Calendar

tion Annual Meeting, Aug. 10-12, 1980, The Lodge at Pebble Beach, Pebble Beach, CA. Contact: Barbara Harrelson, Special Projects Director, National Soybean Processors Association, 1800 M Street, NW, Washington, DC 20036. (tele: 202-452-8040).

22nd Annual Rocky Mountain Conference, Spectroscopy/Chromatography, Aug. 11-14, 1980, sponsored by Rocky Mountain Society of Applied Spectroscopy and Rocky Mountain Chromatography Discussion Group, Denver Convention Complex, Denver, CO. Contact: Keith J. Grossaint, Publicity Chairman, Rocky Flats Plant, Energy Systems Group, PO Box 464, Golden, CO 80401.

Second Chemical Congress of the North American Continent, exposition and meeting of the American Chemical Society, August 24-29, 1980, San Francisco, California.

International Symposium on Food Technology in Developing Countries, sponsored by the Department of Food Science & Technology, Universiti Pertanian Malaysia, Aug. 26-28, Kuala Lumpur, Malaysia. Contact: The Organizing Secretary, International Symposium on Food Technology in Developing Countries, Department of Food Science & Technology, University of Agriculture, Malaysia (Universiti Pertanian Malaysia), Serdang, Selangor, Malaysia.

September

Chemical Marketing Research Association, Sept. 21-24, 1980, Doral, Country Club, Miami, Florida, Contact: CMRA, 139 Chestnut Ave., Staten Island, New York, 10305.

Eleventh International Federation of Societies of Cosmetic Chemists Congress, Sept. 23-27, 1980, Venice, Italy.

1980 Conference on International Cosmetic Regulations, Venice, Italy, Sept. 27, 1980, sponsored by the International Federation of Societies of Cosmetic Chemists.

October

International Symposium on Energy and Food Industry, Oct. 6-8, 1980, sponsored by the Commission Internationale des Industries Agricoles et Alimentaires (CIIA) and the International Union of Food Science and Technology (IUFoST), in cooperation with the Spain Ministry of Agriculture, Madrid, Spain. Contact: Direcion General de Industrias Agrarias (Simposio 80). Ministerio de Agricultura, Paseo Infanta Isabel 1-Madrid 7, Spain (information in Spanish) or CIIA, C.P. 470-08, 75366 Paris Cédex 08, France. (Information in language other than Spanish).

Joint Symposium on Stationary Combustion NO_X Control, Oct. 6-9, 1980, sponsored by the U.S. Environmental Protection Agency (EPA) and the Electric Power Research Institute, Denver, CO. Contact: Keith Bentz, Acurex Corp., 485 Clyde Ave., Mountain View, CA 94042 (tele: 415-964-3200).

"Formulation for and Utilization of Pigment Dispersion Equipment," Oct. 7, 1980, presented by the Manufacturing Committee of the Cleveland Society for Coatings Technology, Cleveland Engineering and Scientific Center, Cleveland, OH. Contact: Girish Dubey, Cambridge Coatings, Inc., 5461 Dunham Rd., Cleveland, OH 44137 (tele: 216-475-3800).

Association of Official Analytical Chemists Annual Meeting, Oct. 19-23, 1980, Marriott Twin Bridges Hotel, Washington, DC. Contact: AOAC, Box 540 Benjamin Franklin Station, Washington, DC 20044.

International Week of Engineering, Oct. 19-25, 1980, sponsored by the Mexican Federation of Engineering Societies, Mexico City, Mexico. Contact: Julie Gibouleau, American Association of Engineering Societies, 345 E. 47th St., 3rd Floor, New York, NY 10017.

Symposium: "Sensory Evaluation of Product Performance," Oct. 20-22, 1980, sponsored by the Society of Cosmetic Chemists, Hilton Hotel, Stratford-upon-Avon, England. Contact: M. Callingham, 56 Kingsway, London WC2B 6DX, England.

Instrumentation of the 80s – A Decade of Challenge, Oct. 20-23, 1980, sponsored by the Instrument Society of America, Houston, TX. Contact: ISA, 400 Stanwix St., Pittsburgh, PA 15222 (tele: 412-281-3171).

"Three R's for the 80's: Research, Resources, and Regulations," Annual Meeting of the Federation of Societies for Coatings Technology, held jointly with the Paint Industries' Show, Oct. 29-31, 1980, Civic Center, Atlanta, GA. Contact: Hugh Lowrey, Federation of Societies for Coatings Technology, 1315 Walnut St., Suite 830, Philadelphia, PA 19107.

National Lubricating Grease Institute Annual Meeting, Nov. 2-5, 1980, Royal Sonesta, New Orleans, LA. Contact: J. Penrod, NLGI, 4635 Wyandotte St., Kansas City, MO 64112.

Bold face indicates new listing.

Abstracts

Fats and oils

INFLUENCE OF ORAL POLYUNSATURATED AND SATURATED PHOSPHOLIPID TREATMENT ON THE LIPID COMPOSITION AND FATTY ACID PROFILE OF CHIMPANZEE LIPOPROTEINS. M. Rosseneu, B. Declercq, D. Vandamme, R. Vercaemst, F. Soetewey, H. Peeters, and V. Blaton (Algemeen Ziekenhuis Sint Jan, Ruddershove, B-8000 Brugge, Belgium) *Atherosclerosis* 32, 141–53 (1979). The influence of treatment with polyunsaturated lecithin (EPL) and with saturated lecithin on the lipoprotein composition and fatty acid profile was investigated in 4 male chimpanzees. The animals were successively given 3 isocaloric diets containing the same amount of fat with a degree of saturation varying from 1 in the control diet to 0.2 in the diet enriched with polyunsaturated lecithin, to 4 in the diet enriched with saturated lecithin. The saturated lecithin treatment increases the plasma VLDL and LDL concentrations and the triglyceride levels and increases mostly the saturation ratio of the cholesterol esters. These effects are likely to enhance the progression of atherosclerosis.

^{13}C-^{12}C ANALYSIS OF VEGETABLE OILS, STARCHES, PROTEINS, AND SOY-MEAT MIXTURES. J. Gaffney, A. Irsa, L. Friedman, and E. Emken (Chem. Dept., Brookhaven Nat'l. Lab., Upton, NY 11973) *J. Agric. Food Chem.* 27(3),475-8 (1979). The ^{13}C-^{12}C ratios for a number of vegetable oils, starches, and proteins have been determined. As expected, the values for animal proteins reflect

the animals' diet. The possible application of using ^{13}C-^{12}C analysis in differentiating corn-fed animal protein (C_4 plant) from soy protein (C_3 plant) in soy-meat mixtures is discussed.

A CONVENIENT PREPARATION OF PURE STEAROYL-2-LACTYLIC ACID. C.A. Elliger (Western Reg. Res. Lab., Science and Education Admin., U.S. Dept. of Agriculture, Berkeley, CA 94710) *J. Agric. Food Chem. 27*(3),527-8 (1979). A preparation of pure stearoyl-2-lactylic acid is described in which benzyl lactylate is allowed to react with stearoyl chloride. The benzyl ester, a key intermediate, is prepared from lactide and benzyl alcohol.

THE CRYSTAL STRUCTURE OF CHOLESTERYL OLEATE. B.M. Craven and N.G. Guerina (Crystallography Dept., Univ. of Pittsburgh, Pittsburgh, PA 15260) *Chem. Phys. Lipids 24*(1),91-8 (1979). Crystals of cholesteryl oleate ($C_{45}H_{78}O_2$) are monoclinic, space group $P2_1$, with a=12.65(3), b=9.13(3), c=18.79(5)Å, β=93.3(3)° and have 2 molecules in the unit cell. The crystal structure has been determined by Patterson and Fourier methods at a resolution d_{min}=1.1Å, using 799 X-ray intensities (Cu-Kα) measured by a diffractometer. Structure refinement by block-diagonal least squares gave R=0.12. The oleate chains are almost straight except for a kink at the *cis*-double bond. The chains pack side by side but without a regular sub-cell structure, in a manner which might be similar to the arrangement within biological membranes. As in cholesteryl octanoate, the cholesteryl ring systems pack together with extensive overlap of anti-parallel nearest neighbours. Projecting methyl groups interlock.

CHEMISTRY OF SINGLET OXYGEN. 30. THE UNSTABLE PRIMARY PRODUCT OF TOCOPHEROL PHOTOOXIDATION. R.L. Clough, B.G. Yee, and C.S. Foote (Dept. of Chem., Univ. of Calif., Los Angeles, CA 90024) *J. Am. Chem. Soc. 101*(3),683-6 (1979). α-Tocopherol (vitamin E) reacts with singlet molecular oxygen both by a quenching process and by irreversible reaction to give products, and this scavenging action may be one mode of its biological antioxidant function. We have investigated the photooxidation of α-tocopherol at low temperature and identified the primary product as the modestly stable *hydroperoxydienone* (6). The structure of 6 has been characterized by IR, UV, ^1H and ^{13}C NMR, and mass spectroscopy.

RAMAN SPECTRAL ANALYSIS OF THE 1300 CM^{-1} REGION FOR LIPID AND MEMBRANE STUDIES. M. Butler, N. Salem, Jr., W. Hoss, and J. Spoonhower (Center for Brain Res., Univ. of Rochester School of Medicine and Dentistry, Rochester, NY) *Chem. Phys. Lipids 24*(1),99-102 (1979). The Raman spectra of fatty acids, fatty acid methyl esters and several membrane lipids are analyzed in the 1300 cm^{-1} region. The ratio of peak intensities at 1303/1267 cm^{-1} varies linearly with the ratio of methylene to vinyl groups in the hydrocarbon chain. This parameter should be useful for estimating the degree of unsaturation in isolated lipids and lipids in membranes.

DETERMINATION OF FREE CHOLINE AND PHOSPHORYLCHOLINE IN RAT LIVER. A.J. Barak and D.J. Tuma (Liver Study Unit, Veterans Admin. Hosp., Omaha, NE) *Lipids 14*, 304-8 (1979). A simple procedure for the determination of levels of free choline and phosphorylcholine in hepatic tissue is outlined. The method makes use of the enzyme acid phosphatase to liberate choline from phosphorylcholine and incorporates the ability of choline to react with potassium triiodide to yield choline periodide for the measurement of choline and phosphorylcholine in liver. For phosphorylcholine, the method is markedly simpler than other methods previously described and the results for normally fed rats are of the same order of magnitude. The applicability of the method was shown when it was demonstrated that diets containing different amounts of choline influenced the level of choline and phosphorylcholine in liver.

SIMULTANEOUS DETERMINATION OF VITAMIN A ACETATE, VITAMIN D_2, AND VITAMIN E ACETATE IN MULTIVITAMIN TABLETS BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY WITH COUPLED COLUMNS. S.A. Barnett and L.W. Frick (Mead Johnson & Co., 2404 Pennsylvania Ave., Evansville, IN 47721) *Anal. Chem. 51*(6),641-54 (1979). A reverse phase high performance liquid chromatographic method for the simultaneous determination of vitamin A acetate (retinol acetate), vitamin D_2 (ergocalciferol) and vitamin E acetate (d,l-α-tocopherol acetate) in multivitamin mineral tablets has been developed. The method requires dissolution of the sample in water-ethanol-pyridine solution (50:46:4), extraction of the vitamins into warm hexane, addition of cholesterol benzoate internal standard, and separation with a methanol-water gradient elution on coupled μBondapak Phenyl-μBondapak C_{18} columns. Detection of the vitamins and internal standard is monitored at 280 nm with separation accomplished in approximately 50 min. The assay is specific for each vitamin, and typical relative standard deviations for analysis of dosage forms are 0.059, 0.065, and 0.023 for vitamin A acetate, vitamin D_2, and vitamin E acetate, respectively.

LIPID STABILITY OF COOKED, DICED, AND FROZEN EGGS. P. Hoojjat and L.E. Dawson (Michigan State Univ., Food Sci. and Human Nutr. Dept., East Lansing, MI) *Poult. Sci. 58*,156-61 (1979). Lipid oxidation in commercially prepared cooked diced frozen egg samples was evaluated. Eggs were cooked, peeled, diced, and quick frozen (CO_2) under commercial conditions. Before freezing one-half of the product was treated with a commercial antioxidant Tenox 2®. Fat and moisture content, lipid oxidation (TBA), total bacteria plate counts, and sensory scores were obtained from appropriate samples during storage period. TBA values were relatively low in all samples throughout storage, indicating that autoxidation was not a problem. Antioxidant and packaging treatments had only minor effects on egg quality, presumably due to the low level of changes found in TBA, sensory scores, and microbial counts.

ROLE OF PHOSPHOLIPIDS AND TRIGLYCERIDES IN WARMED-OVER FLAVOR DEVELOPMENT IN MEAT MODEL SYSTEMS. J.O. Igene and A.M. Pearson (Dept. of Food Science and Human Nutrition, Michigan State Univ., East Lansing, MI 48824) *J. Food Sci. 44*(5),1285-90 (1979). The effects of triglycerides and phospholipids on development of warmed-over flavor (WOF) in cooked meat was studied using model systems from beef and from chicken dark and light meat. Triglycerides, total lipids, total phospholipids, phosphatidyl choline (PC) and phosphatidyl ethanolamine (PE) were added back to the lipid extracted muscle fibers in each system and WOF development was followed by the TBA test and taste panel scores after heating to 70°C and holding at 4°C for 48 hr. Total phospholipids, especially PE, were shown to be the major contributors to development of WOF in cooked meat. The triglycerides enhanced development of WOF only when combined with the phospholipids (as total lipids). Phosphatidyl choline (PC) did not influence WOF in the model system. Changes in the PUFAs of the phospholipids were shown to be related to development of WOF in cooked meat. Addition of 156 ppm of nitrite significantly ($P < 0.01$) reduced TBA numbers and prevented development of WOF.

STUDIES ON THE STRUCTURE OF α-BRANCHED-β-HYDROXYLATED FATTY ACIDS FROM *CORYNE BACTERIUM OVIS (C. PSEUDOTUBERCULOSIS)*. T. Ioneda, C.L. Silva, and D.W. Thomas (Departamento de Bioquimica Universidade de Sao Paulo, Sao Paulo, Brazil) *Chem. Phys. Lipids 24*,1-9 (1979). The composition of the α-branched-β-hydroxylated fatty acids from *Corynebacterium ovis* was studied. These acids were fractionated by argentation thin-layer chromatography in three species according to the degree of unsaturation of their O-acetylated methyl ester derivatives; the isolated fractions were analyzed by gas chromatography combined with mass spectrometry. Corynomycolic (2-tetradecyl-3-hydroxy octadecanoic), corynomycolenic (2-tetradecyl-3-hydroxy-11-octadecenoic) and corynomycoldienic (2-tetradec-7'-enyl-3-hydroxy-11-octadecenoic) acids were identified; these acids represented the main component of the saturated, mono- and di-unsaturated species, respectively. On the other hand, a short-chain corynomycolic acid (2-tetradecyl-3-hydroxy decanoic acid), $C_{24}H_{48}O_3$ was found.

^{13}C NMR STUDIES ON FLUORESCENT PROBES: ^{13}C CHEMICAL SHIFTS AND LONGITUDINAL RELAXATION TIMES OF *N*-HYDROXY-FATTY (*N*=2,6,9,12) ACIDS AND *N*-(9-ANTHROYLOXY)-STEARIC (*N*=6,12) ACIDS. S.R. Johns and R.I. Willing, K.R. Thulborn and W.H. Sawyer (Div. of Applied Organic Chem., C.S.I.R.O., Box 4331, G.P.O., Melbourne, Victoria 3001, Australia) *Chem. Phys. Lipids 24*(1),11-6 (1979). ^{13}C NMR has been used to confirm the structure of two fluorescent probes, *n*-(9-anthroyloxy)-stearic acids (*n*=6,12), and the series of *n*-hydroxy-fatty acids (*n*=2,6,9,12) from which the set of fluorescent fatty acids may be synthesized. ^{13}C longitudinal relaxation times and correlation times of the individual carbon atoms in 12-hydroxy- and 6- and 12- (9-anthroyloxy)-stearic acids show differences in motional properties between these derivatives and the parent stearic acid in chloroform(d) solution. The change in correlation times at the substituted carbons reflects the increase in motion along the acyl chain. The results are discussed in the types of motion which lead to fluorescence depolarization when the fluorescent fatty acids are used as fluidity probes in biomembranes.

HIGH-PERFORMANCE LIQUID CHROMATOGRAPHIC METHOD FOR THE DETERMINATION OF 25-HYDROXYCHOLECALICIFEROL IN CHICKEN EGG YOLKS. K.T. Koshy and A.L. VanDerSlik (The Upjohn Co., Agricultural Div. Kalamazoo, MI 49001) *J. Agric. Food Chem. 27*(1),180-3 (1979). A high-performance liquid chromatographic (LC) procedure was developed for the determination of 25-hydroxycholecaliciferol

(25-OH-D_3) in chicken egg yolk. The procedure involved extraction with a 2:1 mixture of $CHCl_3$ and CH_3OH, solvent partition between hexane and CH_3CN, adsorption column chromatography on silica gel (230-400 mesh) and on microparticulate silica (20 μm), partition chromatography on a diatomaceous earth support, and quantitation by reversed phase LC and on a C_{18} bonded microparticulate silica column.

A SIMPLE METHOD FOR THE DETERMINATION OF CHOLESTEROL AND SOME PLANT STEROLS IN FISHERY-BASED FOOD PRODUCTS. M.I.P. Kovacs, W.E. Anderson and A.G. Ackman (Technology Branch, Fisheries and Environment Canada, 1707 Lower Water St., Halifax Nova Scotia B3J 1S7, Canada) *J. Food Sci. 44*(5),1299-301 (1979). An efficient method has been developed for the microdetermination of cholesterol and some plant sterols such as brassicasterol, campesterol, stigmasterol, and β-sitosterol. The method is a greatly simplified analytical procedure in which samples are directly saponified, the unsaponifiable substances extracted, and the sterols estimated by gas liquid chromatography without further processing. The sterol contents from the new method are at least as high, and generally higher, than those from the official method, indicating superior recovery. The analysis has been found to be simple, sensitive, economical of time and particularly of solvents. It is probably adaptable to a wide variety of food ingredients or products.

SIMULTANEOUS DETERMINATION OF PICOMOLE LEVELS OF GLUCO- AND GALACTOCEREBROSIDE, MONOGALACTOSYL DIGLYCERIDE, AND SULFATIDE BY HIGH PERFORMANCE LIQUID CHROMATOGRAPHY. G. Nonaka and Y. Kishimoto (The John F. Kennedy Inst., 707 N. Broadway, Baltimore, MD) *Biochim. Biophys. Acta 572*,423-31 (1979). A sensitive but simple new procedure has been developed for the simultaneous determination of gluco- and galactocerebroside, monogalactosyl diglyceride and sulfatide by high performance liquid chromatography. The method involves the extraction of lipids, benzoylation, desulfation of perbenzoylated sulfatide and product analysis by high performance chromatography. The effluent was monitored for 230 nm absorbance; it can be collected readily and further analyzed by a reverse-phase, high performance liquid chromatography. Straight lines were obtained when retention times of individual homologs were plotted on a logarithmic scale against fatty acid carbon numbers. A new sulfatide synthesis containing [1-^{14}C]-ignoceric acid is described.

EVIDENCE OF ENZYMIC PRODUCTION OF 9-HYDROPEROXY-*TRANS*-10,*CIS*-12-OCTADECADIENOIC ACID BY PEANUT LIPOXYGENASE. H.E. Pattee and J.A. Singleton (USDA, Sci. and Educ. Admin., and Dept. of Botany, North Carolina State Univ., Raleigh, NC 27650) *J. Agric. Food Chem. 27*(2),216-20 (1979). Four hydroperoxy geometrical isomers have been separated as methyl hydroxylinoleates by high-performance liquid chromatography with a Partisil-10 column and the optical rotations and optical rotatory dispersion (ORD) curves for selected methyl hydroxylinoleates determined, and the effects of selected reaction parameters-pH and O_2-on the enzymatically and nonenzymatically produced components of the peanut lipoxygenase-linoleic acid reaction are shown. Methyl 9-hydroxy-*trans*-10,*cis*-12-octadecadienoate and methyl 13-hydroxy-*cis*-9,*trans*-11-octadecadienoate both have positive ORD curves and the $[\alpha]^{20}_{546}$ values are +4.2° (*c*,4.17% absolute ETOH) and +15.2% (*c*,0.86% absolute ETOH), respectively. A pH 8.3 reaction produces only 10% as much reaction product as the pH 6.2 reaction and the relative distribution of products decreased from 7:1 and 2:1. Similarly, the ratio decreased when O_2 in the reaction was decreased.

OCCURRENCE AND FORMATION OF BITTER-TASTING TRIHYDROXY FATTY ACIDS IN SOYBEANS. C. Moll, U. Bierman, and W. Grosch) (Deutsche Forschungsanstalt für Lebensmittelchemie, 8046 Garching, West Germany) *J. Agric. Food Chem. 27*(2),239-43 (1979). A quantitative method for the determination of the mixture of 9,12,13-trihydroxyoctadeca-10-enoic acid and 9,10,13-trihydroxyoctadeca-11-enoic acid (Tri-OH) in legumes is reported. Storage of a soybean flour at 22°C increased the Tri-OH content from 0.03 to 0.05% in 3 months. Components of soybeans, glutathione, and horse radish peroxidase (HRP) were tested for their ability to form Tri-OH from linoleic acid hydroperoxides. Most effective was a protein fraction from soybeans containing lipoxygenase and peroxidase activities, followed by HRP and by proteins. In the latter case thiol groups are involved in the Tri-OH formation.

SEPARATION OF TRIGLYCERIDES BY CHAIN LENGTH AND DEGREE OF UNSATURATION ON SILICA HPLC COLUMNS. R.D. Plattner and K. Payne-Wahl (Northern Regional Res. Center, Sci. and Ed. Admin., Agr. Res., U.S. Dept. of Agr., Peoria, IL 61604). *Lipids 14*(2),152-3 (1979). Triacylglycerols can be separated by both chain length and number of double bonds using micro particulate silica high pressure liquid chromatography columns with isooctane, diethyl ether, and acetic acid solvent mixtures. The separations obtained are the reverse of those observed with μ-Bondapak C_{18} columns (Waters Associates); i.e., longer chain length triglycerides elute from the column earlier than their shorter chain homologs, and saturated triglycerides elute before the more unsaturated ones. Base line separation was obtained between tristearin, trilinolein, and trilinolenin.

^{13}C NUCLEAR MAGNETIC RESONANCE OF MONO- AND DIHYDROXY SATURATED AND UNSATURATED FATTY METHYL ESTERS. H. Rakoff, D. Weisleder and E.A. Emken (Northern Reg. Res. Center, Federal Res., Sci. and Education Admin., U.S. Dept. of Agr., Peoria, IL) *Lipids 14*(1),81-3 (1979). ^{13}C nuclear magnetic resonance spectra were obtained for methyl esters of *erythro-* and *threo*-9,10-dihydroxystearates, for 12-hydroxy-*cis-* and *trans*-9-octadecenoates, and for *threo*-12,13-dihydroxy-*cis-* and *trans*-9-octadecenoates. *Erythro* and *threo* compounds may be distinguished easily by the difference in the chemical shifts of the carbons alpha to the hydroxy-bearing carbons. The chemical shift of a carbon alpha to both a doubly bonded carbon and a hydroxy-bearing carbon is influenced both by the geometry of the double bond and the number of hydroxy-bearing carbons.

VACCENIC ACID IN TISSUE LIPIDS AND ITS POSITIONAL DISTRIBUTION IN GLYCEROLIPIDS OF RATS FED A POLYUNSATURATED FAT DIET. I. Reichwald-Hacker, I. Kiewitt, K. Ilsemann, and K.D. Mukherjee (Federal Center for Lipid Research, Piusalle 68/76, D-4400 Münster, Germany) *J. Nutr. 109*(4),565-72 (1979). The distribution of vaccenic acid (*cis*-11-octadecenoic acid) was studied in the tissue lipids of rats, fed a diet supplemented with soybean oil, which contained very little (ca. 1%) vaccenic acid. Maximum proportions of vaccenic acid in the octadecenoic acids were found in the total lipids of heart, followed by those of liver, adipose tissue, and blood serum.

LIPID CONSTITUENTS OF BLACK WALNUT KERNELS. S.D. Senter and R.J. Horvat (USDA-SEA Richard B. Russell Arg. Res. Center, Athens, GA 30604) *J. Food Sci. 44*,266-8 (1979). Lipids from the kernels of black walnuts (*Juglans nigra* L.) were quantitated and identified by thin-layer chromatography and gas-liquid chromatography-mass spectrometry. Four classes of lipids were prominent in the walnut oils and were identified as complex lipids, α, β-diglycerides, sterols, and triglycerides. Triglycerides were the predominant class and comprised 99.9% of the lipids. Twenty-one fatty acids were isolated and identified. Among these, unsaturated fatty acids were predominant and comprised ca. 92% of the fatty acids. On the basis of total fatty acids, octadecenoic and octadecadienoic acids comprised 86.1%. Twelve acids were present in trace amounts and accounted for ca. 0.06% of the total.

SPONTANEOUSLY OCCURRING ANGIOTOXIC DERIVATIVES OF CHOLESTEROL. C.B. Taylor, S-K Peng, N.T. Werthessen, P. Tham, and K.T. Lee (Veterans Admn. Hosp., Albany, NY) *Am. J. Clin. Nutr. 32*(1),40-57 (1979). Impurities were concentrated from several lots of USP-grade cholesterol by recrystallizing cholesterol from a methanol extract, retaining the mother liquor, and evaporating the residuum to dryness under vacuum. This concentrate contained the products of spontaneous oxidation of cholesterol and probably other minor contaminants from the original source. In conclusion our group feels that, in addition to avoiding foods containing toxic derivatives of cholesterol, all foods containing cholesterol should be stored in well sealed containers and refrigerated or if possible kept frozen. This type of storage of cholesterol-containing foods should minimize formation of toxic derivatives. The addition of antioxidants such as glutathione to cholesterol containing foods may also provide such protection.

SEPARATION OF FLAVOR COMPOUNDS FROM LIPIDS IN A MODEL SYSTEM BY MEANS OF MEMBRANE DIALYSIS. K.F. Benkler and G.A. Reineccius (Dept. of Food Science & Nutrition, Univ. of Minn., 1334 Eckles Ave., St. Paul, MN 55108) *J. Food Sci. 44*(5),1525-9 (1979). The separation of flavor compounds from lipids by membrane dialysis was studied using a model system consisting of 11 flavor compounds and corn oil dissolved in solvent. Several solvent systems and three perfluorosulfonic acid membranes were studied. The most effective solvent system was a mixture of 70% acetone and 30% pentane while the more effective membranes were ones with equivalent weights of 1200 and 1100 g and thicknesses of 5 and 10 mils, respectively. Diffusion of the corn oil was less than 0.12% of the oil added. Calculation of permeances showed that diffusion decreased with increased molecular size. The diffusion of 2-methoxypyrazine was hindered by either adsorption on to or reaction with the dialysis membrane. Reaction of the

membrane with acetone (solvent) resulted in the formation of two artifacts.

CHEMICAL STRUCTURES OF MONO-, DI-, TRI- AND TETRA-GLYCOSYL GLYCERIDES IN RICE BRAN. Y. Fujino and T. Miyazawa (Dept. of Agr. Chem., Obihiro Univ., Obihiro, Hokkaido, Japan) *Biochim. Biophys. Acta* 572,442-51 (1979). Monoglycosyl monoglyceride, mono-, di-, tri- and tetraglycosyl diglycerides were isolated from rice bran and characterized for their chemical structures. The structures of monoglycosyl diglyceride were Gal(β1′ → 3)-1,2-diacyl-*sn*-glycerol and Glc(β1′ → 3)1-2-diacyl-*sn*-glycerol. Epimeric separation of the galactosyl glycerides was for the first time achieved by thin-layer chromatography. The representative structure of tetraglycosyl diglyceride was for the first time established as Gal(α1′′′′ → 6′′′)-Gal(α1′′′ → 6′′)-Gal(α1′′ → 6′)-Gal(α1′ → 3)-1,2-diacyl-*sn*-glycerol.

ORD AND CD STUDIES OF GLYCERIDES. IV: UNSATURATED GLYCERIDES. S. Gronowitz and B. Herslof (Org. Chem.1, Chem. Center, Univ. of Lund, P.O. Box 740, S-220 07 Lund 7 (Sweden)) *Chem. Phys. Lipids 23*,101-9 (1979). ORD and CD curves of unsaturated 1,2-isopropylidene-3-acyl-*sn*-glycerols, 3-acyl-*sn*-glycerols and triacyl-*sn*-glycerols have been studied. With the exception of α,β-unsaturated compounds, the rotation and CD effect are similar to the saturated analogues. However, clear differences exist between the investigated compounds. Optical activity could be measured in triacyl-glycerols containing oleic acid in combination with lauric, palmitic, stearic, elaidic or erucic acid.

25-HYDROXYCHOLECALCIFEROL IN COW MILK AS DETERMINED BY HIGH-PERFORMANCE LIQUID CHROMATOGRAPHY. K.T. Koshy and A.L. VanDer Slik (The Upjohn Co., Agr. Div., Kalamazoo, MI 49001) *J. Agric. Food Chem. 27*(3),650-2 (1979). A high-performance liquid chromatographic (LC) procedure was developed for the determination of 25-hydroxycholecalciferol (25-OH-D_3) in cow milk. The procedure involved extraction with an ethanol-ether mixture, a set of solvent partitions, adsorption chromatography on silica gel, a partition chromatography on diatomaceous earth support, and final determination by reversed-phase LC on a C_{18} bonded microparticulate silica column using a 254-nm fixed wavelength detector. The method was quantitative at the 10-ppb level and capable of detection at the 2-3 ppb level. The method was applicable to milk and colostrum. The endogenous level of 25-OH-D_3 in the milk was below the detection limit. It was very significant that, even in cow whose serum concentrations were elevated fivefold after treatment with 25-OH-D_3, the concentration in the milk was below the detection level.

DISTRIBUTION OF HYDROCARBONS IN BOVINE TISSUES. C. Lintas, A.M. Balduzzi, M.P. Bernardini and A. Di Muccio (Instituto Nazionale della Nutrizione - Via Lancisi, 29 - Roma, Italy) *Lipids 14*,298-303 (1979). Liver, heart, kidneys, muscle and adipose (perirenal and subcutaneous) tissues were collected from six animals for analysis of their hydrocarbon composition. Qualitative and quantitative determinations were carried out by gas chromatography and combined gas chromatography-mass spectrometry. Although differing in the proportions, a homologous series of n-alkanes ranging from n-C_{12} to n-C_{31} was found in all the samples examined. The isoprenoid hydrocarbons phytane and phytene (phyt-1-ene and phyt-2-ene) were also identified.

ROLE OF LIPOXYGENASE AND LIPID OXIDATION IN QUALITY OF OILSEEDS. A.J. St. Angelo, J.C. Kuck, and R.L. Ory (Southern Reg. Res. Center, Sci. and Educ. Admin., U.S. Dept. of Agr., New Orleans, LA 70179) *J. Agric. Food Chem. 27*(2),229-34 (1979). Lipoxygenase is a prime suspect for catalyzing lipid oxidation in raw peanuts but it is destroyed in the roasting process. After roasting, however, lipid oxidation is catalyzed primarily by nonenzymic catalysts. Examination of several fresh samples of commercial peanut butters showed that the initial peroxide contents differed. This suggested that the samples were already in different stages of peroxidation and demonstrated the need for controlling oxidation in the peanuts before roasting and processing. We found that minor constituents such as metals, metalloproteins, and salts are possible catalysts of lipid oxidation. When ascorbyl palmitate, citric acid, or ethylenediaminetetraacetic acid were added to the peanut butter before storing, oxidation was decreased or completely controlled. Some natural compounds were also examined as possible inhibitors of lipoxygenase activity in raw peanuts.

COUPLING OF TWO-DIMENTIONAL THIN-LAYER CHROMATOGRAPHY WITH GAS CHROMATOGRAPHY FOR THE QUANTITATIVE ANALYSIS OF LIPID CLASSES AND THEIR CONSTITUENT FATTY ACIDS. S.S. Radwan. *J. Chromat. Sci. 16*,538-42 (1978). The present communication describes a new system for the complete separation of lipid classes in natural mixtures by two-dimensional chromatography on thin layers of silica gel impregnated with ammonium sulphate to improve separations. For quantitative analysis an amount of 1 mg. of total lipids is chromatographed, and the lipid classes resolved are then determined by gas chromatography of their constituent fatty acids with added internal standard. The patterns of the constituent fatty acids of the individual lipid classes are obtained simultaneously. (World Surface Coatings Abs. No. 446)

TOXIC FACTORS IN RAPESEED OIL STILL UNCLARIFIED. S.P. Johnson. *Food Consm. Tox. 16*,619-22 (1978). A review is presented of recent studies on the toxicology of the fatty acid components of rapeseed oil, and in particular the cardiopathogenic effects of erucic acid and linolenic acid. (World Surface Coatings Abs. No. 446)

Biochemistry and nutrition

PLASMA LIPOPROTEINS AND CORONARY ARTERIOGRAPHY IN SUBJECTS IN THE PROGRAM ON THE SURGICAL CONTROL OF THE HYPERLIPIDEMIAS. R.B. Moore, J.M. Long, J.P. Matts, K. Amplatz, R.L. Varco, H. Buchwald, and The Posch Group (Univ. of Minnesota Medical School, Minneapolis, MN) *Atherosclerosis* 32, 101–19 (1979). Coronary arteriographic findings, plasma lipid and lipoprotein levels, and cigarette smoking history are reported for the first 101 male post myocardial infarction survivors who have been entered into the POSCH clinical trial. Estimated of the extent of stenosis in the major coronary arteries were made using 4 models ranging from a simple determination of the number of the 3 major vessels having significant (i.e. 50% or greater stenosis) disease to more complex methods of determining overall extent of disease in 14 major segments of the coronary arteries. This preliminary report of 10% of the recruitment objective of the project supports the currently held views of the lipid-atherosclerosis hypothesis regarding the effects of age, total plasma cholesterol, LDL-cholesterol, and HDL-cholesterol on the extent of coronary atherosclerotic plaques, as determined by coronary arteriography.

CLINICAL SIGNS OF ANEMIA IN VITAMIN A-DEFICIENT RATS. L.A. Mejia, R.E. Hodges and R.B. Rucker (Dept. of Internal Med., Univ. of California, Davis, CA) *Am. J. Clin. Nutr.* 32, 1439–44 (1979). Young rats weighing 150 g (initial weight) were fed diets sufficient or deficient in vitamin A. Post-weaning rats were used in order to retard the rapid onset of vitamin A deficiency. The effects of the deficiency were studied with respect to impairment of hematopoietic function and anemia. Values for hemoglobin and hematocrit provided evidence of anemia before the signs of severe vitamin A deficiency become apparent. These data suggest that anemia may be a component of vitamin A deficiency, but might be masked by the dehydration that accompanies severe depletion of vitamin A.

HIGH DENSITY LIPOPROTEIN LEVELS IN CHILDREN OF YOUNG MEN WITH ISCHAEMIC HEART DISEASE. M.S. Nupuf and W.H.F. Sutherland (Dept. of Med., P.O. Box 913, Dunedin, New Zealand) *Atherosclerosis* 33, 365–70 (1979). This study was designed to assess HDL levels in children of young men with IHD, compared with children of symptomatic men. Like their fathers, sons of patients with heart disease, had significantly lower HDL cholesterols than controls. This difference was independent of fasting triglycerides, obesity, diet or physical activity, and was the only "coronary risk factor" in this young age group.

CHARACTERIZATION OF A MODEL OF DIETARY-INDUCED HYPERTRIGLYCERIDEMIA IN YOUNG, NONOBESE RATS. G.M. Reaven, T.R. Risser, Y-D. Ida Chen, and E.P. Reaven (Stanford Univ. School of Medicine and Veterans Admin. Hospital, Palo Alto, CA 94304) *J. Lipid Res.* 20, 371–8 (1979). Healthy, non-obese, young rats developed hypertriglyceridemia (mean triglyceride levels of 250 mg/dl) following consumption of a sucrose-lard diet. The hypertriglyceridemia was apparent three days after start of the diet and persisted throughout the 4-week experimental period. Body weight, liver weight, and serum glucose levels were similar in animals eating either the sucrose-lard diet or standard rat chow. On the other hand, serum free fatty acid substantially increased in animals eating the sucrose-lard diet. The dietary-induced hypertriglyceridemia is associated with elevated serum insulin levels, and, as such, may provide a useful animal model to use in

studies aimed at defining the pathogenesis of endogenous hypertriglyceridemia in man.

REGULATION OF PLASMA LECITHIN: CHOLESTEROL ACYLTRANSFERASE IN MAN. III. ROLE OF HIGH DENSITY LIPOPROTEIN CHOLESTERYL ESTERS IN THE ACTIVATING EFFECT OF A HIGH-FAT TEST MEAL. H.G. Rose and J. Juliano (Lipid Research Laboratory, Bronx VA Hospital, Bronx, NY 10468) *J. Lipid Res.* 20, 399-407 (1979). Plasma lecithin:cholesterol acyltransferase (LCAT) activity is increased during the clearance phase of alimentary lipemia induced by a high-fat test meal in normal subjects. Uutracentrifugal fractionation of high density lipoproteins (HDL) into HDL_2, HDL_3, and very high density (VHD) subfractions followed by analyses of lipid and protein components has been accomplished at intervals during alimentary lipemia to seek associations with enzyme changes. The main determinant of ester transfer, however, appears to be the level of VLDL, both in vitro and in vivo. Regulation of plasma lecithin:cholesteryl acyltransferase in man. III. Role of high density lipoprotein cholesteryl esters in the activating effect of a high-fat test meal.

PROSTAGLANDIN GENERATION IN RABBIT KIDNEY. HORMONE-ACTIVATED SELECTIVE LIPOLYSIS COUPLED TO PROSTAGLANDIN BIOSYNTHESIS. M. Schwartzman and A. Raz (Dept. of Biochem., the George S. Wise Center of Life Sci., Tel Aviv Univ., Ramat Aviv, Tel Aviv, Israel) *Biochim. Biophys. Acta.* 472, 363-9 (1979). The endogenous release of prostaglandins and free fatty acids from the isolated prefused rabbit kidney in the absence or presence of stimulation by bradykinin or angiotensin-II was investigated. Basal (nonstimulated) release of prostaglandin-precursor arachidonic acid was 15-20-fold higher than that of prostaglandin E_2 indicating a low conversion of released arachidonate to prostaglandins. This lipase reaction is tightly coupled to a prostaglandin generating system so that the released arachidonate is first made available to the prostaglandin cycloozygenase, resulting in its substantial conversion to prostaglandins.

INFLUENCE OF DIETARY FAT ON ENERGY UTILIZATION BY LAYING HENS. J.L. Sell, L.G. Tenesaca and G.L. Bales (Dept. of Animal Science, Iowa State University, Ames, Iowa 50011) *Poult. Sci.* 58, 900-5 (1979). Feed grade fat was included at levels of 2 to 6% in corn-based laying hen rations and at levels of 3 to 6% in laying hen rations containing 8% wheat middlings. Added fat did not affect rate of egg production or average egg weight during the 196-day experiments. Feed consumption and efficiency of feed utilization were improved by added fat. Ration metabolizable energy (ME), as measured experimentally, was increased more than expected on the basis of commonly accepted ME values of feed grade fat when fat levels of 4 and 6% were used in corn-based rations. The proportion of ME used for weight gain was increased slightly by added fat while no consistent changes in energy estimated as heat increment were observed.

EFFECT OF CHRONIC INTERMITTENT EXERCISE ON BILIARY LIPIDS, PLASMA LECITHIN CHOLESTEROL ACYLTRANSFERASE, AND RED BLOOD CELL LIPIDS IN RATS. V. Simko and R.E. Kelley (Dept. of Internal Med., Div. of Digestive Diseases, Univ. of Cincinnati College of Med., Cincinnati, OH) *Am. J. Clin. Nutr.* 32, 1376-80 (1979). In a 4 month cross-over experiment two identical groups of rats (A and B) were subjected to daily swimming either in the first 2 months (A) or second 2 months of the study (B). Bile collected quantitatively at the end of the experimental period had lower concentration of cholesterol and phospholipids ($P < 0.05$) in exercisers (B) when compared to controls (A). Regular exercise decreases biliary cholesterol and red blood cell cholesterol in rats probably by promoting its transport from peripheral cells to the liver during the period of physical activity. These metabolic changes may have a preventive potential against cholesterol gallstone formation.

CHARACTERIZATION OF FREE AND TIGHTLY BOUND LIPOPROTEIN IN INTIMA BY THIN LAYER ISOELECTRIC FOCUSING. E.B. Smith, H.S. Dietz and I.B. Craig (Univ. of Aberdeen, Dept. of Chem. Pathology, Foresterhill, Aberdeen AB9 2ZD, Great Britain) *Atherosclerosis* 33, 329-42 (1979). Thin layer isoelectric focusing followed by second dimension quantitative immunoelectrophoresis has been used to characterize the free and tightly bound lipoprotein (LP) fractions in human aortic intima. In 3.3% acrylamide gels plasma low density lipoprotein (LDL) focuses rapidly, but very low density lipoprotein (VLDL) fails to enter the gel and remains at the origin (point of application). An increased proportion of aggregated LDL was associated with (a) accumulation of cholesterol, (b) topographical location towards the centre of plaques, and (c) partial destruction of endogenous LP during incubation of fresh samples of tissue.

A COMPARATIVE STUDY OF THE LIPID COMPOSITION OF ISOLATED RAT SERTOLI AND GERMINAL CELLS. J.K. Beckman and J.G. Coniglio (Dept. of Biochem., Vanderbilt Univ., Nashville, TN) *Lipids 14*,262-7 (1979). The lipid composition of enriched preparations of sertoli cells and of germinal cells, isolated from the testes of mature rats, has been investigated. Sertoli cells contained a much lower content of phospholipids (in particular, much less phosphatidylcholine and phosphatidylethanolamine) and a higher content of triacylglycerols than did germinal cells. In addition, the Sertoli cells had a higher ratio of esterified to unesterified cholesterol than did germinal cells.

LIPID HYDROPEROXIDE REACTIVITY WITH PROTEINS AND AMINO ACIDS: A REVIEW. H.W. Gardner (Northern Reg. Res. Center, Fed. Research, Sci. and Educ. Admin., U.S. Dept. of Agr., Peoria, IL 61604) *J. Agric. Food Chem. 27*(2),220-9 (1979). Lipoxygenase is responsible for the production of lipid hydroperoxides in inadequately processed foods. The hydroperoxides as well as their products of decomposition are potentially reactive substances that can cause deterioration of food proteins or amino acids. Among the many consequences of protein exposure to peroxidized lipids is the formation of lipid-protein complexes that are bound through purely physical forces. Chemical changes caused by interaction of lipid hydroperoxide and protein are protein-protein cross-links, protein scission, protein-lipid adducts, and amino acid damage. The secondary products arising from hydroperoxide decomposition also readily damage protein and amino acids through formation of covalent bonds. Among the secondary products, aldehydes have received the most attention because of their propensity to form Schiff base adducts with amino groups, and, in particular, the bifunctional malondialdehyde can cross-link protein via Schiff base formation.

STEREOSPECIFICITY OF LINOLEIC ACID HYDROPEROXIDE ISOMERASE FROM CORN GERM. H.W. Gardner (Northern Regional Res. Center, Fed. Res., Sci. and Ed. Admin., U.S. Dept. of Agr., Peoria, IL 61604) *Lipids 14*,208-11 (1979). Linoleic acid hydroperoxide isomerase from corn germ inverted the stereoconfiguration of its substrate. 9-D(S)-Hydroperoxy-*trans*-10,*cis*-12-octadecadienoic acid was converted to 10-oxo-9-L(R)-hydroxy-*cis*-12-octadecenoic acid. Presumably, the H_2O solvent of OH^- acted as a nucleophile. In the presence of another nucleophile, linoleate, the 9-D(S)-hydroperoxide was transformed into 9-L(R)-linoleoyloxy-10-oxo-*cis*-12-octadecenoic acid. The substitution of nucleophiles from the incubation solution and the inversion of stereoconfiguration at carbon-9 are consistent with a biomolecular nucleophilic substitution (S_N2) mechanism.

PARTIAL PURIFICATION OF A LIPOXYGENASE FROM APPLES. In-Sook Kim and W. Grosch (Deutsche Forschungsanstalt für Lebensmittelchemie, 8046 Garching, West Germany) *J. Agric. Food Chem. 27*(2),243-6 (1979). A membrane-bound lipoxygenase (EC 1.13.11.12) was partially purified from apples by differential centrifugation and gel chromatography. The enzyme had a pH optimum at 6.0 and converted linoleic acid predominantly into the 13-hydroperoxyoctadeca-9,11-dienoic acid. Reversible inhibition was obtained with ethylenediaminetetraacetic acid disodium salt and cyanide. Hemoproteins were not involved in the lipid peroxidation activity.

PHOSPHORUS NMR ANALYSIS OF PHOSPHOLIPIDS IN DETERGENTS. E. London and G.W. Feigenson (Sec. of Biochem., Molecular and Cell Biology, Clark Hall, Cornell Univ., Uthaca, NY 14853) *J. Lipid Research 20*(3),408-12 (1979). Various detergents can be used to dissolve phospholipids, resulting in very narrow ^{31}PNMR resonances. These resonances are well resolved, allowing identification and quantitative analysis of phospholipids in a mixture. The chemical shift depends strongly on pH, reflecting changes in the state of ionization of the phospholipid headgroup moieties. Samples of phospholipids dissolved in aqueous detergents are conveniently prepared and give narrower ^{31}P resonances than do phospholipids dissolved in organic solvents.

CHOLESTERYL-PHOSPHORYL-CHOLINE IN LIPID BILAYERS. M. Lyte and M. Shinitzky (Department of Membrane Research, The Weizmann Inst. of Sci., Rehovot, Israel) *Chem. Phys. Lipids 24*,45-55 (1979). Cholesteryl-phosphoryl-choline (CPC), a hybrid between cholesterol and lecithin, is incorporated into sonicated liposomes and erythrocyte membranes similarly to cholesterol. The effect of CPC on lipid microviscosity and degree of order is smaller, but not significantly, than that of cholesterol. It is proposed that CPC may be employed as an efficient modulator of lipid dynamics.

REGULATION OF PHOSPHOLIPASE A_2 ACTIVITY BY THE LIPID-WATER INTERFACE: A MONOLAYER APPROACH. F. Pattus, A.J. Slotboom, and G.H. de Haas (Lab of Biochem., State Univ. of Utrecht, Transitorium 3, "De Uithof", Padualaan 8, Utrecht, The Netherlands) *Biochemistry 18*(13),2691-7 (1979). Interfacial regulation of phospholipase A_2 activity on lecithin monolayers was investigated by using radioactively labeled enzyme. Labeling of the protein with ^{125}I did not produce a change in the enzyme and protein properties as compared to the ^{3}H fully amidinated phospholipase A_2. However, the steady-state surface concentration of the enzyme increases with the fatty acyl chain length of the lecithin, indicating that hydrophobic interaction occurs between phospholipase A_2 and the lipid molecules at the interface. From the lecithins used pancreatic phospholipase A_2 preferentially splits substrate molecules with nine carbon atoms in the acyl chain.

REGULATION OF THE INTERACTION OF PANCREATIC PHOSPHOLIPASE A_2 WITH LIPID-WATER INTERFACES BY Ca^{2+} IONS: A MONOLAYER STUDY. F. Pattus, A.J. Slotboom, and G.H. de Haas (Institut für Biochemie, Universität Bern, 3012 Bern Switzerland) *Biochemistry 18*(13),2698-2702 (1979). In addition to the Ca^{2+} ion bound to the active site of porcine pancreatic phospholipase A_2, it is known that Ca^{2+} binds to a second, lower affinity site on the enzyme. This latter binding influences the interaction of phospholipase A_2 with lipid-water interfaces by shifting the p*K* of the α-NH_3^+ group of the N-terminal Ala residue from 8.4 to 9.3. The effects of Ca^{2+} ion and pH on the pre-steady-state kinetics and on the activity of porcine phospholipase A_2 acting on lecithin monolayers were investigated. From Lineweaver-Burk plots of the specific activity of the enzyme on the substrate monolayers as function of Ca^{2+} ion concentration, it was concluded that the low-affinity site not only is indispensable for the penetration at basic pH but also affects the turnover of the enzyme.

BARRIER PROPERTIES OF LIPID BILAYERS COMPOSED OF LECITHINS WITH ODD CHAIN FATTY ACIDS. S. Salvati, G. Serlupi-Crescenzi and J. De Gier (Istituto Superiore di Sanita, Viala Regina Elena 299, 00161 Roma, Italia) *Chem. Phys. Lipids 24*,85-9 (1979). Lecithins with fatty acid chain length of 17 carbon atoms and different degrees of unsaturation were synthesized. The thermotropic behavior and barrier function of derived liposomal bilayers were studied.

LIPID PEROXIDATION AND ITS INHIBITION BY TINORIDINE. II. ASCORBIC ACID-INDUCED LIPID PEROXIDATION OF RAT LIVER MITOCHONDRIA. O. Shimada and H. Yasuda (Res. Lab., Yoshitomi Pharmaceutical Industries, Ltd., Yoshitomi-cho, Chikujo-gun, Fukuoka-ken 871, Japan) *Biochim. Biophys. Acta 572*, 531-6 (1979). Incubation of rat liver mitrochondrial suspension with ascorbic acid and Fe^{2+} resulted in the formation of malondialdehyde and a decrease in the turbidity of the suspension. The maximum amount of malondialdehyde formed during the peroxidation reaction was estimated to be 1 mol per approximately 6 mol of mitochondrial phospholipids. These findings suggest that there is a limit in the chain reaction of the lipid peroxidation of mitochondria and that the limit is the membrane sphere which is capable of releasing 6 molecules of malondialdehyde and contains about 36 molecules of the constitutive phospholipids.

ACTION OF PHOSPHOLIPASE D ON HUMAN SERUM LOW DENSITY LIPOPROTEIN (40443). M.K. Basu, S. Ghosh, and J.S. Schweppe (Dept. of Biochem. and Med., Northwestern Univ. Med. and Dental Schl., Chicago, IL) *Proc. Soc. Exp. Biol. Med. 160*,324-7 (1979). Phospholipase D was used to investigate the lecithin groups on the surface of serum low-density lipoprotein (LDL), isolated from normo- as well as hypercholestermic individuals. The rate of liberation of choline from lipoprotein lecithin was studied in presence and absence of ether and in different concentrations of $CaCl_2$. The kinetics of the digestion in absence of ether suggested that the lecithin groups of LDL are not equally susceptible to enzymic hydrolysis. The effect of ether was to increase the susceptibility of the slowly digesting group of lecithin. Compared to LDL isolated from normal controls, LDL from hypercholesteremic individuals seemed to have a much larger fraction of lecithin that was digested at a faster rate. Immunological activity is retained in normal as well as hypercholesteremic LDL, even after hydrolysis of 75% of the total lecithin.

PREDICTION OF FAT AND FAT FREE LIVE WEIGHT IN BROILER CHICKENS USING BACKSKIN FAT, ABDOMINAL FAT AND LIVE BODY WEIGHT. W.A. Becker, J.V. Spencer, L.W. Mirosh, and J.S. Verstrate (Dept. of Animal Sci., and Dept. of Food Sci. and Tech. Washington State Univ., Pullman, WA 99164) *Poult. Sci. 58*(4),835-42 (1979). Data from 100 male and 100 female broiler chickens that were raised on the floor under two lighting regimes (12 and 24 hr light) were combined. Birds were weighed when 58 days old (male data presented first (2372 g, 1913 g) and then slaughtered at 59 days. Abdominal fat was weighed (2.18%, 2.82%) and fat extracted from ground carcass (12%, 13.7% wet basis), intestines (47.6%, 56.2% dry basis), and from a triangular section of backskin (86.1%, 88.0% dry basis). Selection against percent abdominal fat would probably result in a reduction of fat in other locations and little change in fat free live weight.

EFFECTS OF DIFFUSIBLE PRODUCTS OF PEROXIDATION OF RAT LIVER MICROSOMAL LIPIDS. A Benedetti, A.F. Casini, M. Ferrali and M. Comporti (Istituto di Patologia Gernerale dell'Università di Siena, Via Laterino 8, 53100 Siena, Italy) *Biochem. J. 180*(2),303-12 (1979). The effects on cellular structures of products of peroxidation of rat liver microsomal lipids were investigated. A system containing actively peroxidizing liver microsomal fraction was separated from a revealing or target system by a dialysis membrane. The target system, contained in the dialysis tube, consisted of either intact cells (erythrocytes) or subcellular fractions (liver microsomal fraction). These results indicate that during the course of the peroxidation of liver microsomal lipids toxic products are formed that are able to induce pathological effects at distant loci.

STUDIES ON THE CONTROL OF LIPOGENESIS: STRAIN DIFFERENCES IN HEPATIC METABOLSM. C.D. Berdanier, R.B. Tobin and V. DeVore (Dept. of Biochem. and Medicine, Univ. of Nebraska College of Medicine; and Vet. Admn. Hosp., Omaha, NE 68105) *J. Nutr. 109*(2),245-60 (1979). Detailed studies of hepatic metabolism of lipemic BHE and nonlipemic Wistar rats were conducted. Hepatic lipogenic capacity was varied through the use of starvation or meal feeding. Livers were clamped in precooled copper plates and used for the assay of glycolytic, gluconeogenic, and lipogenic metabolites. Redox and phosphorylation states were calculated. Mitochondrial metabolism was evaluated through studies of the oxygen consumption of isolated mitochondria and through the study of the activities of the α-glycero-phosphate and malate-aspartate shuttles and ATPase.

EVIDENCE FOR THE PROMOTION OF BONE MINERALIZATION BY 1α,25-DIHYDROXYCHOLECALCIFE ROL IN THE RAT UNRELATED TO THE CORRECTION OF DEFICIENCIES IN SERUM CALCIUM AND PHOSPHORUS. A. Boris, J.F. Hurley, T. Trmal, J.P. Mallon and D.S. Matuszewski (Dept. of Cell Biol., Roche Res. Center, Nutley, NJ) *J. Nutr. 108*,1899-906 (1979). Concurrent administration of 1α,25-dihydroxycholecalciferol [1α,25-$(OH)_2$-CC] to intact and thyroparathyroidectomized rats treated with ethane-1-hydroxy-1-1-diphosphonate (EHDP) prevented or reversed the EHDP-induced inhibition of bone mineralization as measured by changes in epiphyseal plate width and ash content of bone. An analog, 1-α-hydroxycholecalciferol, was also effective. Recovery of bone after EHDP treatment was also significantly improved by administration of 1α,25-$(OH)_2$-CC as evidenced by enhanced uptake of ^{45}Ca by epiphyseal plates and decreased plate widths. Cholecalciferol (CC), ergocalciferol, dihydrotachysterol$_2$, 5,6-trans-CC, 25-OH-CC, 5,6-trans-25-OH-CC, and 1α,24R,25-$(OH)_3$-CC also blocked EHDP-induced epiphyseal plate widening, but required high, pharmacological dose levels. 24R,25-$(OH)_2$-CC was inactive at doses up to 10 μg/day. Since EHDP-treated rats are not deficient in calcium or phosphate, these data suggest that 1α,25-dihydroxycholecalciferol promoted bone mineralization independently of effects upon the intestinal absorption of calcium and phosphate.

STEROL SYNTHESIS IN VARIANT CHINESE HAMSTER LUNG CELLS SELECTED FOR RESISTANCE TO 25-HYDROXYCHOLESTEROL. CROSS-RESISTANCE TO 7-KETOCHOLESTEROL, 20α-HYDROXYCHOLESTEROL, AND SERUM. H.W. Chen, W.K. Cavanee and A.A. Kandutsch (Jackson Lab., Bar Harbor, Maine) *J. Biol. Chem. 254*,715-20 (1979). Two lines of Chinese hamster lung (Dede) cells which are resistant to the killing effect of 25-hydroxycholesterol, and which grow to confluence in its presence, have been isolated. The two lines selected for growth in the presence of 25-hydroxycholesterol were also resistant to the inhibitory effects of 7-ketocholesterol, 20α-hydroxycholesterol, and serum upon HMG-CoA reductase and sterol synthesis, suggesting that suppression of cholesterol synthesis by these inhibitors involves a common step.

IN VITRO CONVERSION OF ERUCIC ACID BY MICROSOMES AND MITOCHONDRIA FROM LIVER, KIDNEYS AND HEART OF RATS. P. Clouet and J. Bezard (Lab. de Physiologie animale et de la Nutr., Faculte des Sci. Mirande, B.P. 138, 21004 DIJON Cedex, France) *Lipids 14*,268-73 (1979). Microsomes and mitochondria of liver, kidneys, and heart were incubated with [14-^{14}C] erucic acid in three assay media: one favorable for chain elongation (NADPH + KCN), another favorable for β-oxidation and the last one for shortening (NADP + KCN). Elongating reactions occurred mainly in microsomes, those of kidneys being very active; the mito-

chondria also showed some activity, heart mitochondria being, however, more active than the microsomes, when considering the amount of erucic acid activated. In the presence of carnitine and NADP, the level of the chain-shortening reaction did not differ from that observed with NADP alone. It appears, therefore, that the activated erucic acid is mainly directed towards shortening reactions and not towards transfer reactions across the mitochondrial membranes.

MODULATION BY SODIUM ASCORBATE OF THE EFFECT OF CHLOROQUINE ON LOW DENSITY LIPOPROTEIN RETENTION AND DEGRADATION IN CULTURED HUMAN SKIN FIBROBLASTS. G.A. Coetzee, O. Stein, and Y. Stein (Department of Experimental Medicine and Cancer Research, Hebrew Univ.—Hadassah Medical School, and Lipid Research Laboratory, Dept. of Medicine B, Hadassah Univ. Hospital, Jerusalem, Israel) *Atherosclerosis 32*(3),277-87 (1979). Human skin fibroblasts in culture were incubated for 48 hr with ^{125}I-labelled low density lipoprotein and chloroquine in the prsence and absence of sodium ascorbate. Pretreatment of the cells for 3 days with sodium ascorbate and addition of the vitamin during incubation resulted in a decrease in cellular retention and an increase in degradation of the labelled low density lipoprotein. It is proposed that sodium ascorbate by hydrolases against the inhibitory action of chloroquine. If cholesterol accumulation in human and experimental atheroma is caused by partial inhibition of lysosomal enzymes, sodium ascorbate could play a role in the alleviation of such an inhibition.

EFFECTS OF THE UNSATURATION OF DIETARY FAT AND OF ARACHIDONATE SUPPLEMENTATION ON CHOLESTEROL POOL EXPANSION IN THE GUINEA PIG. P.J. Crocker, M. Fitch and R. Ostwald (Dept. of Nutr. Sci., Univ. of California, Berkeley, CA 94720) *J. Nutr. 109*(6),927-38 (1979). We have studied the effects of methyl arachidonate supplementation on the lipid metabolism of guinea pigs fed cholesterol. Four groups of guinea pigs were fed a purified diet containing 9.5% hydrogenated coconut oil (HCNO), a highly saturated fat, with or without the addition of 1% cholesterol, for 15 weeks. One half of the animals fed the control and the cholesterol-containing diets were supplemented with 15 mg methylarachidonate three times per week. We conclude that in guinea pigs supplementary methyl arachidonate had no hypocholesterolemic effect at the levels we fed, that circulating cholesterol levels are not a measure of cholesterol accumulation by organs and that decrease of serum cholesterol in response of PUFA is due in part to an increase of cholesterol storage in the liver.

THE ASSOCIATION OF BOVINE PROTHROMBIN FRAGMENT 1 WITH PHOSPHOLIPID: QUANTITATIVE CHARACTERIZATION OF THE Ca^{2+} ION-MEDIATED BINDING OF PROTHROMBIN FRAGMENT 1 TO PHOSPHOLIPID VESICLES AND A MOLECULAR MODEL FOR ITS ASSOCIATION WITH PHOSPHOLIPIDS. F.A. Dombrose, S.N. Gitel, K. Zawalich and C.M. Jackson (Dept. of Biological Chemistry, Div. of Biol. and Biomed. Sci., Washington University School of Med., St. Louis, MO 63110) *J. Biol. Chem. 254*(12),5027-40 (1979). Calcium-mediated binding of bovine Prothrombin Fragment 1 (the NH_2-terminal 156 residues of bovine prothrombin) to single bilayer phospholipid vesicles composed of dioleoyl-*sn*-glycerophosphorylcholine and dioleoyl-*sn*-glycerophosphorylglycerol has been investigated over Prothrombin Fragment 1 concentrations from 0.2μM to 12μM and calcium ion concentrations from 0.5 mM to 16 mM. Binding has been found to be reversible and to occur without aggregation of the vesicles or sequestration of protein by them.

STUDY OF THE TWO PATHWAYS FOR ARACHIDONATE OXYGENATION IN BLOOD PLATELETS. C.E. Dutilh, E. Haddeman, G.H. Jouvenaz, F. Ten Hoor and D.H. Nugteren (Unilever Res., Vlaardingen, PO Box 114, 3130 AC Vlaardingen, The Netherlands) *Lipids 14*(2),241-6 (1979). During collagen-induced blood platelet aggregation, arachidonic acid is set free from membrane phospholipids and subsequently converted into 12-hydroxyeicosatetraenoic acid by arachidonate lipoxygenase and into thromboxane A_2, 12-hydroxy heptadecatrienoic acid (HETE) and malondialdehyde by cyclooxygenase and thromboxane synthase. It was found that platelet phospholipase A_2 preferentially splits off fatty acid with four double bonds. The results indicate that arachidonate lipoxygenase is essential for irreversible blood platelet aggregation.

EFFECT OF CONTACT INHIBITION ON THE REGULATION OF CHOLESTEROL METABOLISM IN CULTURED VASCULAR ENCOTHELIAL CELLS. P.E. Fielding, I. Vlodavsky, D. Gospodarowicz, and C.J. Fielding (Cardiovascular Res. Inst., Cancer Res. Inst., and Dept. of Physiology and Med., Univ. of California, San Francisco, CA) *J. Biol. Chem. 254*,749-55 (1979). Cholesterol synthesis in actively growing bovine vascular endothelial cells is regulated by low density lipoprotein (LDL) at a step prior to mevalonate formation, in a manner comparable to that found in aortic smooth muscle cells. LDL uptake by these cells is associated with induction of cholesterol esterification, an increase in total cell cholesterol, and an inhibition of endogenous sterol synthesis. It is suggested that this inhibition is due to a strict contact-inhibited morphology which enables the endothelium of the larger arteries to function as a selective barrier to the high circulating levels of plasma LDL.

A POTENTIAL ROLE FOR PHOSPHOLIPIDS IN THE REGULATION OF 3-HYDROXY-3-METHYL-GLUTARYL-COENZYME A REDUCTASE IN CULTURED C-6 GLIAL CELLS. R.S. Finkel and J.J. Volpe (Dept. of Pediatrics, Washington Univ. Schl. of Med., St. Louis, MO) *Biochim. Biophys. Acta 572*,461-71 (1979). The relation of the activity of the microsomal enzyme, 3-hydroxy-3-methylglutaryl coenzyme A reductase, to cellular phospholipid composition was studied in C-6 glial cells. Phospholipid composition was perturbed by growth of cells in the naturally occurring amino alcohol, *N,N*-dimethylethanolamine. The data demonstrate that incorporation of *N,N*-dimethylethanolamine into the polar head group of cellular phospholipids has a major impact on the regulation of the reductase. These observations may have particular relevance for the mechanisms of regulation of this enzyme, the cellular adaptation to alterations in membrane lipid composition, and the regulation of cholesterol synthesis in the developing nervous system.

EFFECT OF DIETARY EGG ON HUMAN SERUM CHOLESTEROL AND TRIGLYCERIDES. M.A. Flynn, G.B. Nolph, T.C. Flynn, R. Kahrs, and G. Krause (Univ. of Missouri-Columbia, Dept. of Family and Community Med., Dept. of Pathology, School of Med., College of Home Economics and Dept. of Statistics, Columbia, MO) *Amer. J. Clin. Nutr. 32*(5), 1051-7 (1979). One hundred sixteen male volunteers between the ages of 32 and 62 years (mean age 46) consumed two whole fresh eggs daily in their customary diets for 3 months and also eliminated eggs for 3 months before or after eating eggs. The men had had normal-range serum cholesterol and triglycerides for the past 7 years. Four-day food records kept by them in each experimental period were assessed for nutrient intake. A Latin square design allowed analyses for season and sequential effects on serum lipids. The serum cholesterol and triglyceride levels at the end of 6 months were compared with their initial levels on customary free choice diets as well as their levels after the first 3 months of study. No significant increase in mean serum cholesterol was found nor was there a significant association of dietary cholesterol intake with either serum cholesterol or triglyceride.

SIDE CHAIN CLEAVAGE OF SOME CHOLESTEROL ESTERS. F. Gasparini, A. Wolfson, R. Hochberg, and S. Lieberman (Depts. of Biochem. and of Obstetrics and Gynecology, and The International Inst. for the Study of Human Reproduction, The College of Physicians and Surgeons, Columbia Univ., New York, NY 10032) *J. Biol. Chem. 254*(14),6650-6 (1979). For some time it has been known that the side chain of cholesterol sulfate is cleaved by the cleavage enzyme system present in bovine adrenal mitochondria without prior hydrolysis of the sulfate moiety. In this work, other inorganic esters as well as some organic esters of cholesterol were tested as substrates for this enzyme system. The results revealed that cholesterol can also be cleaved by the enzyme system to their respective pregnenolone derivatives without first being hydrolyzed to cholesterol. The rate of oxidation of the carboxylic acid esters decreased as the size of the acyl groups increased. Cholesterol stearate and cholesterol phosphate were demonstrated to be inhibitors of the side chain cleavage of cholesterol. While digitonin, as might be expected, inhibits the cleavage of cholesterol, it accelerates the oxidation of both cholesterol sulfate and cholesterol nitrate. The results reported in this paper add support to the previously proposed hypothesis that more than one cholesterol side chain cleavage enzyme system exists in adrenal mitochondria.

EFFECT OF RETINOIC ACID AND RETINYL ACETATE FEEDING UPON LIPID METABOLISM IN ADRENALECTOMIZED RATS. L.E. Gerber and J.W. Erdman, Jr. (Dept of Food Science, University of Illinois, Urbana, IL 61801) *J. Nutr. 109*(4), 580-9 (1979). A series of experiments were performed in order to assess the possible role of the adrenal gland in vitamin A-induced lipid alterations in rats. Adrenal ectomized, sham-operated, and intact rats were fed retinoic acid or retinyl acetate at several levels. Vitamin A, especially in the form of retinoic acid, was found to induce an elevation of plasma triglycerides. These experiments demonstrate that vitamin A, especially in the form of retinoic acid, fed at as low as 25 RE/g diet to the rat can induce hypertriglyceridemia, and that the adrenal gland does not mediate this effect.

THE SYNTHESIS AND METABOLISM OF THE LIPOPROTEINS IMPLICATED IN ATHEROSCLEROSIS. G.S. Getz (Departments of Pathology and Biochemistry, and Specialized Center of Research in Atherosclerosis, University of Chicago and the Pritzker School of

Medicine, Chicago, Illinois 60637) *Artery* 5(4),330-45 (Leonidas, MI) (1979). The basic concepts of lipoprotein biogenesis and metabolism have been briefly reviewed. Emphasis has been placed upon the distinctive roles of the liver and intestine in apolipoprotein synthesis and delivery, upon the complex interchange of lipids and apolipoproteins between lipoproteins which accompanies nascent lipoprotein maturation and metabolsim within the vascular compartment, upon the primary role of these latter processes in the genesis of low density lipoprotein and upon the remodelling of nascent lipoproteins to achieve a structure suitable for the function of the mature lipoproteins in the carriage of triglycerides and cholesterol between the liver, intestine and peripheral tissues.

OXIDATIVE ACTIVATION OF GUANYLATE CYCLASE BY PROSTAGLANDIN ENDOPEROXIDES AND FATTY ACID HYDROPEROXIDES. G. Graff, J.H. Stephenson, R.R. Winget, and N.D. Goldberg (Dept. of Pharmacology and Dept. of Pathology and Lab. Med., Univ. of Minn. Med. School, Minneapolis, MN 55455) *Lipids* 14(2),212-28 (1979). Purified prostaglandin endoperoxides (PGG_2 and PGH_2) and hydroperoxides (15-OOH-PGE_2) as well as fatty acid hydroperoxides (12-OOH-20:4, 15-OOH-20:4 and 13-OOH-18:2) were examined as effectors of soluble splenic cell guanylate cyclase activity. The observations indicate that fatty acid hydroperoxides and prostaglandin endoperoxides promote activation of the cyclase by oxidation of enzyme-related thiol functions. Studies to identify the species of the rapidly metabolized prostaglandin endoperoxides that serve as effectors of the cyclase indicated the PGG_2 but not 15-OOH-PGE_2 is most likely an activator. These results suggest that activation of soluble guanylate cyclase from splenic cells can be achieved by the oxidation of sulfhydryls that may be associated with specific hydrophobic sites of the enzyme or a related regulatory component.

THE INTERACTION OF DIVALENT CATIONS WITH (Na,K)-ATPase: A LIPID-BOUND FLUORESCENCE PROBE STUDY. S.S. Gupte, L.K. Lane, D. Johnson, E.T. Wallick, A. Schwartz (Dept. of Pharmacology and Cell Biophysics, Univ. of Cincinnati College of Medicine, Cincinnati, OH 45267) *J. Biol. Chem.* 254(12), 5099-103 (1979). The lipid-bound fluorescnece probes dansyl phosphatidylethanolamine (DPE) and 12-(9-anthroyl) stearate (12-AS) have been incorporated into purified lamb kidney (Na,K)-ATPase and into the lipids extracted from (Na,K)-ATPase. Addition of 5mM $MgCl_2$ or 1mM $CaCl_2$ caused a 20% enhancement in the fluorescence of DPE incorporated into (Na,K)-ATPase (DPE-(Na,K)-ATPase) and a 50% enhancement in the fluorescence of DPE incorporated into extracted lipids (DPE-lipids). The efficiency of energy transfer was higher for (Na,K)-ATPase labeled at 4 C (below T_l) compared to (Na,K)-ATPase labeled at 37 C (above T_h), indicating two domains of lipids present in (Na,K)-ATPase membranes.

PHARMACOKINETICS AND AMOUNTS OF 25-HYDROCHOLECALCIFEROL IN SHEEP AFFECTED BY OSTEODYSTROPHY. M. Hidiroglou, C.J. Williams, and M. Ivan (Res. Branch, Agr. Canada, Ottawa, Ontario, Canada) *J. Dairy Sci.* 62(4),567-71 (1979). Amounts of 25-hydroxycholecalciferol in plasma were measured in two groups (A and B) of lambs (Experiment 1) and in two groups (C and D) of wethers (Experiment 2). Groups A (eight lambs) and C (nine wethers) consisted of animals born and raised in total confinement; these animals exhibited an osteodystrophic condition. Groups B (four lambs) and D (10 wethers) consisted of healthy animals born and raised in a conventional barn with free access to an open barn yard (i.e. exposure to sunshine). The 25-hydroxycholecalciferol in plasma of both groups of sick animals, Group A (12.9 ng/ml) and Group C (18.0 ng/ml), were lower than the amounts of the two corresponding groups of healthy animals, Group B (29.2 ng/ml) and Group D (32.5 ng/ml). Pharmacokinetic analysis of 25-hydroxycholecalciferol in affected lambs following intramuscular injection of 1,000,000 IU vitamin D_3 indicated that transport of vitamin D_3 from the site of injection to the liver and its metabolism to 25-hydroxycholecalciferol were rapid. Peak 25-hydroxycholecalciferol occurred at .6 wk, and half-life was 3.1 wk.

CORRELATION IN THE HUMAN AORTA OF APO B FRACTIONS WITH TISSUE CHOLESTEROL AND COLLAGEN CONTENT. H.F. Hoff, M. Karagas, C.L. Heideman, J.W. Gaubatz and A.M. Gotto, Jr. (Departments of Medicine, and Pathology, Baylor College of Medicine, Houston, TX 77030) *Atherosclerosis* 32(3),259-68 (1979). The amounts of buffer- and Triton-extracted apo B (LDL-protein), as well as the sum of these two fractions, were correlated with the total tissue cholesterol and hydroxyproline content (as a measure of collagen) in grossly normal intima, fatty streaks, and fibrous plaques of human aortas obtained at autopsy. The positive correlation between Triton-extracted apo B and cholesterol in plaques suggests one or both of the following: the extracellular pool of cholesterol or some material increasing concurrently with cholesterol interacts with apo B or another part of the LDL particle; or the apo B containing lipoprotein is trapped in the hydrophobic apo B and tissue collagen and the lack of a significant correlation between buffer-extracted apo B and collagen content suggests that collagen is probably not responsible for apo B retention in the aortic intima.

SYNTHESIS OF 1-PALMITOYL AND 1-STEAROYL PHOSPHATIDYLCHOLINES FROM MIXTURES OF ACYL ACCEPTORS VIA ACYL-COA:1-ACYL-*SN*-GLYCERO-3-PHOSPHORYLCHOLINE ACYLTRANSFERASE IN LIVER MICROSOMES. B.J. Holub, J.A. MacNaughton and J. Piekarski (Dept. of Nutr., Univ. of Guelph, Guelph, Ontario N1G 2W1, Canada) *Biochim. Biophys. Acta* 572,413-22 (1979). The fatty acid selectivity of the acyl-CoA:1-acyl-*sn*-glycero-3-phosphorylcholine acyltransferase in rat liver microsomes was studied using a mixture of the [1-^{3}H] palmitoyl plus [1-^{14}C] stearoyl molecular species of 1-acylglycerylphosphorylcholine. The results support the potential importance of the fatty acid selectivities of the acyl-CoA:1-acyl-*sn*-glycero-3-phosphoryl-choline acyltransferase towards both acyl acceptor and donor in regulating the phosphatidylcholine species formed by this reaction *in vivo*.

SUBSTRATE SELECTIVITY OF DIACYLGLYCEROL KINASE IN GUINEA PIG BRAIN. B.J. Holub and J. Piekarski (Dept. of Nutr., Univ. of Guelph, Guelph, Ontario, Canada N1G 2W1) *Lipids* 14,309-11 (1979). The present study was conducted to test the selectivity of the microsomal diacylglycerol kinase (ATP:1,2-diacyl-*sn*-glycerol phosphotransferase) from guinea pig brain towards different 1,2-diacyl-*sn*-glycerols. No marked enzyme selectivity for either the 1-palmitoyl or 1-stearoyl homolog of the various 1-saturated 2-unsaturated diacylglycerols was apparent. Generally similar results were obtained with the diacylglycerol kinase in rat brain microsomes.

CARDIAC AND RENAL LIPASES AND PROSTAGLANDIN BIOSYNTHESIS. W. Hsueh and P. Needleman (Depts. of Pharmacology and Pathology, Washington Univ., St. Louis, MO 63110) *Lipids* 14(2),236-40 (1979). The tissue phospholipids of isolated Krebs perfused rabbit hearts and kidneys can be efficiently labeled with [^{14}C] arachidonic acid. Subsequent stimulation of the prelabeled organ with hormones or ischemia results in release of [^{14}C] prostaglandins (PG). There is a highly efficient acylation mechanism existing in these perfused organs. Thus, tissue lipase activity can only be quantitatively assessed by measuring the [^{14}C] arachidonic acid in the venous effluent in the presence of albumin infusion which "traps" the released fatty acid. Hormone stimulation elicits tightly coupled PG synthesis in the vasculature which possess both phospholipase and the cyclooxygenase while ischemia induced deacylation in the entire tissue, but the majority of the arachidonic acid released is not converted to PG due to a relative lack of cyclooxygenase activity in myocytes and renal tubules.

AN *IN VIVO* COMPARISON OF ACETATE AND PALMITATE AS PRECURSORS OF SURFACTANT PHOSPHATIDYLCHOLINE. A. Jobe (Fetal-Maternal Res. Lab., Building A-17, Los Angeles County Harbor-UCLA Med. Center, 1000 W. Carson St., Torrance, CA) *Biochim. Biophys. Acta* 572,404-12 (1979). 3-day old rabbits were injected simultaneously with [^{3}H] acetate and [^{14}C] palmitic acid. The specific activities of lung, lamellar body and surfactant phosphatidylcholine and disaturated phosphatidylcholine were measured at time intervals from 10 min to 23 h following isotope administration. Apparently the palmitic acid synthesized from acetate is preferentially incorporated into lung phosphatidylcholines and disaturated phosphatidylcholines which are destined to become surfactant.

TRANS FATTY ACIDS: POSITIONAL SPECIFICITY IN BRAIN LECITHIN. R,I, Karney and G.A. Dhopeshwarkar (Laboratory of Nuclear Medicine and Radiation Biology, 900 Veteran Ave., Univ. of Calif., Los Angeles, CA 90024) *Lipids* 14(3),257-61 (1979). Fifteen-day-old rats were divided into three groups: one received an intracerebral injection of 5 μCi of 9-*trans*,12-*trans* [1-^{14}C] octadecadienoic acid; the second group was given 5 μCi of the same compound plus an equal wt of nonradioactive all *cis* arachidonic acid; the third group was given 5 μCi of 9-*trans* [1-^{14}C] octadecenoic acid. All animals were sacrificed 8 hr after injection. Glycerophosphocholine (GPC) was isolated and partically deacylated with phospholipase A_2 from *Crotalus Adamanteus* venom. The possibility is discussed that the observed distribution pattern of the injected radioactive tracers may be attributed to tissue metabolic specificity. Ramifications of the deposition of dietary *trans* fatty acids in the brain during the developmental stage of the central nervous system are also discussed.

GROWTH, LIPID METABOLISM AND PATHOLOGY OF TWO STRAINS OF RATS FED HIGH FAT DIETS. J.K.G. Kramer, H.W. Hulan, H.L. Trenholm, A.H. Corner (Animal Research Institute Agriculture Canada, Ottawa, Ontario, Canada K1A 0C6) *J.*

Nutr. 109(2),202-13 (1979). Studies were carried out on Sprague-Dawley (SD) and Chester Beatty (CB) rats to determine whether the difference in incidence of myocardial lesions can be related to dietary factors and parameters known to be affected in SD rats fed rapeseed oils. The two strains of young, male rats were fed diets which contained 20% by weight of either corn, LEAR (low erucic acid) or HEAR (high erucic acid rapeseed) oils for a period of up to 16 weeks. A signficantly lower incidence of focal myocardial necrosis was observed in CB rats than in SD rats. The incidence of this heart lesion in CB rats was similar between all diets; in SD rats a higher incidence was observed in the groups fed rapeseed oils. In both strains the growth rates of rats fed LEAR and corn oils were similar; growth rates with HEAR oil diets were much lower than the other oils. There was no evidence to indicate that differences in heart lesion response between the two rat strains could be related to cardiac triglycerides, free fatty acids or phospholipids.

NADH- AND NADPH-DEPENDENT DESATURATION OF LINOLEIC ACID IN THE EXTRACTED MICROSOMAL FRACTION OF RAT LIVER, AND RELATED EFFECTS OF CATALASE AND HYDROGEN PEROXIDE. O.M. Larsson and L. Brimer (The Royal Danish Schl. of Pharmacy, Biochem. Lab., 2, Universitetsparken, DK-2100 Copenhagen, Denmark) *Biochim. Biophys. Acta 572*,395-403 (1979). The NADPH-dependent Δ^6 desaturationof linoleic acid is decreased by low ionic strength extraction of the microsomal fraction from rat liver. On the other hand, the NADH-dependent desaturase activity is slightly increased. On the basis of these results we suggest that the decreased NADPH-dependent desaturase activity of the extracted microsomal fraction is due to a microsomal formation of hydrogen peroxide which possibly inactivates one or more components of the microsomal electron transport system. Furthermore, in the present microsomal fraction the formation of hydrogen peroxide seems to be NADPH-dependent.

MECHANISM OF CYTOCHROME B_5 BINDING TO PHOSPHATIDYLCHOLINE VESICLES. T.L. Leto, and P.W. Hollway (Dept. of Biochem., Univ. of Virginia School of Med., Charlottesville, VA 22908) *J. Biol. Chem. 254*(12),5015-19 (1979). The mechanism of binding of rabbit liver cytochrome b_5 to phosphatidylcholine vesicles was studied by monitoring fluorescence of tryptophan residues in the hydrophobic domain of the protein. Aqueous solutions of detergent-isolated cytochrome b_5 contain a mixture of monomer and octomer. These solutions, when mixed with phosphatidylcholine vesicles, exhibit biphasic kinetics of fluorescence enhancement. Solutions of monomeric cytochrome b_5 display only the rapid phase. The slow phase is independent of phospholipid conconcentration and demonstrates a first order dependence on cytochrome b_5 concentration. This indicates that the slow phase cannot be attributed to a direct bimolecular interaction of octomer with vesicles. We suggest that binding with cytochrome b_5 vesicles occurs with the monomeric species of the protein and that the slow phase of fluorescence enhancement is the result of a slow dissociation of octomer to monomer followed by rapid binding of monomer to vesicles.

PHOSPHOLIPASE A_2 IN RAT-LUNG MICROSOMES: SUBSTRATE SPECIFICITY TOWARDS ENDOGENOUS PHOSPHATIDYLCHOLINES. W.J. Longmore, V. Oldenborg and L.M.G. Van Golde (Lab of Vet. Biochem., State Univ. of Utrecht, The Netherlands) *Biochim. Biophys. Acta 572*,452-60 (1979). Isolated rat lungs were perfused with a variety of radioactive precursors to label the phosphatidylcholines of the microsomal and lamellar body fractions. These endogenously labelled phosphatidylcholines were used as substrates in experiments to identify and characterize phospholipase A activity in lung subcellular fractions. The microsomal fraction was found to contain a phospholipase A specific for the 2-position of endogenous phosphatidylcholines. The enzyme oprated optimally at pH 8.5 and required 10 mM Ca^{2+} for maximal activity. These results suggest the existence of two pools of disaturated phosphatidylcholines in rat-lung microsomes. They are consistent with the concept that dipalmitoylphosphatidylcholine synthesized by remodeling of unsaturated phosphatidylcholines with exogenously supplied palmitic acid, is not hydrolysed by phospholipase A_2 of lung microsomes.

EFFECT OF SUBSTRATE PROPERTIES ON THE ACTIVITY OF LYSOSOMAL CHOLESTERYL ESTER HYDROLASE. B. Lundberg, R. Klemets and T. Lövgren (Dept. of Biochem. and Pharmacy, Åbo Akademi, Porthansgatan 3, SF-20500, Åbo 50, Finland) *Biochim. Biophys. Acta 572*(3),492-501 (1979). The effects of the substrate properties on the catalytic activity of lysosomal cholesteryl ester hydrolase from rat liver have been examined with three standard substrate types: vesicle, micelle and emulsion. The mixed micelle of sodium taurocholate and phosphatidylcholine was the most potent substrate vehicle. With dipalmitoyl phosphatidylcholine vesicles the enzyme showed maximal activity at the gel-liquid-crystalline transition temperature of the phospholipid. The possible physiological significance of the lysosomal cholesteryl ester hydrolase is discussed with special reference to the form of the substrate.

THE EFFECT OF A PUTATIVE ANTI-ATHEROSCLEROTIC AGENT (S 1204) ON LIPID METABOLISM IN RABBIT AORTA. G. Marquie (Laboratoire de Physiologie Métabolique et de la Nutrition, Institut de Biologie, Université des Sciences et de la Technologie, P.O. Box 9, Dar-el-Beida (Alger) *Atherosclerosis 32*(3),253-7 (1979). The effects of the novel fenfluramine derivative, S 1204 (meta-trifluoromethyl phenyl-1 [β(sulfamyl-3'-chloro-4'-benzoyloxyethyl)] amino-2-propane) were studied on lipid metabolism in rabbit aorta and other tissues. Pretreatment of rabbits with S 1204 (50 mg/kg orally) for 10 days strongly inhibited the aortic incorporation of an intravenous 20 μCi tracer-dose of [4-^{14}C] -cholesterol given 24 h earlier. The results indicate that S 1204 may have anti-atherogenic properties, which could be valuable in the clinical treatment of atherosclerosis.

THE RELATIONSHIP OF DIETARY FATS TO PROSTAGLANDIN BIOSYNTHESIS. M.M. Mathias and J.Dupont (Dept. of Food Sci. and Nutr., Colorado State Univ., Fort Collins, Colorado 80523) *Lipids 14*,247-52 (1979). The direct and indirect evidence that the fatty acid composition of dietary fat is involved in the regulation of prostaglandin biosynthesis was reviewed. Direct evidence included effects of essential fatty acid deficiencies and excesses on endogenous tissue levels and production rates of prostaglandins by several tissues. Indirect evidence indicated lipolytic, platelet aggregatory, hypertensive, inflammatory and immune responses. In general, composition of dietary fat did not affect prostaglandin biosynthesis unless a biochemical essential fatty acid deficiency was induced or the linoleate to saturated fatty acids ratio of the dietary fat was greater than 5. Most results were interpreted in light of changing fatty acid composition; however, very few direct measurements have been made.

COMPARISON OF FISH MEAL AND SOYBEAN MEAL IN THE PREVENTION OF FATTY LIVER-HEMORRHAGIC SYNDROME IN CAGED LAYERS. D.V. Maurice, L.S. Jensen, and H. Tojo (Dept. of Poultry Science, Univ. of Georgia, Athens, Georgia) *Poult. Sci. 58*(4),864-70 (1979). Two experiments, of five weeks each, were designed to study the effect of protein source and level of dietary protein on hepatic and plasma lipids and incidence of liver hemorrhage in caged laying hens. Experiment 1 compared equicaloric (3.1 kcal/g) and isonitrogenous (12.5%) corn-fish meal and corn-soybean diets. Influence of dietary protein source was reevaluated in Experiment 2 and the effect of adding selenium (0.3 mg/kg as Na_2SeO_3) or a combination of trace elements (As, Br, Cr, F, Mo, Ni, Sn, V) to the corn-soybean diet on liver lipid accumulation examined. Neither selenium nor the combination of trace elements had a significant effect on hepatic and plasma lipids. Adding selenium to the corn-soybean diet reduced incidence of liver hemorrhage to the same level as that observed with the corn-fish meal diet.

HIGH DENSITY LIPOPROTEIN CHOLESTEROL IN MALE RELATIVES OF PATIENTS WITH CORONARY HEART DISEASE. H. Micheli, D. Pometta, C. Jornot, and J. Scherrer (Divisions de Diabétologie et d'Informatique, Department of Medicine of the University of Geneva, Geneva, Switzerland) *Atherosclerosis 32*(3), 269-76 (1979). To study factors that play a role in the familial occurrence of coronary heart disease, very low density lipoprotein (VLDL) triglycerides, low density lipoprotein (LDL) cholesterol and high density lipoprotein (HDL) cholesterol were measured after preparative ultracentrifugation in first degree male relatives of coronary patients and in control subjects. The HDL cholesterol concentration was significantly lower in relatives of 20-71 years old than in controls. No increase of serum and LDL cholesterol was found. A low HDL cholesterol level appears to be a marker of relatives of coronary patients.

LEVELS OF CEREBROSIDES, SULFATIDES, AND GALACTOSYL DIGLYCERIDES IN DIFFERENT REGIONS OF RAT BRAIN, CHANGE DURING MATURATION AND DISTRIBUTION IN SUBCELLULAR FRACTIONS OF GRAY AND WHITE MATTER OF SHEEP BRAIN. G. Nonaka and Y. Kishimoto (The John F. Kennedy Inst., 707 N. Broadway, Baltimore, MD) *Biochim. Biophys. Acta 572*,432-41 (1979). The concentrations of galactosyl non-hydroxyceramide, galactosyl hydroxyceramide, non-hydroxyfatide, hydroxysulfatide, monogalactosyl diglyceride, and glucosyl ceramide were determined in brain stem, cerebellum, cerebral hemisphere, and dienephalone of brains from 5-, 10-, 14-, 19-, 26-, and 37-day old rats by high performance liquid chromatography. The concentrations of cerebrosides and sulfatides increased rapidly in all areas of the brain during the maturational period. The most rapid increase was in the brain stem, and the least rapid increase was in the cerebral hemisphere.

POSITIONAL DISTRIBUTION OF FATTY ACIDS IN THE GLYCEROPHOSPHOLIPIDS OF *TETRAHYMENA PYRIFORMIS*. J. Pieringer and R.L. Conner (Bryn Mawr College, Bryn Mawr, PA 19010) *J. Lipid Res. 20*(3),363-70 (1979). The positional distributions of the fatty acids in the major glycerophospholipids of *Tetrahymena pyriformis* W were analyzed. A comparison was made of the acyl distributions in normal and ergosterol-grown cells. It was assumed that the positional arrangement of fatty acids would serve as an indicator of acyltransferase enzyme specificity. The qualitative pattern of the fatty acyl distribution is the same in both normal and ergosterol-grown organisms. The data are interpreted to indicate that the fatty acid transformations in the glycerophospholipids of organisms that contain ergosterol are not the result of altered acyltransferase specificities.

MEMBRANE-BOUND PHOSPHOLIPID DESATURASES. E.L. Pugh and M. Kates (Dept. of Biochem., Univ. of Ottawa, Ottawa, Canada, K1N 6N5) *Lipids 14*(2),159-65 (1979). This review covers studies on membrane-bound phospholipid desaturases in yeast and rat liver carried out in this laboratory. In yeast the desaturase system was shown to effect the direct desaturation of dioleoyl-lecithin to dilinoleoyl-lecithin. In rat liver the desaturase was capable of converting 2-eicosatrienoyl-lecithin to 2-arachidonoyl-lecithin. Both systems required reduced pyridine nucleotides, O_2 and cytochrome b_5. Eicosatrienoyl-lecithin desaturase along with eicosatrienoyl-CoA desaturase of rat liver microsomes was solubilized with detergents and purified 7-8-fold from the microsomal pellets. The demonstration of desaturation of eicosatrienoyl-lecithin by a solubilized and partially purified desaturase provides strong evidence for the direct desaturation of the lecithin substrate without prior conversion to the acyl-CoA thiolester.

INHIBITION OF FATTY ACID OXIDATION BY 2-BROMOOCTANOATE. B.M. Raaka and J.M. Lowenstein (Graduate Department of Biochem., Brandeis Univ., Waltham, MA 02154) *J. Biol. Chem. 254*(14),6755-62 (1979). Incubation of rat liver mitochondria with 10 μM DL-2-bromooctanoate causes complete and irreversible inactivation of 3-ketothiolase I(acyl-CoA:acetyl-CoA *C*-acyltransferase). Evidence is presented that mitochondria convert bromooctanoate to 2-bromo-3-ketooctanoyl-CoA, an α-haloketone which is probably the active form of the inhibitor. The inactivation is accompanied by incorporation of radioactivity from [1-^{14}C]bromooctanoate into the enzyme. Bromooctanoate does not affect the activities of the other enzymes of β-oxidation, except for 3-ketothiolase II(acetyl-CoA:acetyl-CoA *C*-acetyltransferase), which becomes partially inhibited. Evidence is also presented that various enzymes of β-oxidation can use 2-bromooctanoyl-CoA and it β-oxidation products as substrates.

THE EFFECTS OF PHENOBARBITAL ON BILIARY LIPID METABOLISM IN CHOLESTEROL GALLSTONE SUBJECTS. R.N. Redinger (Univ. Hosp., Dept. of Medicine, London, Ontario, Canada) *Lipids 14*,277-84 (1979). The effect of 1.7-2.2 mg/day oral phenobarbital over short (1 MO) and long term 6-24 MO) treatment on primary bile acid (BA) secretion, composition, synthesis, pool size, and enterohepatic cycling rates as well as phospholipid (PL) and cholesterol (C) secretion rates and biliary composition was determined in 12 asymptomatic cholesterol gallstone subjects while 5 normals had only short term studies. Thus, phenobarbital affected hepatic metabolism of CA by enhancing production rate, secretion, and pool size; and intestinal metabolism of both CA and chenodeoxycholic (CDC) acids by increasing their cycling rates. Phenobarbital may have failed to produce stone dissolution by enhancing CA production and pool size more than that of CDC.

EFFECTS OF HIGH AND LOW ERUCIC ACID RAPESEED OILS ON ENERGY METABOLISM AND MITOCHONDRIAL FUNCTION OF THE CHICK. R. Renner, S.M. Innis and M.T. Clandinin (Div. of Foods and Nutr., Faculty of Home Econ., Univ. of Alberta, Edmonton, Alberta T6G 2E2) *J. Nutr. 109*,378-87 (1979). Duplicate experiments were conducted to compare energy utilization, growth, cardiac mitochondrial oxidative phosphorylation, and mitochondrial membrane fatty acid composition of chicks fed diets containing 20 parts of high erucic acid rapeseed oil (HER), low erucic acid rapeseed oil (LER) or sunflower seed oil (SFO) for 24

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