBLE FATS ANALYSIS. U. Pallotta. *Rev. Fr. Corps Gras* 24(7), 351–64 (1977). The instrumental analysis, mainly during the last decade, has completely changed the analytical methods for the edible fats. On this account, their composition is obtained in detail. In particular, the rational use of different methods:chromatography, spectrophotometry and mass-spectrometry, alone or associated, is able to control the purity of these foods, as well for production as for regulation.

COMPARISON OF THE GLYCERIDE STRUCTURE OF COPRA AND PALM KERNAL OIL. I.—TOTAL FATTY ACIDS AND GROUPS OF TRIGLYCERIDES. M. Bugaut and J. Bezard. *Oléagineux,* 32(6), 277–82 (1977). This is the first part of an extensive study devoted to these lauric oils. Modern chromatographic analysis methods are used amply to determine their composition in fatty acids and triglyceride groups. The second part will deal with the fatty acid composition of the triglyceride groups, and the third with the various types of triglycerides. Although the raw materials (palm kernel, coconut pulp) are very different, the mode of biosynthesis of their reserve fats is comparable; in effect, both copra and kernel oils have identical fatty acids and glyceride structures. To reach this conclusion the authors have accomplished considerable analytical work—the comparison of experimental results with those calculated, using random distribution formulae.

STRUCTURE OF RESIDUAL TRIENES IN SELECTIVELY HYDROGENATED SOYBEAN OIL AND PRIMOR RAPESEED OIL. G. Mallet, C. Dimitriades and E. Ucciani. *Rev. Fr. Corps Gras* 24(7), 373–7 (1977). Residual trienes in selectively hydrogenated soybean and Primor rapeseed oils (Ni-Ziegler) have been separated and determinated. The separation is carried out by partition chromatography with inverse phases on polyethylene. Trienes are reacted with soybean lipoxidase under the conditions for determining linoleic acid. The conjugable trienes reacted with $RhCl(PPh_3)_3$ are evaluated; semi-conjugated and conjugated trienes are obtained in ration 2:1. These methods are completed by determinating the trans isomers and evaluating the position of double bonds (ozonolysis). During hydrogenation, the main change for linolenic acid is a partial isomerisation. The trienes in Primor oil are more affected than the trienes in soybean oil.

RAPID METHOD FOR DETERMINING THE PARTIAL GLYCERIDES IN OILS. APPLICATION TO THE STUDY OF TRIGLYCERIDE STRUCTURE OF PALM OIL AND ITS DIFFERENT FRACTIONS. P. Archier, C. Bouvron and H. Yohou. *Rev. Fr. Corps Gras* 24(7), 367–72 (1977). The monoglycerides and diglycerides in oils are extracted with alcohol and determined by gas liquid chromatography. This method is very rapid and gives in ten mn the qualitative and quantitative composition of glycerides, with an internal standard. This method has been used for products obtained from refining and fractionation (in oil phase and solvent phase) of palm-oil.

POTENTIAL NEW SURFACTANTS FOR THE BAKING INDUSTRY. M.M. Hanamoto and M.M. Bean (Western Regional Research Laboratory U.S. Department of Agriculture, Berkeley, Ca.). *Baker's Dig.* 51, 32 (1977). Several new surfactants developed from fatty acid esters of propylene glycol glycosides (PGG) and glycerol glycosides (GG) obtained directly from starch or glucoside were tested for their baking properties. When used as dough conditioners in soy-fortified wheat bread, many produced excellent loaf volume, grain, and texture. One impressive attribute of these surfactants was their ability to strengthen the proofed doughs against shock and rough handling just prior to baking. In layer cake application, a definite decrease in batter mixing time and significant shortening sparing action was noted, without loss of volume or grain and texture characteristics. Addition of two per cent surfactant (based on shortening weight) reduced the mixing time by 25 per cent and shortening requirement by 40 per cent. As additives in an icing type shortening, the most efficient surfactants were those containing 20 moles of ethylene oxide. These were comparable to the commercial icing shortenings in stabilizing icing emulsions and superior to two of three commercial icing shortenings in entrapping air.

THE OLIVE OIL CONSERVATION IN POLYESTER-GLASS FIBRE STORAGE TANKS. A. del Barrio Pérez-Cerezal, F. Gutiérrez Rosales and R. Gutiérrez González-Quijano. Instituto de la Grasa y sus Derivados.—Sevilla. *Grasas Aceites (Seville)* 28, 5–9 (1977). This paper includes a study on the olive oil conservation in a polyester-glass fibre storage tank in comparison with that of the same oil stored in an iron tank. During the storage the following indexes and characteristics are studied:acidity, peroxyde index, A.O.M. stability, specific extinction at 270 nm, and organoleptic test. The results show that the oil stored in the polyester-glass fibre tank is much better conserved than the one in the iron tank.

FRACTIONAL CRYSTALLIZATION OF TRIGLYCERIDES OF VIRGIN OLIVE OIL. PRESENCE OF SEMIDRYING OILS. J. Martel. Instituto de la Grasa y sus Derivados. Seville. *Grasas Aceites (Seville)* 28, 189–98 (1977). A method based on the fractional crystallization of triglycerides of virgin olive oil in a polar solvent at low temperature, with posterior analysis of methyl esters from the triglycerides remaining in solution by G. L. C., has been developed. From the obtained results in the studied population, a regression analysis of linoleic acid percentage contents in the soluble fraction and in the total fatty acids of virgin olive oil has been made. From the data obtained in this study, on a population of 34 samples of virgin olive oil with linoleic acid contents from 4.2 to 14.6%, a method for the detection of semidrying oils is proposed.

PHYSICO-CHEMICAL STUDIES CONCERNING MISCELLAS OF VEGETABLE OILS. II. PARTIAL MOLAR VOLUME, REFRACTION INDICES, AND VISCOSITIES OF OLEIC ACID SOLUTIONS IN HEXANE AND CYCLOHEXANE. V. Flores Luque, C. Gómez Herrera and M. Galán Vallejo (Departamento de Quimica Técnica de la Uni-

versidad de Sevilla e Instituto de la Grasa y sus Derivados) *Grasas Aceites (Seville)* **28**, 77–84 (1977). Values of molar refraction for every studied solution, and those for partial molar volumes for cyclohexane solutions, show lineal plots versus molar fractions of oleic acid. A volume contraction is found for hexane solutions. The «excess viscosity» for every studied solution shows remarkable negative values, being highest those for hexane solutions. Lineal plots of viscosity logarithms, versus volume fractions of oleic acid, are found for solutions in cyclohexane with molar fractions of oleic acid above 0.1, and for solutions in hexane with molar fractions of acid above 0.3. Behaviour disagreements are attributed to structural differences in chains for used hydrocarbons.

APPLICATION OF NUCLEAR MAGNETIC RESONANCE IN DETERMINATION OF THE FAT CONTENT IN OLEAGINOUS. II. OLIVES. F. Romero Guzmán and J. Gracian Tous (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* **28**, 85–99 (1977). The application of nuclear magnetic resonance for determining the olive fat content has been studied using three kinds of technics: a) with previous elimination of water; b) with previous elimination of the water sign; and c) with saturation of radiofrequency of the water sign. It has been proved that by the three procedures have always been obtained convenient contents carrying systematic errors which can be corrected by means of adequate formulas deduction. The normalized UNE method has been used as standard process in every case.

RELATIONSHIP BETWEEN POLYPHENOL-CONTENTS AND THE QUALITY AND STABILITY OF VIRGIN OLIVE OIL. R. Gutiérraz González-Quijano, C. Janer del Valle, M.L. Janer del Valle, F. Gutiérrez Rosales and A. Vázquez Roncero (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* **28**, 101–6 (1977). A good correlation between polyphenol contents and A. O. M. stability of virgin olive oils is found. That is also found for polyphenol contents versus odor and flavor, as determined by an organoleptic panel-test. Presence or lacking of several phenolic acids is related to development of some characteristic qualities or defects in virgin olive oils.

DEGUMMING AND REFINING STUDY OF THE SUNFLOWER OILS. F. Ramos Ayerbe (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* **28**, 1–4 (1977). The following products such as citric, phosphoic, nitric, sulphuric and chlorhydric acids, tribasic sodium phosphate and sodium chloride are comparatively tested as degumming and refining agents. The oils are purified, neutralized and bleached. The phospholipids content is followed in each of these process for determining the phosphorus content.

VOLATILE COMPONENTS IN THE AROMA OF VIRGIN OLIVE OIL. I. J.M. Olias, A. del Barrio and R. Gutiérrez (Instituto de la Grasa y sus Derivados. Sevilla) *Grasas Aceites (Seville)* **28**, 107–12 (1977). The volatile components in the aroma of a virgin olive oil, swept by nitrogen, collected on active carbon and extracted with carbon disulphide are isolated and identified by gas-liquid chromatography and mass spectrometry. Thirteen hydrocarbons, nine alcohols, three aldehydes, three ketones, five esters and one ether are identified.

STUDY OF STEROLIC COMPOSITION OF ARGENTINE OLIVE OILS. L.C.F. de Wetzler, M.C.Z. de Frigiotti and R.A. Macchi (Departamento de Technologia de los Alimentos. Instituto Nacional de Tecnologia Industrial. Miguelete—Provincia de Buenos Aires—Argentina) *Grasas Aceites (Seville)* **28**, 155–60 (1977). Sterolic composition of unsaponifiable of Argentine virgin olive oils (1973 season) is studied. The limit values found were: campesterol, 2.2–4.7%; stigmasterol, 0.8–2.9%; β-sitosterol, 93.7–96.2%; Δ 7-stigmastenol not detected; relation S = β-sitosterol/campesterol + stigmasterol, 15–25. Not important differences are found between industrial and laboratory oils. Application to detect adulterations with sunflower oil are also studied; the assays confirm former results, since that to detect 5–10% of sunflower oil additions is possible.

• Biochemistry and Nutrition

TRIGLYCERIDE LOWERING EFFECT OF SOMATOSTATIN AND ITS ANALOGUES. V. Schusdziarra, M. Brown, J. Rivier, W. Vale, R. Dobbs, P. Raskin and R.H. Unger (Veterans Admin. Hospital, 4500 South Lancaster Road, Dallas, Texas). *FEBS Letters* **79**, 133–4 (1977). Clinical interest in the possible use of somatostatin (SS) to inhibit glucagon secretion in diabetes mellitus has led to the search for analogs of SS with greater and/or more selective activities and with a prolonged biologic effectiveness. Several SS analogs with either a higher potency in suppressing insulin and glucagon secretion [D-Trp^{8}]-SS or a greater effect for inhibition of glucagon than insulin [D-Cys^{14}]-SS and [-Trp^{8}-D-Cys^{14}]-SS have now been developed. In the course of a study designed to compare the relative efficacies of the foregoing analogs as glucagon suppressants in alloxan diabetic dogs, it was noted that plasma samples were less turbid after a subcutaneous injection of the peptides than after a saline control. In order to test if there is an influence of SS and its analogs on postabsorptive triglyceride levels, we have measured plasma triglyceride levels in the plasma of insulin deprived fasted alloxan diabetic dogs after a single injection of SS, [D-Trp^{8}]-SS, [D-Trp^{8}-D-Cys^{14}]-SS, or saline, respectively.

EFFECT OF ALBUMIN ON PRODUCTS FORMED FROM CHYLOMICRON TRIACYLGLYCEROL BY LIPOPROTEIN LIPASE IN VITRO. R.O. Scow and T. Olivecrona (Sec. on Endocrinology, Lab of Nutr. and Endocrinology, Natl. Inst. of Arthritis, Metabolism and Digestive Diseases, Bethesda, Md.). *Biochim. Biophys. Acta* **487**, 472–86 (1977). The effect of albumin and Ca^{2+} on the action of purified bovine milk lipoprotein lipase on chylomicron triacylglycerol in vitro was studied with rat lymph chylomicrons containing triacylglycerol labeled with [^{14}C] oleic acid and [^{3}H] glycerol. Lipoprotein lipase hydrolyzed chylomicron triacylglycerol to mostly glycerol and fatty acids when incubated in medium containing sufficient albumin to bind all of the fatty acids formed. There was, however, transient accumulation of monoacylglycerol during the first 5 min of incubation. It is suggested that the latter represented monoacylglycerol undergoing isomerization with chylomicrons before being hydrolyzed to glycerol and fatty acid. The rate of hydrolysis of chylomicron triacylglycerol by liprotein lipase in vitro was related directly to the amount of enzyme added up to 1.7 μg (30 pmol) of enzyme per μmol of triacylglycerol. It was calculated that a nearly maximal rate was obtained when 43 molecules of enzyme were added per chylomicron.

PREDICTABLE CHANGES IN LOW DENSITY LIPOPROTEIN COMPOSITION AFTER ACUTE MYOCARDIAL INFARCTION. A.D. Sniderman and B. Teng (Royal Victoria Hosp., McGill Univ., Montreal, Quebec). *Atherselerosis* **27**, 361–8 (1977). Acute changes in low density lipoprotein cholesterol levels may be due to both a change in the number of LDL particles/ml of plasma and an alteration in the amount of cholesterol per LDL particle. Since LDL cholesterol levels are known to alter abruptly after myocardial infarction, the composition of LDL was determined in nine patients who suffered an uncomplicated transmural myocardial infarction. In six of these, LDL cholesterol levels fell whereas in three LDL cholesterol rose during the first nine days in hospital. The contents of B protein, free cholesterol, phospholipid, cholesterol ester and triglyceride in LDL were determined in the initial sample and the subsequent sample showing the greatest changes in LDL cholesterol level. These data are consistent with a pseudomicellar model of LDL in which the surface components are present in fixed amounts but the interior shell of cholesterol ester and triglyceride varies in an inverse relation depending on the absolute LDL concentration.

ANESTHETIC ACTION ON MEMBRANE LIPIDS. T.Y. Tsong, M. Greenberg, and M I. Kanehisa (Dept. of Physiol. Chem., The Johns Hopkins Univ. Schl. of Med., Baltimore, Md.). *Biochemistry* **16**, 3115–21 (1977). The kinetics of the transport of 8-anilino-1-naphthalenesulfonate (ANS) across membrane bilayers have been found to be sensitive to the physical state of the phospholipids. We have employed the transport reaction to probe the effect of local anesthetics and sedative hypnotics on synaptosomal and synthetic membranes. It is concluded that local anesthetics reduce the average size of the lipid culsters. This creates more phase boundaries and permits faster permeation of the dye molecules.

DIFFERENCES IN LIPID FLUIDITY AMONG ISOLATED PLASMA MEMBRANES OF NORMAL AND LEUKEMIC LYMPHOCYTES AND MEMBRANES EXFOLIATED FROM THEIR CELL SURFACE. W.J. Van Blitterswijk, P. Emmelot, H.A.M. Hilkmann, ELs P.M. Ommen-Meulemans and M. Inbar (The Netherlands Cancer Inst., Div. of Cell Biol., Amsterdam, The Netherlands). *Biochim. Biophys. Acta.* **467**, 309–20 (1977). The fluorescence polarization technique with 1,6-diphenyl 1,3,5-hexatriene as a probe was used to determine the lipid microviscosity, η, of isolated plasma membranes of mouse thymus-derived ascitic leukemia (GRSL) cells and of extracellular membraneous vesicles exfoliated from these cells and occurring in the ascites fluid. For comparison, η was also determined in isolated plasma membranes of normal thy-

mocytes and extracellular membranes of thymus cell supernatants. For isolated plasma membranes of thymocytes and GRSL cells η values at 25°C amounted to 4.67 and 3.28 P, respectively, which were higher than the microviscosities of the corresponding intact cells, 3.24 and 1.73 P, respectively. Liposomes of total extracts of plasma membranes and extracellular membranes of both cell types exhibited about the same microviscosity as the corresponding intact membranes, indicating virtually no contribution of (glyco)-protein to the lipid fluidity as measured by the fluorescence polarization technique.

EFFECTS OF COLIPASE ON HYDROLYSIS OF MONOMOLECULAR FILMS BY LIPASE. R. Verger, J. Rietsch, and P. Desnuelle (Centre de Biochem. et de Biol. Moleculaire du Centre Natl. de la Recherche Scientifique, 13274 Marseille Cedex 2, France). *J. Biol. Chem.* **252**, 4319–25 (1977). In a system free of bile salts we measured lipase hydrolysis of 1,3-didecanoylglycerol films in the presence or absence of colipase at different surface pressures. The strong, but not absolutely specific protective effect of colipase, most visible at low surface pressure, can account for the higher enzyme activity in the presence of colipase. This can be understood by taking into account simultaneous penetration and surface inactivation fluxes. Using radioactively labeled lipase, we have shown for the first time in a bile salt-free system that the critical surface pressure above which lipase can no longer penetrate a 1,2-didodecanoylphosphatidylglycerol monolayer is around 23 dynes/cm. Colipase increased this critical surface pressure to 30 dynes/cm indicating that it enables lipase penetration between 23 and 30 dynes/cm. The transfer experiment showed that colipase acts by first penetrating the lipid film and then serving as an anchor for lipase into the film.

EFFECT ON REGRESSION POTENTIAL OF ATHERSCLEROSIS PRODUCED BY INTERMITTENT OR CONTINUOUS HYPERCHOLESTEROLEMIA. W.D. Wagner and T.B. Clarkson (Arteriosclerosis Res. Center, Bowman Gray Schl. of Med., Wake Forest Univ., Winston-Salem, N.C.). *Atherosclerosis* **27**, 369–81 (1977). The feasibility of producing advanced or complicated atherosclerosis and the potential for regression of these lesions was studied in the White Carneau pigeon. Over a 14-month period, one group of White Carneau pigeons was fed an atherogenic or control diet alternating at two-month intervals to induce intermittent hypercholesterolemia as a means for producing advanced atherosclerosis. Another was fed an atherogenic diet for a continuous period of eight months to induce continuous hypercholesterolemia. After atherosclerosis induction, subgroups of animals were studied at four and eight months of lesion regression during which time control diets were fed to all animals. Intermittent hypercholesterolemia in White Carneau pigeons induced atherosclerosis that was charcterized by greater aortic cholesterol concentrations, lesions that were more fibrous and mineralized and lesions that showed a different pattern of regression than the atherosclerosis produced by continuous hypercholesterolemia.

EFFECTS OF LACTATION ON KETOGENESIS FROM OLEATE OR BUTYRATE IN RAT HEPATOCYTES. E. Whitelaw and D.H. Williamson (Metabolic Res. Lab., Nuffield Dept. of Clinical Med., Radcliffe Infirmary, Oxford 0 X2 6HE, U.K.). *Biochem J.* **164**, 521–8 (1977). Rates of ketogenesis from endogenous butyrate or oleate were measured in isolated hepatocytes prepared from fed rats during different reproduction states [virgin, pregnant, early-lactating (2–4 days) and peak-lactating (10–17 days)]. In the peak-lactation group there was a decrease (25%) in the rate of ketogenesis from butyrate, but there were no differences in the rates between the other groups. With oleate, the rate of ketogenesis was increased in the pregnant and in the early-lactation groups compared with the virgin group, whereas the rate was 50% lower in the peak-lactation group. Experiments with [1-^{14}C]oleate indicated that these differences in rates of ketogenesis were not due to alterations in the rate of oleate utilization, but to changes in the amount of oleoyl-CoA converted into ketone bodies. It is concluded that livers from rats at peak lactation have a lower capacity to produce ketone bodies from long-chain fatty acids which is due to an alteration in the partitioning of long-chain acyl-CoA esters between the pathways of triacylglycerol synthesis and β-oxidation. The physiological relevance of this finding is discussed.

A COMPARATIVE STUDY OF THE EFFECTS OF PALMITATE AND ACETATE FORMS OF VITAMIN A ON TOAD TADPOLES. S. Saxena and I.A. Niazi (Dept. of Zoology, Univ. of Rajastan, Jaipur 302 004, India). *Curr. Sci.* **46**, 148–9 (1977). The effects of palmitate and acetate of vitamin A were compared on the tadpoles of *Bufo andersonii* Boulenger of identical age in equal periods of time. Two age groups (4 and 7 days after hatching) were reared for 10 days in solutions containing 1–30 IU/ml of vitamin A ester. The older tadpoles were more tolerant than the younger ones. For both age groups, acetate was far more toxic than palmitate even in low concentration of vitamin A solutions. Mortality was higher with acetate. Growth of larve was retarded by both, more so by acetate. Severe haemorrhage, oedema and dipigmentation occurred with high concentration of palmitate but not of acetate and low concentrations of acetate.

EFFECT OF TYPE AND AMOUNT OF DIETARY FAT AND 1,2-DIMETHYLHYDRAZINE ON BILIARY BILE ACIDS, FECAL BILE ACIDS, AND NEUTRAL STEROLS IN RATS. B.S. Reddy, S. Mangat, A. Sheinfil, J.H. Weisburger, and E.L. Wynder (Div. of Nutr., Naylor Dana Inst. for Disease Prevention, American Health Foundation, Valhalla, N.Y.). *Cancer Res.* **37**, 2132–7 (1977). The effect of type (corn oil or lard) and quantity (5 or 20%) of dietary fat and 1,2-dimethylhydrazine (DMH) on the composition of biliary bile acids, fecal bile acids, and neutral sterols was studied in rats exposed to a given regimen for two generations prior to s.c. treatment with DMH for 20 weeks. Biliary excretion of total bile acids as well as cholic acid, β-muricholic acid, ursodeoxycholic acid, and deoxycholic acid was higher in rats fed a diet containing 20% corn oil or lard than it was in rats fed diets containing 5% corn oil or lard. Treatment of animals with DMH produced an increase in biliary total bile acids, cholic acid, hyodeoxycholic acid, and deoxycholic acid irrespective of diets. High-fat (corn oil or lard at 20% level) intake was associated with an increased excretion of fecal neutral sterols and bile acids.

LIPIDS OF THE ANAL SAC SECRETIONS OF THE RED FOX, VULPES VULPES, AND OF THE LION, PANTHERA LEO. E.S. Albone and T.O. Gronneberg (Dept. of Animal Husbandry and the Organic Geochemistry Unit, Schl. of Chem., Univ. of Bristol, Bristol, United Kingdom). *J. Lipid Res.* **18**, 474–9 (1977). Lion anal sac secretions were found to be richer in lipids and to contain more complex, less uniform mixtures of lower molecular weight lipids than anal sac secretions of the red fox. In the lion, homologous series of 1-alkylglycerols and 2-hydroxy-fatty acids were identified. Phenylacetic, 3-phenylpropionic, and related hydroxylated acids were also observed. Gas-liquid chromatography profiles of fox anal sac secretion lower molecular weight lipids were found to be less variable in their major constituents and to be dominated by relatively few large peaks, mainly fatty acids. Indole was also identified. Free cholesterol, and, occasionally stanols were observed in fox and lion secretions. In the red fox, total cholesterol levels averaged 0.93 mg/g, $n = 5$. Findings are discussed in histological and anatomical similarity relationships between anal sacs of the lion and the fox and in the context of the role of these secretions in chemical communication.

ION PERMEATION ACROSS THE BILAYER OF ANNEALED PHOSPHATIDYLCHOLINE VESICLES AT ELEVATED TEMPERATURES. CONCENTRATION DEPENDENCE AND THE MICELLE-BILAYER DYNAMIC EQUILIBRIUM. R. Lawaczeck, R. Blackman and M. Kainosho (Arthur Amos Noyes Lab. of Chemical Physics, California Inst. of Technology, Pasedena, California). *Biochim. Biophys. Acta* **468**, 411–22 (1977). The relative stability of the lipid bilayer toward ions above the crystalline to liquid-crystalline phase transition temperature has been studied under isotonic conditions for small annealed vesicles of dilauroyl (DLPC), dimyristoyl (DMPC), dipalmitoyl (DPPC), and distearoyl (DSPC) phosphatidylcholine by using lanthanide ions as a probe. The bilayer stability increased as the chain length of the lipid fatty acid increased, and a rapid translocation of ions across the bilayer started at about 60, 70, and 80°C for DMPC, DPPC and DSPC vesicles, respectively. The bilayer of DLPC vesicles is apparently permeable for the tested ions even at room temperature. Firstly, the ion leakage occurred in an "all-or-nothing" fashion, i.e. as soon as the vesicles start to become permeable toward ions. The concentration of ions in the intra and extravesicular media are equalized within a short time. Secondly, the rate of the relative number of inward facing lipid molecules which become exposed to extravesicularly added paramagnetic lanthanide is a function of the inverse phosphotidylcholine concentration.

THE INTERACTION OF IONS WITH PHOSPHATIDYLCHOLINE BILAYERS. H. Hauser, C.C. Hinckley, J. Krebs, G.A. Levine,

M.C. Phillips and R.J.P. Williams (Inorganic Chem. Lab., Univ. of Oxford, South Parks Rd., Oxford, England). *Biochim. Biophys. Acta* **468**, 364–77 (1977). The interactions of lanthanides and other cations with phosphatidylcholine bilayers present as single bilayer vesicles in ^2H_2O has been investigated in terms of stoichiometry, apparent binding constants and environmental conditions. Lanthanides are shown to form 2:1 (molar ratio) phosphatidylcholine to metal ion complexes. The apparent binding constant K_b varies as a function of the quantity of metal ion bound and as a function of the quantity of the Cl^- concentration. The apparent binding constant at zero loading is $K_0 = 1.25 \cdot 10^4 L^2 \cdot M^{-2}$ at 0.15 M KCl. It decreases exponentially with increased "loading" expressed as the molar ratio of metal ion bound to effective phosphatidylcholine concentration and increases with Cl^- concentration.

HALOTHANE FLUORINE-19 NUCLEAR MAGNETIC RESONANCE IN DIPALMITOYLPHOSPHATIDYLCHOLINE LIPOSOMES. L.S. Koehler, E.T. Fossel and K.A. Koehler (Anesthesiology Dept., Univ. of North Carolina, Div. of Health Affairs, Chapel Hill, North Carolina 27514). *Biochemistry* **16**, 3700–7 (1977). The ^{19}F nuclear magnetic resonance (NMR) spectrum of halothane in aqueous buffer containing unsonicated dipalmitoylphosphatidylcholine (PC) liposomes appears as a sharp doublet with a significantly broadened base. At high PC:halothane ratios, the halothane signal is broad and no spin-spin splitting is observed. Thus, the species involved appear to be halothane freely mobile and in the aqueous state and halothane significantly immobilized in association with PC. The exchange rate between these species is slow on the NMR time scale. Gadolinium (III) chloride causes substantial line broadening of the halothane ^{19}F doublet in the presence of phosphatidylcholine liposomes. In the absence of liposomes, gadolinium (III) chloride has no effect on the halothane ^{19}F resonances. These observations indicate that halothane and these paramagnetic metals coexist at the liposome surface and that the halothane molecules in the bulk phase rapidly exchange with surface oriented anesthetic molecules. These results are interpreted in terms of an hypothesis involving an effect of halothane/temperature on the environment of halothane in the PC bilayer.

AN ELECTRON SPIN RESONANCE STUDY OF CHOLESTANE SPIN LABEL IN AQUEOUS MIXTURES OF BILIARY LIPIDS. R.D. Stevens (Dept. of Medicine, Div. of Gastroenterology, Duke Univ. Medical Cntr., Durham, North Carolina 27710). *J. Lipid Res.* **18**, 417–22 (1977). The effect of cholesterol on fluidity of the phospholipid matrix in mixed micelles derived from bile salts and lecithin has been determined by the paramagnetic probe technique. It was found that the corrolation times for the cholestane spin label were discontinuous functions of cholesterol content and that these discontinuities correlate with the equilibrium solubility limit for cholesterol in this quaternary system. The origin of these discontinuities is attributed to the existence of another aggregate in addition to the disc-shaped mixed micelle in lipid solutions supersaturated with cholesterol.

A THERMODYNAMIC STUDY OF THE PARTITION OF N-HEXANE INTO PHOSPHATIDYLCHOLINE AND PHOSPHATIDYLCHOLINE-CHOLESTEROL BILAYERS. S.A. Simon, W.L. Stone and P. Busto-Latorre (Dept. of Physiology and Anesthesiology, Duke Univ. Medical Cntr., Durham, North Carolina 27710). *Biochim. Biophys. Acta* **486**, 378–88 (1977). The partition coefficients of n-hexane from water to bilayers of dioleoyl phosphatidylcholine and egg lecithin were measured as a function of temperature. Over a 50°C temperature range, the partition coefficient decreased linearly with temperature. The addition of cholesterol (1:1 mol ratio) to those bilayers reduced the partition coefficient by, at most, a factor of 2.5 at 25°C. The thermodynamic transfer parameters so obtained were compared to those of bulk hydrocarbon liquids and sodium dodecyl sulphate micelles. The results indicate that a bulk hydrocarbon liquid is not a good model for the interior of a bilayer whereas sodium dodecyl sulphate has approximately the same thermodynamic transfer parameters as egg lecithin.

COMPONENTS OF 25-HYDROXYVITAMIN D IN SERUM OF YOUNG CHILDREN IN UPPER MIDWESTERN UNITED STATES. S.B. Arnaud, M. Matthusen, J.B. Gilkinson and R.S. Goldsmith (Dept. of Pediatrics and Medicine, the Gastroenterology Unit and the Mineral Research Laboratory, Mayo Clinic and Mayo Foundation, Rochester, Minnesota). *Am. J. Clin. Nutr.* **30**, 1082–6 (1977). The relative importance of cholecal-ciferol and ergocal-ciferol in maintaining the vitamin D level in children (½ to 6 years old) living in the upper midwestern United States was determined by measurement of total 25-hydroxyvitamin D, its components and other indices of calcium homeostasis in serum. In 38 normal children (mean range: 35.2, 17 to 51 ng/ml in summer and 51.9, 5 to 32 ng/ml in winter) was not accompanied by changes in the means serum 25-OH-D_2, calcium, phosphorus, or alkaline phosphatase values. Sources of D_3, which include both dermal synthesis and intestinal absorption of D_3 added to milk, appear to be more important than sources of D_2 in maintaining vitamin D nutrition of young children through out the year. However, sources of D_2 offset the decrease in total 25-OH-D in winter months.

LIPID METABOLISM IN INFECTION[1–4]. G.L. Blachburn (Harvard Schl. of Medicine, Boston, Massachusetts 02215). *Am. J. Clin. Nutr.* **30**, 1321–32 (1977). Lipid metabolism is affected in a variety of ways during infection, depending on the causative agents. This interaction is further modulated by the nutritional status of the host and the severity of the infection. The most profound effects occur with gram-negative bacterial infections, endotoxemia, and sepsis. The duration and the severity of the infection, fever and age represent important variables. The major lipid changes involve triglycerides, free fatty acids, and ketone bodies, the partially oxidized products of fatty acids by the liver. The changes in phospholipids and cholesterol appear to be trivial with respect to the survival mechanisms of the host. Elevated triglyceride concentrations during infection are primarily caused by impaired lipoprotein lipolytic activity. The level of free fatty acids is the result of the interplay of the anti-lipolytic action of insulin and fat mobilization effect on catecholamines. Dietary manipulations, particularly in amounts of glucose, also alter the contribution of free fatty acids to the total energy requirements.

ACTIONS OF 1α-HYDROXYVITAMIN D_3 AND 1, 25-DIHYDROXYVITAMIN D_3 ON MINERAL METABOLISM IN MAN. EFFECTS ON NET ABSORPTION OF PHOSPHORUS. A.S. Brickman, D.L. Hartenbower, A.W. Norman and J.W. Corburn (The Medical and Research Services, Veterans Admin. Hospital, Riverside, California). *Am. J. Clin. Nutr.* **30**, 1064–9 (1977). The effect of vitamin D sterols on intestinal absorption of phosphorus hasn't been extensively evaluated in man. By and large, restrictions in the use of radiophosphorus have limited observations to those obtained from metabolic balance methods. The present report describes the effects of treatment with 1, 25-dihydroxyvitamin D_3 or 1α-dihydroxyvitamin D_3 on net absorption of phosphorus in patients with advanced renal failure and in normal volunteers. The results indicate that these two analogs of vitamin D_3 can augment intestinal absorption of phosphorus in man.

FAILURE OF REGRESSION OF ATHEROSCLEROSIS IN DOGS WITH MODERATE CHOLESTEROLEMIA. R.G. DePalma, S. Koletsky, E.M. Bellon and W. Insull, Jr. (Dept. of Surgery, Pathology and Radiology, Case Western Reserve Univ. Schl. of Med., Cleveland, Ohio). *Atherosclerosis* **27**, 297–310 (1977). Controversy exists as to whether regression occurs in atherosclerotic plaques in response to serum cholesterol reduction. In the present study, using sequential observation of canine atherosclerosis, we attempted regression in hypothyroid dogs. Animals with established lesions prior to a regression attempt were placed on a 0.05% cholesterol diet and observed up to 60 months. Weighted average cholesterols ranged from 235 to 587 mg/100 ml during the regression attempt. A control fed for the entire period of the experiment, 75 months, had an average weighted cholesterol 435 mg/100 ml. We failed to obtain regression of atherosclerotic plaques in spite of reduction of serum cholesterol from high to moderate levels. The lesions in the experimental animals contained less lipid and more collagen and calcium than occurred in the control. Complicated plaques with aneurysm formation, stenosis of the distal aorta, and gangrene of the tail were also noted.

CALCIUM BINDING TO RAT HEART PLASMA MEMBRANES: ISOLATION AND PURIFICATION OF A LIPOPROTEIN COMPONENT WITH A HIGH CALCIUM BINDING CAPACITY. D.A. Feldman and P.A. Weinhold (Veterans Admin. Hospital and the Dept. of Biochem., The Univ. of Michigan-Ann Arbor, Ann Arbor, Michigan). *Biochemistry* **16**, 3470–5 (1977). A calcium binding lipoprotein component of rat heart plasma membrane was isolated, purified and characterized. The lipoprotein complex had an apparent molecular weight of 71,400. One mole of lipoprotein

contained 90 mol of phospholipid and 1 mol of a 12,300 molecular weight protein. The maximum calcium binding capacity was 4.27 μmole/mg of protein, which corresponded to 52 mol of calcium per mol of lipoprotein complex. Calcium binding was competively inhibited by a variety of metal ions and experimental antirrhythmic and anesthetic agents.

RATE EQUATIONS AND SIMULATION CURVES FOR ENZYMATIC REACTIONS WHICH UTILIZE LIPIDS AS SUBSTRATES. INTERACTION OF ENZYMES WITH THE MONOMERS AND MICELLES OF SOLUBLE, AMPHIPHILIC LIPIDS. S. Gatt and T. Bartfai (Lab. of Neurochemistry, Dept. of Biochemistry, Hebrew Univ.-Hadassah Medical Schl., Jerusalem, Israel). *Biochim. Biophys. Acta* **488**, 1–12 (1977). Theoretical aspects of the kinetics of interaction of enzymes with lipid substrates are presented. Rate equations were written and used to simulate v versus S curves for interaction of enzymes with "monomers" or micelles of the "soluble," amphiphilic lipids. The rate equations were written assuming separate kinetic parameters for the interaction of the enzyme with these two forms. Although the rate equations are based upon the kinetic theory of Michaelis and Menten, most of the simulated v versus S curves were not hyperbolic. A procedure is suggested for determining the kinetic parameters with the aid of a graphic method.

NUTRITION STUDIES IN THAILAND. EFFECTS OF THE FORTIFICATION OF RICE WITH LYSINE, THREONINE, THIAMIN, RIBOFLAVIN, VITAMIN A, AND IRON ON PRESCHOOL CHILDREN.[1-3] S.N. Gershoff, et al. (Dept. of Nutr., Harvard Schl. of Public Health, Boston, Massachusetts). *Am. J. Clin. Nutr.* **30**, 1185–95 (1977). From January 1971 to July 1977, a study of the effects of rice fortification was conducted in 29 villages with a population of approximately 13,500 in the province of Chiang Mai, Thailand. Three types of rice forification grains, added at the mills, were used. The children of the villages, when compared to the children of the middle-class were retarded in growth and development. At the conclusion of the study, approximately 2,250 children, ages 1½ to 9 years had been in the program for 1 to 4 years. The lack of effect of the nutrition intervention could not be contributed to the high prevalence of infectious disease. Although adequate quantities of the traditional foods were available to the children, it appeared probable that most of them did not meet their energy needs either because of the low caloric density or the lack of palatability of their diets.

HYPERALPHA- AND HYPOBETA-LIPOPROTEINEMIA IN OCTOGENARIAN KINDREDS. C.J. Glueck, P.S. Gartside, P.M. Steiner, M. Miller, T. Todhunter, J. Haaf, M. Pucke, M. Terrana, R.W. Fallat and M. L. Kashyap (Gen. Clin. Res. Cntr., Univ. of Cincinnati, Cincinnati, Ohio). *Atherosclerosis* **27**, 387–406 (1977). To assess factors related to distinctive longevity, lipoprotein and kindred studied were carried out in 22 octogenarian kindreds self-referred by virtue of either two siblings or a parent and child living to age 80 or over. There was evidence for familial hyperalphalipoproteinemia in 7 kindreds, for familial hypobeta-lipoproteinemia in 3 kindreds, and for primary hyperalpha-lipoproteinemia and hypobeta-lipoproteinemia in an additional 2 and 2 kindreds respectively. First degree relatives of probands with primary or familial hyperalpha- or hypobeta-lipoproteinemia had sharply reduced morbidity and mortality from myocardial infarction when compared to population controls, P 0.005. Longevity analysis in the 14 kindreds with hyperalpha- and hypobeta-lipoproteinemia revealed an average life expectancy for males and females respectively of 82 and 86 years, as compared to 71 and 75 years for males and females in the general population.

TREATMENT OF HYPERCHOLESTEROLEMIA. S.M. Grundy (The Univ. of California, and Veterans' Administration Hospital, San Diego, Ca.). *Am. J. Clin. Nutr.* **30**, 985–92 (1977). A relationship between plasma cholesterol concentrations and development of atherosclerosis is well established. This correlation has been shown in both experimental animals and in man. In a variety of animal species, cholesterol feeding produces hypercholesterolemia that is followed by development of atherosclerosis; in most instances, the degree of atherosclerosis parallels the rise in plasma cholesterol. The relation between plasma cholesterol and atherosclerosis also has been demonstrated in several ways for man. In populations in which plasma cholesterol levels are relatively high, the incidence of atherosclerotic disease is greater than in populations with low cholesterol concentrations. Also, in patients with familial hyperlipidemias, especially familial hypercholesterolemia, the risk for development of atherosclerotic complications is extremely high. Therefore, there is little question that high levels of plasma cholesterol are a risk factor for atherosclerosis; this relationship has been amply confirmed.

A COMPARATIVE STUDY OF SURFACE BINDING OF HUMAN LOW DENSITY AND HIGH DENSITY LIPOPROTEINS TO HUMAN FIBROBLASTS:REGULATION BY STEROLS AND SUSCEPTIBILITY TO PROTEOLYTIC DIGESTION. T. Koschinsky, T.E. Carew and D. Steinberg (Div. of Metabolic Disease, Dept. of Medicine, Univ. of California, San Diego, La Jolla, California 92093). *J. Lipid Res.* **18**, 451–8 (1977). Binding of ^{125}-I-low density lipoprotein (LDL) and ^{125}-I high density lipoprotein (HDL) was determined human fibroblasts from a normal subject and two subjects with homozygous familial hypercholesterolemia (HFH). Binding was assayed at 0°C to minimize the internalization of labeled lipoproteins. The binding of LDL and HDL were compared following interventions reported to affect LDL binding in normal fibroblasts. These results suggest that the HDL binding sites on normal fibroblasts are for the most part distinct from LDL binding sites. They also support the conclusion that LDL binding sites on HFH cells are for the most part qualitatively different from those on normal cells.

DIFFERENTIAL CHARACTERISTICS OF PURIFIED HEPATIC TRIGLYCERIDE LIPASE AND LIPOPROTEIN LIPASE FROM HUMAN POSTHEPARIN PLASMA. M.L. Baginsky and W.V. Brown (Dept. of Medicine, Schl. of Medicine, Univ. of California, San Diego and La Jolla, California 92093). *J. Lipid Res.* **18**, 423–37 (1977). Evidence is presented that hepatic triglyceride lipase and lipoprotein lipase, purified from human postheparin plasma, can each hydrolyze both glyceryl trioleate and palmitoyl-CoA. The average ratio of glyceryl trioleate/palmitoyl-CoA hydrolase activities, obtained with enzyme preparations from 15 human postheparin plasma samples was 1.30 for H-TGL and 8.75 for LPL. Albumin was identified as the serum cofactor required for the hydrolysis of palmitoyl-CoA by H-TGL. It protected this enzyme from inactivation by this substrate. In contrast, the palmitoyl-CoA activated and protected LPL from denaturation by dilution and incubation at 25°C. The very dissimilar effects of detergents on preparations on H-TGL and LPL may form the basis for the direct assay of each enzyme in the presence of the other.

FAT METABOLISM IN NORMAL AND ABNORMAL STATES. E.J. Masoro (Dept. of Physiology, The Univ. of Texas Health Cntr., San Antonio, Texas 78284). *Am. J. Clin. Nutr.* **30**, 1311–20 (1977). Various aspects of the use of fatty acids as fuel in normal and abnormal states are described. The discussion includes the use of dietary lipid as fuel, the functioning of adipose tissue as a fuel reservoir, the use of free fatty acids mobilized from adipose tissue as fuel, the liver as a source of lipid metabolism to fasting and exercise are reviewed. Finally, selected data on the current effects of infections on the use of lipids as fuels are considered in relation to our current knowledge of lipid metabolism.

INSENSITIVITY OF LARGE RAT ADIPOCYTES TO THE ANTILIPOLYTIC EFFECTS OF INSULIN. J.M. Olefsky (Stanford Univ, Schl. of Medicine, S-001 Medical Cntr., Dept. of Medicine, Stanford, California 94305). *J. Lipid Res.* **18**, 459–64 (1977). The ability of insulin to inhibit epinephrine-stimulated lipolysis was compared in large and in small rat adipocytes. Large cells were obtained from older, obese animals and small cells were obtained from younger, leaner animals. Insulin markedly inhibits hormone-stimulated lipolysis in adipocytes, and this effect provides another convenient system in which to assess insulin sensitivity in these cells. In these studies we have compared insulin's antilipolytic effects in large and small adipocytes and have found that, while maximal antilipolytic effects are comparable in both groups of cells, the large cells are less sensitive to submaximal concentrations of insulin.

CYCLIC 3′:5′-NUCLEOTIDE PHOSPHODIESTERASE. STIMULATION OF BOVINE BRAIN CYTOPLASMIC ENZYME BY LYSOPHOSPHATIDYLCHOLINE. Anne-Lise Pichard and Wai Yiu Cheung (Dept. of Biochem., St. Jude Children's Research Hospital and the Univ. of Tennessee Cntr. for the Health Sciences, Memphis, Tennessee). *J. Biol. Chem.* **25**, 4872–5 (1977). Brain cytoplasmic cyclic 3′:5′-nucleotide phosphodiesterase requires an endogenous Ca^2-binding protein for full activity. We now show that lysophosphatidylcholine also effectively enhances activator-deficient phosphodiesterase activity. Stimulations by both ligands was immediate and reversible; both rendered the enzyme more thermally labile, decreased the energy of

activation, and increased the V_{max} of phosphodiesterase without affecting its apparent K_m for adenosine 3':5'-monophosphate. However, the cofactor requirements of the two ligands were different. Although the protein activator gave a greater stimulation than lysophosphatidylcholine, the simultaneous presence of the two gave a stimulation comparable to lysophosphatidylcholine, suggesting that the effect of the latter was predominant. Phosphodietserase was also stimulated by oleic acid, cardiolipin, and phosphatidylinositol, albeit to a less extent.

STUDIES OF EFFECTS OF TRANS FATTY ACIDS IN THE DIET ON LIPID METABOLISM IN ESSENTIAL FATTY ACID DEFICIENT RATS. O.S. Privett, F. Phillips, H. Shimasaki and E.C. Nickell (The Hormel Inst., The Univ. of Minnesota, Austin, Minnesota). *Am. J. Clin. Nutr.* **30**, 1009–17 (1977). Effects of diets containing mixtures of safflower oil, hydrogenated coconut oil with elaidate or linolelaidate on growth, fatty acid composition, serum lecithin:cholesterol acyl transferase (LCAT) and postheparin plasma lipoprotein lipase activities in essential fatty acid (EFA) deficient rats were determined. It is suggested that trans fatty acids exhibit particular effects on the metabolism of lipids in addition to aggravation of an EFA deficiency.

EXCHANGE OF CYTOCHROME b_5 BETWEEN PHOSPHOLIPID VESICLES. M.A. Roseman, P.W. Holloway, M.A. Calbro, T.E. Thompson (Dept. of Biochem., Univ. of Virginia Schl. of Medicine, Charlottesville, Virginia). *J. Biol. Chem.* **14**, 4842–9 (1977). Detergent-extracted cytochrome b_5, which binds readily to phosphatidylcholine vesicles, has been shown to exchange between vesicles by the following experiments. When preformed cytochrome b_5 vesicle complexes are incubated with fresh vesicles a new species arises which sediments in the analytical centrifuge with a rate intermediate between those of the original components. When the same mixture is subjected to free boundary electrophoresis no slow moving component corresponding to pure vesicles is seen. The results of sucrose density gradient centrifugation are also consistent with the conclusion that cytochrome b_5 exchanges between vesicles. The possibility that the above results were produced by vesicle fusion of aggregation was eliminated by light-scattering studies and a direct assay for vesicle fusion. The ability of cytochrome b_5 to exchange between lipid structures has important implications not only in the cytochrome b_5-lipid system but also in enzymatic reactions in which cytochrome b_5 is involved.

ELECTRON MICROSCOPIC STUDIES OF THE ASSEMBLY, INTRACELLULAR TRANSPORT, AND SECRETION OF CHYLOMICRONS BY RAT INTESTINE. S.M. Sabesin and S. Frase (Div. of Gastroenterology, Dept. of Tennessee Cntr. for the Health Sciences and V.A. Hospital, Memphis, Tennessee). *J. Lipid Res.* **18**, 496–511 (1977). A detailed ultrastructural investigation of the assembly, intracellular transport, and secretion of chylomicrons by rat proximal jejunal intestinal cells was performed in rats fed corn oil. Following fat feeding the smooth endoplasmic reticulum of the absorptive cells become laden with triglyceride droplets which are transported through channels of the endoplasmic reticulum to the Golgi apparatus. The Golgi zones become extremely prominent due to the accumulation of osmiophilic droplets, similar in size and configuration to chylomicrons, within proliferated Golgi vesicles. Golgi-derived secretory vesicles, containing nascent chylomicrons, migrate towards the lateral cell membrane. The secretory vesicle membranes fuse with the lateral plasmalemma and nascent chylomicrons are then discharged into the intracellular spaces. Alterations of specific domains of the secretory vesicles were prominent appearing as coated pits. These observations indicate that nascent chylomicrons accumulate within Golgi vesicles as a prerequisite to secretion and that secretion occurs by exocytosis resulting in the release of nascent chylomicrons from secretory vesicles.

CORRELATION BETWEEN LIPID SYNTHESIS IN TUMOR CELLS AND THEIR SENSITIVITY TO HUMORAL IMMUNE ATTACK. S.I. Schlager and S.H. Ohanian (Lab. of Immunobiology, Natl. Cancer Inst., Natl. Inst. of Health, Bethesda, Maryland, 20014). *Science* **197**, 773–5 (1977). Prolonged incubation of two antigenically distinct, chemically induced guinea pig hepatomas with relatively high concentrations of chemotherapeutic drugs or metabolic inhibitors increases their susceptibility to killing by antibody and complement. This effect is reversible when the cells are cultured in the absence of drugs. The drug-induced sensitivity and the ability of the cells to recover their resistance to killing are directly correlated to their ability to synthesize complex lipids.

BINDING OF URANYL TO PHOSPHATIDYLCHOLINE LIPOSOMES. LIPOSOME AGGREGATION EFFECT ON SURFACE AREAS. S.E. Schullery and R.H. Miller (Chem. Dept., Eastern Michigan Univ., Ypsilanti, Michigan 48197). *Biochim. Biophys. Acta* **468**, 451–60 (1977). The binding of uranyl ion, UO^{2+}_2, to egg phosphotidylcholine liposomes was studied as a potential method for the determination of liposome surface areas. Unbound uranyl was determined spectrophotmetrically as the Arrenazo III complex with centrifuge supernatant. There is an apparent positive cooperativity in uranyl binding at phosphatidylcholine concentrations above approximately 0.1 mM. The binding capacity per mol increases upon liposome dilution. The data are consistent with liposomes existing in a highly aggregated state. The binding constant in the limit of low concentration of bound uranyl was $(9 \pm 3) \cdot 10^6\ M^{-1}$ in 0.1 M NaCl, pH 4.1. At saturation about four uranyl ions are bound per 100 phosphatidylcholine molecules. Relative surface areas of different dispersions may be calculated from intercepts of interpolated binding isotherms, and absolute surface areas may be calculated if a value for the uranyl-phosphatidylcholine stoichiometry is assumed.

DIRECT TRANSESTERFICATION OF LIPIDS IN MAMMALIAN TISSUE FOR FATTY ACID ANALYSIS VIA DEHYDRATION WITH 2, 2'-DIMETHOXYPROPANE. H. Shimasaki, F.C. Phillips and O.S. Privett (The Hormel Institute, Univ. of Minnesota, Austin, Minnesota 55912). *J. Lipid Res.* **18**, 540–3 (1977). A method is described for the transesterification of lipids of mammalian tissues for fatty acid analysis by gas-liquid chromatography (GLC) that eliminates the extraction step of conventional procedures. The method involves the direct reaction of anhydrous HCL-methanol with the lipids in approximately 10 mg of tissue or 0.1 ml of serum after removal of water by reacting it with 2, 2'-dimethoxypropane (DMP). Acetone and methanol produced from water in the sample, as well as the excess DMP, are evaporated prior to transesterification in order to eliminate the formation of artifacts from the solvents. The method was demonstrated with rat serum and brain tissue.

THE GROWTH CHARACTERISTICS OF NOVIKOFF HEPATOMA CELLS IN THE PRESENCE OF DIFFERENT FATTY ACID:ALBUMIN RATIOS. W. Steele and H.M. Jenkins (The Hormel Inst., The Univ. of Minnesota, 801 16th Avenue N.E., Austin, Minnesota 55912). *Proc. Soc. Exp. Biol. Med.* **155**, 405–9 (1977). The growth characteristics of Novikoff hepatoma cells can be altered by varying the amount of albumin or by altering the ratio of certain long-chain fatty acids:albumin in the growth medium.

A COMPARISON OF INSULIN BINDING BY LIVER PLASMA MEMBRANES OF RATS FED A HIGH GLUCOSE DIET OR A HIGH FAT DIET. J.V. Sun, H.M. Tepperman and J. Tepperman (Dept. of Pharmacology, State Univ. of New York Upstate Medical Center, Syracuse, New York). *J. Lipid Res.* **18**, 533–9 (1977). The interaction of ^{125}I-labeled insulin with purified liver plasma membrane from rats fed a high fat (L) diet or a high glucose (G) diet was studied with respect to specific binding, insulin degradation, binding site degradation, and the rate of hormone association and dissociation. Scatchard analysis suggested the presence of high and low affinity binding sites for membranes of both G and L diet-adapted rats. However, liver plasma membranes from rats fed the high glucose diet bound 50% more insulin than did membrane from fats fed the high fat diet. Diet did not change insulin site degradation. The results suggested that an apparently reduced number of insulin binding sites associated with fat feeding as compared to glucose feeding was responsible for reduced insulin binding by membrane from rats fed the high fat diet. These results suggested that diet can modify the plasma membrane glycoproteins.

LIPIDS IN THE EXTERIOR STRUCTURES OF HEN EGGS. K. Suyama, H. Nakamura, M. Ishida, S. Adachi (Lab. of Animal Products Technology, Faculty of Ag., Tohoku Univ., Sendai, Japan). *J. Agric. Food Chem.* **25**, 799–803 (1977). Studies are reported on the composition of lipids of shell with cuticle (SC) and shell membrane (SM) from hen egg. Total lipids were approximately 0.045% of SC and 1.35% of SM. The ratios of neutral lipid to polar lipid in SC and SM were 5:1 and 6:1, respectively. The neutral lipid fractions of SC and SM were found to contain mono-, di-, and triglyceride, cholesterol,

cholesteryl ester, and free fatty acid as well as fairly large amounts of bis(2-ethyl hexyl) phthalate. The major neutral lipid (excluding the phthalates) was cholesterol, and the levels of triglyceride were very low in the neutral lipids of SC and SM. The polar lipid fractions of SC and SM were found to contain very low levels of phosphatidylethanolamine and phosphatidylcholine. The predominant phospholipid were sphingomyelin. Significant amounts of ceramide mono- and dihexoside were also detected in the polar lipid fractions of SC and SM. At least 17 different fatty acids were present in SC and SM lipids. The level of linoleic acid was higher in SM than in SC neutral lipid. The fatty acid distributions of polar lipids of SC and SM were similar.

TOCOPHEROLS IN CANNED ENTREES AND VENDED SANDWICHES. H.H. Koehler, H. Chae'eun Lee, and M. Jacobson (Home Economic Research Center, Washington State University, Pullman). *J. Am. Diet. Assoc.* **70,** 616 (1977). Determination was made of alpha-, beta-plus-gamma-, and delta-tocopherol contents of brand-name canned entrées from a supermarket and from vending machines on a college campus, of several home-prepared entrées, and of sandwiches from vending machines in Spokane, Washington. Amounts of total tocopherols in canned entrées were small, ranging from none detected to 0.66 mg. per 100 g. food. Similar home-prepared entrées, however, contained 0.41 mg. to 1.55 mg. Tocopherols in vended sandwiches ranged from 0.05 mg. to 1.86 mg. per 100 gm. sandwich. Results are also expressed as total tocopherols per serving (I.U.). These convenience foods contribute only a small amount to the day's intake of vitamin E. ●

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