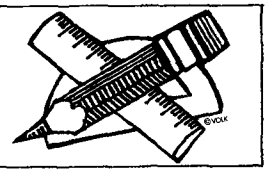
# Abstracts





## • Fats and Oils

PROCESSING OF OILS AND FATS. V. Young, *Chem. Ind.* 1978, 692–703. Current procedures for storage, degumming, neutralisation, bleaching, filtration, deodorisation, physical refining, fractionation and interesterification are reviewed. (World Surface Coatings Abs. No. 440)

APPLICATION OF GAS CHROMATOGRAPHY TO THE IDENTIFICATION OF WAXES. R. White, *Studies Conservat.* 23(2), 57–68 (1978). Gas chromatography is generally superior to IR spectroscopy for the identification of waxes. The best conditions are a column of OV-1 on acid-washed Diatomite, with programmed temp. from 180 to 380°C. Some examples of the analysis of museum objects are given. (World Surface Coatings Abs. No. 440)

SILVER NITRATE IN REVERSED-PHASE HIGH PERFORMANCE LIQUID CHROMATOGRAPHY: SEPARATION OF CIS- AND TRANS-ISOMERS OF MONOENOIC FATTY ACID P-BROMOPHENACYL ESTERS. H. W-S. Chan and G. Levett, *Chem. Ind.* 1978, 578–9. Silver nitrate in the aqueous methanol mobile phase enabled the separation of the retention times within the pairs oleic and elaidic acid, and erucic and brassidic acid. Detection was by absorption at 257 nm. (World Surface Coatings Abs. No. 438)

INTERACTION OF TRIGLYCERIDES AND DIGLYCERIDES OF PALM OIL. *Oleàgineux* 33, 625–8 (1978). The role and mode of action of diglycerides during crystallization of palm oil were investigated. Similarities in structure between triglycerides and 1:3 diglycerides suggest that some diglyceride molecules were probably being adsorbed into the crystal lattices of triglycerides. This heterogeneous mixture was unable to pack closely and was more easily disrupted by heat than a structure built up entirely of triglyceride molecules. Consequently, there was a reduction in heats of fusion as well as solid contents. The life of the unstable polymorphic phases, namely, $\beta\frac{1}{2}$ and $\alpha$ were prolonged.

LIPID COMPOSITION OF EDIBLE MARGARINES. A. Strocchi, *Rev. Fr. Corps Gras* 26, 9–16 (1979). The consumer available edible margarines in Italy show marked differences concerning the fatty acid content and composition. The unsaturated margarines obtained from a single oil have the highest rates of trans fatty acids. The unsaponifiable fraction of vegetable oils is practically unchanged by hydrogenation. The analysis of geometrical and positional isomers of unsaturated fatty acids enables to know if a margarine contains a single oil.

VALORIZATION OF TROPICAL FATS AND OILS: REFINING AND FRACTIONATION OF THE PALM-OIL. D. Pairaud, *Rev. Fr. Corps Gras* 26, 5–8 (1979). The main unitary operations of refining and fractionation for the palm oil are reviewed. Then, its different uses in food and industry fields are expounded. The palm oil is a new product with a lot of not yet studied uses.

POLYENIC FATS FOR THE COATING INDUSTRY. R. Poisson, *Rev. Fr. Corps Gras* 25, 539–49 (1978). Some oils, called drying oils, give solid skins under the effect to air, when they are in thin films. This property is owed to the presence of polyenic acids in a large quantity. In presence of air, these undergo extremely complex autoxipolymerisation reactions giving polymers. These natural, more or less transformed, products have been used in the coating industry for a long time. Now, they are substituted in a large part by synthesis products. Thanks to their siccativity owed to polyenic acids, they are used in chemical combination with many preformed polymers. The obtained products become reticulable after application on a surface under the effect to air. Nowadays the natural fats are an irreplaceable help in filmogen polymer industry.

DETERMINATION OF GLYCERIDIC COMPOSITION OF FATS AND OILS BY HIGH-PRESSURE LIQUID CHROMATOGRAPHY WITH GRADIENT ELUTION. A. Karleskind, *et al.*, *Rev. Fr. Corps Gras* 25, 551–6 (1978). The high-pressure liquid chromatography with uv-absorption detector permits to study fats and oils glyceridic composition, after transformation in iodochloride containing compounds. The use of gradient elution is necessary to improve the peaks separation. The application of high-pressure liquid chromatography to the determination of oil purity is described. But this method has a high cost price, specially with gradient elution for which the solvents cannot be recycled.

THERMAL BEHAVIOUR OF FATS AND OILS. II. RAPESEED OIL AND DERIVATIVES. R. Perron and M. Broncy, *Rev. Fr. Corps Gras* 25, 525–31 (1978). As it was made for palm oil and derivatives, Primor rapeseed oil and its derivatives obtained by hydrogenation, interesterification and fractionation were examined by variable temperature NMR and DTA, correlating the results of these two methods. In order to relate thermal behaviour and composition of fats and oils, it is particulary shown that binary representations with simple monovariant regions can schematically depict this behaviour, which is so much simpler that the fat is more unsaturated. As for palm oil, in the case of unstable forms at low temperatures endothermal solid-solid transitions favoured by the presence of a liquid phase have been evidenced.

DEVELOPMENT OF A METHOD FOR DETERMINING TRISATURATED GLYCERIDES IN FATS AND OILS. APPLICATION TO THE PALM OIL AND ITS FRACTIONS. C. Bouvron, *Rev. Fr. Corps Gras*, 26, 17–21 (1979). The fat is oxidised by the potassium permanganate in acetone medium; the unchanged saturated glycerides are extracted and directly determined by liquid-gas chromatography. The quantitativity is possible thanks to the use of an internal standard (trimyristin) and response coefficients for every glyceride. This method is applied to concrete and fluid fractions from palm-oil.

UNSATURATED FATS AND DERIVATIVES USED IN TANNERY. J. Pore, *Rev. Fr. Corps Gras* 25, 533–7 (1978). Oils from viscera of marine animals—fishes or mammals are the polyunsaturated fats the most often used in tannery or directly or after transformation in order to be used in aqueous medium as emulsions O/W (sulfatation-sulfonation) or W/O (oxydation). The properties, composition and applications of these products are recalled; the advantages and disadvantages of their uses are shown; some studies on the harmful effects owed to an inadequate use are reviewed.

DETERMINATION OF THE PURITY OF VEGETABLE MARGARINES: PROBLEMS OF THE INEVITABLE MIXTURES. J.P. Wolff, *Rev. Fr. Corps Gras* 26, 23–8 (1978). Vegetable margarines must contain only vegetable fats and oils. However, they may be contamined by some amounts of animal fats or marine oils as inevitable pollution coming from the hydrogenated fats employed or from the installation when an other blend of fats is used. The detection of animal fats in vegetable oils may be performed by the analysis of cholesterol in the total sterols or by the content of cholesterol in the fatty blend itself. The occurence of some amount of cholesterol in the sterols of some vegetable oils and fats: palm, palm kernel, coconut (up to 8%) complicates the possibility of using this method. The means of using this method for detection animal fat or marine oils until 1 or 2% are described.

TRANS ACID RESTRICTED HARD BUTTERS. John M. Hasman, SCM Corporation, New York, N.Y. U.S. 4,134,905. A non-fractionated, partially hydrogenated, non-lauric glyceride oil product suitable as a hard butter is made by hydrogenating the oil with copper-chromite catalyst to an Iodine Value of about 100–110 followed by hydrogenation with a conventional hydrogenation catalyst, suitably nickel, until hard butter characteristics of the fatty product are achieved.

THE CONTENT AND COMPOSITION OF STEROLS AND STEROL ESTERS IN LOW ERUCIC ACID RAPESEED (BRASSICA NAPUS). A. Johansson and L.A. Appelqvist, *Lipids* 13, 658–65 (1978). The low temperature crystallization technique for the enrichment of "minor" components, such as sterols and sterol esters, from vegetable oils was applied to low erucic acid rapeseed oils.

The recovery of free sterols and sterol esters was estimated by use of $^{14}$C-cholesterol and $^{14}$C-cholesterol oleate. 80% of the free sterols and 45% of the sterol esters were recovered in the liquid fraction, while in two studies total recoveries were 95% and 99%, respectively. Little or no variation in sterol and sterol ester patterns with locality within Sweden was observed for the one cultivar of summer rapeseed investigated by the low temperature crystallization technique.

DEUTERATED PHOSPHOLIPIDS AS RAMAN SPECTROSCOPIC PROBES OF MEMBRANE STRUCTURE: DIPALMITOYLPHOSPHATIDYLCHOLINE-DIPALMITOYLPHOSPHATIDYLETHANOLAMINE MULTILAYERS. R. Mendelsohn and T. Taraschi, *Biochemistry* 17, 3944–9 (1978). Raman spectral data are reported for several conformation-sensitive spectral regions of dipalmitoylphosphatidylethanolamine (DPPE) and for chain perdeuterated dipalmitoylphosphatidylcholine (DPL-$d_{62}$) alone, in 1:1 binary mixtures, and in 1:1:1 ternary combination with cholesterol. Raman melting curves for DPPE multilayers reveal the non-cooperative formation of 4–5 gauche rotamers per chain prior to the gel-liquid crystal transition at 66°C. This phenomenon is also evident for DPL-$d_{62}$ multilayers.

# • Drying Oils and Paints

IDENTIFICATION OF PAINT MEDIA: INTRODUCTION. J.S. Mills, *Conserv. Restor. Pict. Art* 1976, 69–71. Various techniques for the identification of media in paintings are discussed; possible media include egg tempera and glue tempera, drying oils and resins. (World Surface Coatings Abs. No. 438)

GAS CHROMATOGRAPHIC EXAMINATION OF PAINT MEDIA. SOME EXAMPLES OF MEDIUM IDENTIFICATION IN PAINTINGS BY FATTY ACID ANALYSIS. J.S. Mills and R. White, *Conserv. Restor. Pict, Art* 1976, 72–7. Egg tempera and oils, e.g. walnut oil, linseed oil and poppyseed oil, were identified in paintings by GC. (World Surface Coatings Abs. No. 438)

COLOUR STABILITY OF ARTISTS' VEHICLES. H.W. Levison. *Color Res. Appl.* 3(1), 7–9 (1978). Combinations of room illumination and dark conditions were used and the ASTM D 1925 yellowness index was determined for white paints containing linseed and safflower oils, and alkyd, damar and copal resins. Safflower oil and medium-oil alkyds yellowed the least. If linseed oil was predominant, the rest of the vehicle had little effect. (World Surface Coatings Abs. No. 438)

POLYURETHANES BASED ON TALL OIL. V.A. Era and M. Dolk. *Kem.-Kemi, Suomi* 4, 449–50 (1977). Use of tall oil in polyurethane paints is described. (World Surface Coatings Abs. No. 438)

SUSPENSION POLYMERISATION OF VINYL CHLORIDE. POLYMERISATION OF VINYL CHLORIDE IN PRESENCE OF PEOXIDISED OIL. L. Kotseva and I. Panamsky, *Europ. Polym. J.* 14, 203–4 (1978). The effect of epoxidised cottonseed oil on the polymerisation process and some major characteristics of the polymer produced, such as plasticiser absorption and K-value, were studied. Inclusion of the additive into the polymer chain was proved by IR spectrophotometry, and thermogravimetric analysis showed that the oil improved the polymer thermostability. (World Surface Coatings Abs. No. 438)

# • Biochemistry and Nutrition

MODIFICATION OF HUMAN PLATELET FUNCTION BY A DIET ENRICHED IN SATURATED OR POLYUNSATURATED FAT. J.A. Jakubowski and N.G. Ardlie, *Atherosclerosis* 31, 335–44 (1978). Twelve healthy male subjects were maintained on a saturated fat (SF) dietary regimen followed by a polyunsaturated fat (PUF) regimen. At selected intervals a number of tests were carried out to assess the effect of SF or PUF on platelet composition and activation. Concomitant with the fall in serum cholesterol, associated with the *PUF* diet, there was a decrease in plasma heparin neutralizing activity (as measured by the heparin-thrombin clotting time), and a fall in the number of circulating platelet aggregates was also observed. These results indicate that platelets may by activated in apparently normal people consuming a SF diet (the standard diet of developed countries) and that this activation may be decreased by replacement of dietary SF with PUF.

CHOLESTEROL VEHICLE IN EXPERIMENTAL ATHEROSCLEROSIS. PART 16. EFFECT OF PEANUT OIL ON PRE-ESTABLISHED LESIONS. D. Kritchevsky, S.A. Tepper and J.A. Story, *Atherosclerosis* 31, 365–70 (1978). Rabbits were fed an atherogenic diet (2% cholesterol and 6% corn oil) for 8 weeks and then divided into groups of equal average serum cholesterol levels. One group was autopsied, and the others were returned to cholesterol-free diets consisting of commercial laboratory ration or ration augmented with 6% corn oil, peanut oil or PGF, a fat designed to resemble peanut oil minus arachidic and behenic acids. The animals were maintained on the diets for 8 more weeks. On all regimens, severity of atherosclerosis was exacerbated. The extent of exacerbation was significantly less in rabbits fed corn oil than in the others. The extent of exacerbation of lesions appears to be a function of the level of unsaturation of the dietary fats.

STEROL SYNTHESIS AND $CO_2$ PRODUCTION FROM MEVALONATE IN CALVES. J.R. Linder and D.C. Beitz, *J. Lipid Res.* 19, 836–40 (1978). Nonruminating male Holstein calves were fed a reconstituted milk containing 11.7% nonfat-dried-milk solids and 3.5% beef tallow. Calves were slaughtered at 17 weeks of age. Samples of perirenal adipose tissue, liver, muscle, small intestine, kidney cortex, and kidney medulla were assayed in vitro for sterol synthesis and production of $^{14}CO_2$ from (2-$^{14}$C) mevalonate. These data reveal a shunt for mevalonate utilization that does not lead to sterols and also show that the kidney is important in the sterol and nonsterol metabolism of mevalonate.

THE SOURCES OF RAT BILIARY CHOLESTEROL AND BILE ACID. T.T. Long *et al., J. Lipid Res.* 19, 872–78 (1978). The precursor sources of bile acid and bile neutral sterol were evaluated in the rat using Triparanol to inhibit the terminal reduction in the synthesis of cholesterol. During the initial period of Triparanol administration, the accumulation of hepatic desmosterol acts to segregate relatively newly synthetic hepatic sterol from the bulk of the equilibrated sterol mass. Biliary excretion of newly synthetic sterol can then be determined in acute studies, assuming no great differences between desmosterol and cholesterol as precursors of biliary neutral sterol or bile acid.

THE EFFECT OF A FISH DIET ON SERUM LIPIDS IN HEALTHY HUMAN SUBJECTS. T.O. van Lossonczy *et al., Am. J. Clin. Nutr.* 31, 1340–6 (1978). A cross-over study was done with 19 male and 23 female volunteers living in a monastery and a convent, respectively. The effect of a fat fish (mackerel) diet on the blood serum lipid composition was studied. As the normal diet of these volunteers was of the lacto-ovo-vegetarian type, a control diet in which the fish was replaced by full-fat cheese was used. Subjects consuming the fish diet had a daily uptake of polyunsaturated acids of the $\omega$3 family of about 8 g; comparable amounts of linoleic acid were ingested with both diets. Both diets were consumed for a period of 3 weeks. Serum cholesterol was slightly but significantly (7.5%) lower and serum triglycerides considerably lower (35%) on the fish diet, whereas high density lipoprotein cholesterol increased slightly. Long-chain monoenoic acids which are abundant in the mackerel were not detected in any serum lipid fraction.

EFFECTS OF VARYING MATERNAL DIETARY CHOLESTEROL AND PHYTOSTEROL IN LACTATING WOMEN AND THEIR INFANTS. M.J. Mellies *et al., Amer. J. Clin. Nutr.* 31, 1347–54 (1978). Relationships between maternal cholesterol and phytosterol intake, and concentrations of cholesterol and phytosterol in maternal plasma, breast milk, and infant plasma were evaluated in 14 lactating mothers and their infants. No significant correlations were observed between maternal plasma and milk cholesterol levels, or between maternal milk and infant plasma cholesterol levels. On the polyunsaturate enriched as compared to a saturate enriched diet, milk content of linoleic acid was more than doubled, while oleic, palmitoleic, stearic, palmitic, and myristic acid levels were reduced.

THE VALUE OF THE NORMOLIPAEMIC RAT AS AN EXPERIMENTAL ANIMAL IN HYPOCHOLESTEROLAEMIC DRUG RESEARCH. K.R. Muller and R.G. Cortesi, *Artery (Leonidas, Mich.)* 4, 564–77 (1978). The effects of a series of clinically tested hypolipidaemic agents on the concentrations and composition of individual lipoprotein classes were determined in normal male rats. The main differences between the rat and man were the decrease in HDL-cholesterol induced by clofibrate and the decrease in VLDL-cholesterol induced by cholestyramine in rats. In view of the comparatively good correlation between the effects observed in the rat and in man, it may be concluded that the normal rat is an acceptable animal for testing

hypolipidaemic drugs, provided the effects on the lipid contents of the individual lipoprotein classes are determined.

THE EFFECT OF DIETARY FAT SUPPLEMENTS ON CHOLESTEROL METABOLISM IN RUMINANTS. P.J. Nestel *et al., J. Lipid Res.* 19, 899–909 (1978). The serum cholesterol of ruminant animals rises when supplemental fat is fed in a form that ensures the absorption of long-chain fatty acids. The effects of these fat supplements on cholesterol metabolism have been studied in sheep and goats. The reciprocal findings in the intestine and liver may reflect the increased requirement for cholesterol for the transport of triglyceride in chylomicrons and the secondary inhibiting effect of this cholesterol on sterol synthesis in the liver. Dietary fat supplementation did not alter the excretion of neutral steroids in the feces of goats but did cause a marked reduction in the excretion of acidic steroids which may have been due to the decreased formation of sterols in the liver. The hypercholesterolemia that develops in fat-fed ruminants appears to be primarily due to an increased intestinal biosynthesis of cholesterol but may also be partly due to a decreased fecal excretion of bile acids.

INTERACTION OF THE PARATHYROID AND 1,25-DIHYDROXYVITAMIN $D_3$ IN THE CONTROL OF RENAL 25-HYDROXYVITAMIN $D_3$ METABOLISM. J.L. Omdahl, *J. Biol. Chem.* 253, 8474–8 (1978). Parathyroid extract and 1,25-dihydroxyvitamin $D_3$ (1,25-$(OH)_2D_3$) were found to antagonize each other's action to regulate the kidney hydroxylation of 25-hydroxyvitamin $D_3$. Parathyroid extract prompted an increase in serum 1,25-$(OH)_2D_3$ in thyroparathyroidectomized rats whereas the administration of exogenous 1,25-$(OH)_2D_3$ resulted in stimulated 24,25-dihydroxyvitamin $D_3$ and suppressed 1,25-$(OH)_2D_3$ serum levels. Such results suggest that the kidney 25-hydroxyvitamin $D_3$- 1- and 24-hydroxylase enzyme systems are regulated in response to the relative modulatory activities of parathyroid hormone and 1,25-$(OH)_2D_3$.

PLASMA SQUALENE: LIPOPROTEIN DISTRIBUTION AND KINETIC ANALYSIS. C.D. Saudek, B.M. Frier, and G.C.K. Liu, *J. Lipid Res.* 19, 827–35 (1978). Plasma squalene concentration is increased in hypertriglyceridemia. In 24 normotriglyceridemic and 12 hypertriglyceridemic subjects, whole plasma squalene correlated strongly with plasma triglyceride ($r = 0.973$, $P < 0.001$) in the latter. In normal postabsorptive plasma, squalene was found in each lipoprotein fraction, 50.8% in very low density lipoprotein, 25.6% in low density lipoprotein, and 23.6% in high density lipoprotein. Conversion of ($^{14}C$) mevalonic acid into ($^{14}C$)squalene and kinetic analysis of ($^{14}C$)squalene die-away curves were studied in 17 subjects. We conclude that squalene in whole plasma and in lipoprotein fractions varies directly with triglyceride content.

THE INFLUENCE OF A WIDE RANGE OF ABSORBED CHOLESTEROL ON PLASMA CHOLESTEROL LEVELS IN MAN. L.A. Simons *et al., Am. J. Clin. Nutr.* 31, 1334–9 (1978). The influence of absorbed dietary cholesterol on plasma cholesterol concentration was studied in two populations, one Seventh Day Adventist (SDA) vegetarian and one nonvegetarian, representing a broad range of plasma cholesterol values and dietary cholesterol intakes. As a group, the SDA vegetarians had significantly lower levels of plasma cholesterol and triglycerides than did the nonvegetarians. This hypolipidemic pattern in the SDA vegetarians was apparently closely related to dietary habits, since another group of SDA who were nonvegetarian had significantly higher plasma cholesterol and triglyceride levels than their vegetarian counterparts. The mass of cholesterol absorbed increased linearly with the mass of cholesterol ingested in all groups, but no relationship could be demonstrated between absorbed cholesterol and plasma cholesterol concentration.

INTERRELATIONSHIP BETWEEN APOPROTEINS OF VERY LOW DENSITY LIPOPROTEIN AND OTHER SERUM LIPOPROTEINS IN LACTATING GOATS. D. Stead, M. Tamir and V.A. Welch, *J. Dairy Sci.* 61, 1529–36 (1978). Lipoproteins of goat serum were labeled in vivo by intravenous injection of tritium labeled DL-lysine monohydrochloride. The specific radioactivity of the very low density plus intermediate density fractions reached a maximum at 1.2 h, declined sharply until about 9 h, and then more slowly. The specific radioactivities of the low density and high density lipoproteins reached lower maxima at 6.5 h and 8.5 h, respectively. The results are consistent with the formation of low density lipoprotein from very low density lipoprotein via the intermediate density lipoprotein and with a transfer of apoproteins between very low density and high density lipoproteins.

RE-EVALUATION OF THE 3α-HYDROXYSTEROID DEHYDROGENASE ASSAY FOR TOTAL BILE ACIDS IN BILE. S.D. Turley and J.M. Dietschy, *J. Lipid Res.* 19, 924–8 (1978). A review of the 3α-hydroxysteroid dehydrogenase method for determining the concentration of total bile acids in bile is described. The optimum conditions for the assay were established with respect to pH, temperature, incubation time, amount of $NAD^+$, and units of enzyme activity required to obtain complete oxidation of the substrate under fixed conditions. Furthermore, the effect of hydrazine hydrate, methanol, and bile volume on the reaction was examined. It was also established that the bile acid concentration in bile samples with a high molar percentage of cholesterol would be overestimated if 3β-hydroxysteroid dehydrogenase were present with the 3α-enzyme.

UPTAKE OF LABELLED FREE AND ESTERIFIED CHOLESTEROL FROM PLASMA BY THE AORTIC INTIMA-MEDIA TISSUE MEASURED IN VIVO IN THREE ANIMAL SPECIES. S. Stender, S. Christensen and O. Nyvad, *Atherosclerosis* 31, 279–93 (1978). Hyperlipemic stilbestrol-treated cockerels, cholesterol-fed rabbits and minipigs, as well as normolipemic cockerels and rabbits were injected intravenously with homologous plasma of corresponding lipid concentration labelled in vivo with radioactive cholesterol. The ratios between labelled free cholesterol in the intima-media from the thoracic aorta of these 5 groups of animals were respectively 1-, 2-, 8-, 2- and 20-fold greater than the corresponding average tracer ratio in plasma during the uptake period of 4–6 h. The relatively higher uptake in the minipig of the labelled plasma protein (albumin) than of the lipoprotein (as traced by its lipids) suggests a molecular weight-dependent arterial entry of these plasma macromolecules.

TRIGLYCERIDES IN CLINICAL MEDICINE. A REVIEW. M. Tzagournis, *Am. J. Clin. Nutr.* 31, 1437–52 (1978). There have been many relevant advances in our knowledge of triglycerides as they apply to clinical medicine. Some of the basic concepts of triglyceride metabolism are reviewed in a context of clinical applicability. Hypertriglyceridemia may be associated with dramatic symptoms and signs such as acute abdominal pain, hepatosplenomegaly, and neuromuscular abnormalities, or it may be asymptomatic until an atherosclerotic complication occurs. Treatment by diet and/or drugs is quite effective in relieving many of the clinical manifestations of hypertriglyceridemia. Whether a beneficial effect also occurs in atherosclerosis is still unknown.

INHIBITION OF CHOLESTEROL SYNTHESIS BY OXYGENATED STEROLS. A.A. Kandutsch and H.W. Chen, *Lipids* 13, 704–7 (1978). Sterols derived from cholesterol by introducing a ketone or hydroxyl function in the 6, 7, 15, 20, 22, 24, or 25 positions are known to be potent inhibitors of sterol synthesis in cell cultures. To gain more information regarding structural requirements for inhibitory activity, inhibitory potencies were determined for a series of 18 $C_{27}$ steroids with various combinations of ketone and hydroxyl functions substituted in positions 3, 4, 5, 6, and 7, or with a single ketone or hydroxyl function in one of these positions. Current knowledge of the mechanism through which the oxygenated sterols suppress cholesterol synthesis is reviewed.

CHEMICAL CONSTITUTION OF LIPID DROPLETS IN HUMAN ATHEROSCLEROTIC LESIONS. D. Kaul, M.G. Karmarkar and V. Kothekar, *Artery (Leonidas, Mich.)* 4, 497–503 (1978). The present communication reports an analysis of the lipid droplets and droplet-free residue (cytoplasm + membrane + nuclei) present in the intimal atherosclerotic lesions which revealed that the proportions of lipids in the droplet preparation of atherosclerotic lesions not only differ among themselves but also differ significantly ($p < 0.01$) from the lipid proportions in their corresponding residue preparations. Further, the lipid constitution of the residue preparations of the lesions closely resembles that of normal intima adjacent to these lesions. An empirical relation, which relates proportion of individual lipids in the fibrous plaque to their corresponding proportions in the droplet and residue preparations of the fatty streak, is suggested on the basis of the present data and those reported in the literature.

STRUCTURES AND FATTY ACID COMPOSITIONS OF NEUTRAL GLYCOSPHINGOLIPIDS OF HUMAN PLASMA. J. Koscielak *et al., Biochim. Biophys. Acta* 530, 385–93 (1978). Major neutral glycosphingolipids were isolated from human plasma and their structures and fatty acid compositions studied. The four neutral glycosphingolipids of plasma were characterized as

Glc $\beta(1\rightarrow 1)$ceramide, Gal $\beta(1\rightarrow 1)$ceramide, Gal $\beta(1\rightarrow 4)$ Glc $\beta(1\rightarrow 1)$ceramide, Gal $\alpha(1\rightarrow 4)$ Gal $\beta(1\rightarrow 4)$ Glc $\beta(1\rightarrow 1)$ceramide and GalNAc $\beta(1\rightarrow 3)$ Gal $(1\rightarrow 4)$ Gal $(1\rightarrow 4)$ Glc $\beta(1\rightarrow 1)$ceramide. The glycosphingolipids contained mostly short chain fatty acids of which most prominent was $C_{16}$.

PHOSPHOLIPID COMPOSITION AND METABOLISM IN MOUSE MUSCULAR DYSTROPHY. C.T. Kwok and L. Austin, *Biochem. J.* **176,** 15–22 (1978). The composition and metabolism of phospholipids were studied in various tissues from both normal and dystrophic mice of the 129 ReJ strain. Phospholipids extracted from forebrain, spinal cord, sciatic nerve and plasma were fractionated by t.l.c. and measured. It is suggested that are number of features of mouse muscular dystrophy related to altered membrane structure and function can be rationalized in terms of changes in lipid composition and metabolism.

CRYSTALLIZATION AND POSITIONAL SPECIFICITY OF HYDROPEROXIDATION OF FUSARIUM LIPOXYGENASE. Y. Matsuda, T. Beppu and K. Arima, *Biochim. Biophys. Acta* **530,** 439–50 (1978). A lipoxygenase obtained from the fungus *Fusarium oxysporum* was purified and crystallized. Using the purified enzyme, the positional specificity of linoleate was studied. Linoleate hydroperoxides were converted into the corresponding trimethylsilyl derivative by reduction, catalytic hydrogenation and treatment with hexamethyldisilazane/trimethylchlorosilane/pyridine and then analyzed by combined gas-liquid chromatography-mass spectrometry. Fusarium lipoxygenase was found to produce 9- or 13-hydroperoxyoctadecadienoates from linoleate. With the use of the heavy isotope of oxygen ($^{18}O_2$), atoms of oxygen introduced into hydroperoxides were found to be derived from the gaseous phase and not from the aqueous phase.

ISOLATION AND IDENTIFICATION OF 5,6-EPOXYRETINOIC ACID: A BIOLOGICALLY ACTIVE METABOLITE OF RETINOIC ACID. A.M. McCormick *et al., Biochemistry* **17,** 4085–90 (1978). A highly biologically active metabolite of retinoic acid ($8_{III}$) has been isolated in pure form from intestinal mucosa of vitamin A deficient rats given ($^3$H)retinoic acid. This metabolite has been positively identified as 5,6-epoxyretinoic acid based on the ultraviolet absorption spectrum and mass spectrum of its methylated derivative.

CHOLESTEROL OXIDASE: THERMOCHEMICAL STUDIES AND THE INFLUENCE OF HYDROORGANIC SOLVENTS ON ENZYME ACTIVITY. E.T. McGuinness *et al., Biochim. Biophys. Acta* **530,** 247–257 (1978). Thermal and binary cosolvent studies of the cholesterol oxidase (cholesterol:oxygen oxidoreductase, EC 1.1.3.6) reaction have been carried out using batch microcalorimetry and ultraviolet spectrophotometry, respectively. Heat conduction measurements are shown to provide the basis for a serum cholesterol assay yielding results comparable to conventional automated clinical assay. The enthalpy of the reaction for cholesterol oxidation, measured with different sources of the enzyme in the presence and absence of catalase is $-113 \pm 7.2$ mJ/$\mu$mol.

SEX HORMONES OF THE AQUATIC FUNGUS ACHLYA. T.C. McMorris, *Lipids* **13,** 716–22 (1978). Fungi in the order Saprolegniales are known to contain varying proportions of sterols, such as cholesterol and fucosterol. In the case of *Achlya,* it has been found that fucosterol, the major sterol component, serves as the biosynthetic precursor of the hormones, antheriodiol and the oogoniols. Artheridiol is secreted by female strains of *Achlya* and induces the formation of antheridial hyphae in male strains. It also causes the male to secrete the oogoniols which induce the formation of oogonial initials in female strains. Antheriodiol is responsible for the chemotropic growth of the antheridial hyphae to a developing oogonium which results in sexual conjugation. The structures, biosynthesis, and functions of these hormones are discussed in this paper.

THE PREPARATION OF LARGE SINGLE BILAYER LIPOSOMES BY A FAST AND CONTROLLED DIALYSIS. M.H.W. Milsmann, R.A. Schwendener and H.G. Weder, *Biochim. Biophys. Acta* **512,** 147–55 (1978). A new method is described for the preparation of large, homogeneously sized, single bilayer phospholipid vesicles. Physicochemical properties of these vesicles are examined by several techniques and compared with those prepared with other methods.

CHOLESTEROL-LIPID INTERACTIONS IN MEMBRANES. THE SATURATION CONCENTRATION OF CHOLESTEROL IN BILAYERS OF VARIOUS LIPIDS. H. Reiber, *Biochim. Biophys. Acta* **512,** 72–83 (1978). The integration of cholesterol in a lipid bilayer can be visualized by changes in the fluorescence properties of the probe *N*-phenyl-1-naphthylamine (NPN). An increasing cholesterol content in the lipid phase corresponds to a decreasing fluorescence intensity of NPN and a short wave shift of the emission spectrum. The comparison of the maximal molar ratio of cholesterol:lipid with the number of proton donor and proton acceptor sites in the lipid moiety is used for a discussion of the polar interactions of cholesterol within a lipid bilayer.

INHIBITION OF PANCREATIC LIPASE BY MIXED MICELLES OF DIETHYL P-NITROPHENYL PHOSPHATE AND BILE SALTS. M. Rouard *et al., Biochim. Biophys. Acta* **530,** 227–35 (1978). Solubility and Sephadex filtration assays have shown that dissolved diethyl *p*-nitrophenyl phosphate can be included into bile salt micelles with a partition coefficient of 32:1. This inclusion is probably a prerequisite for the organophosphate to inhibit lipase. Therefore, it appears that the requirements of lipase towards specific substrates and inhibitors are very similar.

NON-ISOTHERMAL POTENTIAL OF PHOSPHOLIPID BILAYER FILMS. INFLUENCE OF CHOLESTEROL AND MACROCYCLIC CARRIER EFFECTS. G. Scibona *et al., Biochim. Biophys. Acta* **512,** 41–53 (1978). The effect of cholesterol on the ion selective behavior of phospholipid (phosphatidylcholine or phosphatidylethanolamine) bilayer films is studied through the measurement of the membrane non-isothermal potential. These results are discussed on the basis of the current ideas on the charge distribution through the bilayer membranes. Moreover, the role of the permeating ions as potential determining species is stressed.

THE SUSCEPTIBILITY OF CHOLESTEROL-DEPLETED ERYTHROCYTES TO SAPONIN AND SAPOGENIN HEMOLYSIS. R. Segal and I. Milo-Goldzweig, *Biochim. Biophys. Acta* **512,** 223–6 (1978). The assumption that complex formation between erythrocyte membrane cholesterol and saponins or sapogenins is the cause for their hemolytic activity, was tested by measuring the susceptibility of cholesterol-depleted erythrocytes towards these hemolysins. The results suggest that cholesterol does not serve as a specific binding site for these hemolysins.

GLYCOLIPIDS OF A HALOTOLERANT, MODERATELY HALOPHILIC BACTERIUM. BIOSYNTHESIS OF GLUCOSYLPHOSPHATIDYLGLYCEROL BY CELL-FREE PARTICLES. N. Stern and A. Tietz, *Biochim. Biophys. Acta* **530,** 357–66 (1978). A 247,000 × g particulate fraction from a moderately halophilic halotolerant bacterium incorporated ($^{14}$C)glucose added as UDP($^{14}$C)glucose and $^{32}$P-labeled phosphatidylglycerol into glucosylphosphatidylglycerol. The system required $Mg^{2+}$ or $Ca^{2+}$ for activity. KCl and NaCl were inhibitory even when added at low concentrations.

COMPARATIVE STUDIES ON THE EFFECTS OF pH AND $Ca^{2+}$ ON BILAYERS OF VARIOUS NEGATIVELY CHARGED PHOSPHOLIPIDS AND THEIR MIXTURES WITH PHOSPHATIDYLCHOLINE. P.W.M. Van Dijck *et al., Biochim. Biophys. Acta* **512,** 84–96 (1978). The thermotropic behaviour of dimyristoyl phosphatidylglycerol, phosphatidylserine, phosphatidic acid and phosphatidylcholine was investigated by differential scanning calorimetry and freeze-fracture electron microscopy as a function of pH and of $Ca^{2+}$ concentration. The nature of $Ca^{2+}$-induced changes in bilayers containing negatively charged phospholipids is strongly dependent on the character of the polar headgroup of the negatively charged phospholipid involved.

EFFECT OF INTENSIVE PLASMAPHERESIS ON THE PLASMA CHOLESTEROL CONCENTRATION WITH FAMILIAL HYPERCHOLESTEROLEMIA. C.S. Apstein *et al., Atherosclerosis* **31,** 105–15 (1978). Plasmapheresis was studied as a means of reducing the serum cholesterol concentration in 3 hypercholesterolemic patients who each underwent courses of intensive plasmapheresis with removal of 250–500 ml of plasma each day for 5–9 days. After cessation of treatment, the cholesterol concentration returned to pre-treatment levels in 10–13 days in the homozygous patient and 7 days in one non-homozygous hyperbetalipoproteinemic patient; clofibrate (2 g/day) in this patient was associated with a smaller reduction of the cholesterol concentration with plasmapheresis and an increased rate of return of pre-treatment levels after plasmapheresis was stopped. The response of the plasma cholesterol levels to plasmapheresis was subjected to kinetic analysis based on a current model of the regulation of lipoprotein metabolism.

STRUCTURAL ORGANIZATION OF THE LIPOPROTEIN $HDL_c$ FROM ATHEROSCLEROTIC SWINE. STRUCTURAL FEATURES RELATING THE PARTICLE SURFACE AND CORE. D. Atkinson *et al.*, *Biochemistry* 17, 3930-3 (1978). The plasma lipoprotein $HDL_c$ from miniature swine fed a high-cholesterol, saturated-fat diet exhibits a thermal transition (temperature range 25–45°C) of its core-located cholesterol esters. This transition from an ordered, smectic-like structure to a more disordered structure is similar to that described for human plasma low-density lipoprotein (LDL).

TURBIDITY CHANGES OF LIPID VESICLES NEAR THE PHASE TEMPERATURE AS AN INDICATION OF FUSION. O. Avramovic-Zikic and K. Colbow, *Biochim. Biophys. Acta* 512, 97–104 (1978). Sonicated liposomes of dipalmitoyl phosphatidylcholine show sharp turbidity changes on heating at two distinct temperatures. A decrease in turbidity at the lower temperature (approx. 37°C) is thought to be associated with the phase transition of small vesicles and a decrease at about 44°C with larger vesicles or multilayer. The turbidity changes were studied under various modes of vesicle preparation to confirm the interpretation of the turbidity data. Alternate interpretations are discussed.

YOLK CHOLESTEROL IN EGGS FROM VARIOUS AVIAN SPECIES. C.W. Bair and W.W. Marion, *Poult. Sci.* 57, 1260–5 (1978). Studies were conducted to establish the differences in yolk cholesterol concentrations in eggs from various avian species. Cholesterol was determined by a modification of the colorimetric procedure of Pearson *et al.* (1953). Species listed in increasing concentrations of cholesterol per gram of yolk, were guinea fowl, chicken, pheasant, quail, turkey, duck, goose, and dove with an overall range of 12.77 to 21.99 mg of cholesterol per gram of yolk. These results confirm the possibility of genetically selecting for decreased yolk cholesterol if economic or other conditions warrant. The increased efforts required to decrease yolk cholesterol by this approach would undoubtedly be expensive.

THE SUBMICROSOMAL LOCALIZATION OF ACYL-COENZYME A-CHOLESTEROL ACYLTRANSFERASE AND ITS SUBSTRATE, AND OF CHOLESTERYL ESTERS IN RAT LIVER. S. Balasubramaniam *et al.*, *Biochem. J.* 174, 863–72 (1978). To determine the submicrosomal distribution of acyl-CoA-cholesterol acyltransferase and of cholesteryl esters, the microsomal fraction and the digitonin-treated microsomal preparation of rat liver were subjected to analytical centrifugation on sucrose density gradients. With untreated microsomal fractions the distribution profile and the median density of acyl-CoA-cholesterol acyltransferase were very similar to those of RNA. This is in contrast with hydroxymethylglutaryl-CoA reductase and cholesterol 7$\alpha$-hydroxylase, which are confined to endoplasmic reticulum membranes with low ribosomal coating. In digitonin-treated microsomal preparations activity of acyl-CoA-cholesterol acyltransferase was not detectable. The ratio of the concentrations of non-esterified to esterified cholesterol in the subfractions from both untreated and digitonin-treated microsomal fractions was highest at the maximum distribution of plasma membranes.

PHOSPHOLIPID METABOLISM OF MONKEY SMOOTH MUSCLE CELLS GROWN IN HYPERLIPEMIC SERUM. S.R. Bates, *Biochim. Biophys. Acta* 530, 175–87 (1978). The phospholipid content and synthesis of monkey smooth muscle cells grown in tissue culture with normal or hyperlipemic monkey serum were examined. The pattern of incorporation of radioactively labeled inorganic phosphate into the phospholipids of these cells was measured using a 4 h pulse of $^{32}P$. The distribution of $^{32}P$ into the phospholipids of monkey alveolar macrophages, L-cell mouse fibroblasts, and segments of the intima-media from monkey aortas is reported.

FATTY ACID REQUIREMENTS AND TEMPERATURE DEPENDENCE OF MONOOXYGENASE ACTIVITY IN RAT LIVER MICROSOMES. J.F. Becker, T. Meehan and J.C. Bartholomew, *Biochim. Biophys. Acta* 512, 136–46 (1978). The effect of variation in the microsomal membrane fatty acid composition on Arrhenius plot phase transition temperatures for *p*-nitroanisole *O*-demethylation and benzo(*a*)pyrene hydroxylation has been investigated. The low level of *p*-nitroanisole *O*-demethylase activity in membranes with altered fatty acid compositions suggests that a particular type(s) of fatty acid was not present in sufficient quantity to permit the induction of maximal enzyme activity. Since the induced benzo(*a*)pyrene hydroxylase activity was the same regardless of diet, there was presumably sufficient quantities of the appropriate fatty acids present in the membrane for induction of this activity. Therefore, particular fatty acids may be necessary for the induction of maximal activity of particular enzymes in the mixed function monooxygenase system.

THE LIPID COMPOSITION OF ISOLATED RAT SPERMATIDS AND SPERMATOCYTES. J.K. Beckman, M.E. Gray and J.G. Coniglio, *Biochim. Biophys. Acta* 530, 367–74 (1978). The lipid composition of enriched fractions of spermatids and spermatocytes, isolated from rat testicular tissue, has been investigated. More than 20% of the total fatty acids of spermatids but only 10% of those of spermatocytes, isolated from testes of mature rats, was 4, 7, 10, 13, 16-docosapentaenoic acid. Major phospholipid classes and the triacylglycerols of spermatids contained much more of the docosapentaenoic acid than the corresponding lipid types from spermatocytes. Differences in content of total phospholipids, individual classes of phospholipids and triacylglycerols among spermatocytes, spermatids and late spermatids were also observed.

EFFECT OF PHTHALATE ESTERS ON SERUM CHOLESTEROL AND LIPID BIOSYNTHESIS IN LIVER, TESTES, AND EPIDIDYMAL FAT IN THE RAT AND RABBIT. F.P. Bell, C.S. Patt, and P.J. Gillies, *Lipids* 13, 673–8 (1978). Lipid biosynthesis was studied in vitro in liver, testes, and epididymal fat obtained from rats and rabbits fed di-(2-ethylhexyl)phthalate for 4 weeks at levels of 0.5% and 1.0%, respectively. Several differences in response of the two species to DEHP feeding were observed. In addition, DEHP feeding significantly reduced serum cholesterol ($p < 0.01$) in the rat but not in the rabbit. The results of this study indicate that DEHP feeding is associated with alterations in tissue lipid metabolism and that there are species differences in the response of tissue to DEHP.

INCORPORATION OF *N*-ACETYLGLUCOSAMINE FROM UDP-*N*-ACETYLGLUCOSAMINE INTO PROTEINS AND LIPID INTERMEDIATES IN MICROSOMAL AND GOLGI MEMBRANES FROM RAT LIVER. A. Bergman and G. Dallner, *Biochim. Biophys. Acta* 512, 123–35 (1978). Rough and smooth microsomes and Golgi membranes incorporate *N*-acetylglucosamine from UDP-*N*-acetylglucosamine into endogenous protein acceptors. A lipid intermediate of the dolichol phosphate type participates in this transfer reaction in the case of both microsomal subfractions, but the nature of lipid glycosylation is different in these two fractions. Proteolysis of intact vesicles of the subfractions removes glycosylated dolichol phosphate and protein acceptors to various extents and interferes with transferase activities. This finding suggests the possibility that glycosylation at the cytoplasmic side of the membrane of the endoplasmic reticulum may involve a system separate from that acting at the luminal side of the same membrane.

ACTION OF $\alpha$-PHOSPHOLIPASE $A_2$ ON HUMAN SERUM HIGH DENSITY LIPOPROTEIN-3: KINETIC STUDY OF THE REACTION BY $^{31}P$ NUCLEAR MAGNETIC RESONANCE SPECTROSCOPY. E.B. Brasure *et al.*, *Biochemistry* 17, 3934–8 (1978). $^{31}P$ nuclear magnetic resonance spectroscopy ($^{31}P$ NMR) was used to monitor the hydrolysis of phospholipids in human serum high-density lipoprotein-3 ($HDL_3$) by $\alpha$-phospholipase $A_2$ purified from *Crotalus adamanteus* venom. The $^{31}P$ NMR spectra obtained at regular intervals during incubation of $HDL_3$ with the enzyme indicated that phosphatidylcholine was completely converted into lysophosphatidylcholine.

FATTY ACID METABOLISM IN L1210 MURINE LEUKEMIA CELLS: DIFFERENCES IN MODIFICATION OF FATTY ACIDS INCORPORATED INTO VARIOUS LIPIDS. C.P. Burns, S.P.L. Wei and A.A. Spector, *Lipids* 13, 666–72 (1978). L1210 leukemia cells can utilize all of the main fatty acids that normally are present in the ascites fluid in which they grow. This finding is consistent with the view that L1210 cells derive most of their fatty acids from the ascites fluid. From 80–90% of each fatty acid was incorporated into cell lipids without structural modification, suggesting that the lipid composition of these cells can be altered by changing the type of fatty acids to which they are exposed. These findings indicate that fatty acids incorporated into various cell lipid fractions are not structurally modified to the same extent. There appears to be greater modification of fatty acid used for ethanolamine phosphoglyceride synthesis as compared with triglyceride and choline phosphoglyceride synthesis.

THE EFFECT OF CLOFIBRATE-FEEDING ON HEPATIC FATTY ACID METABOLISM. R.Z. Christiansen, *Biochim. Biophys. Acta* 530, 314–24 (1978). The hepatocytes isolated from clofibrate-fed rats oxidized palmitate to ketone bodies and $CO_2$ more rapidly than did hepatocytes from control rats. Glucagon stimulated

the oxidation of palmitate further. The extent of stimulation was approximately the same in cells from control and clofibrate-fed animals. The esterification of palmitate was decreased by clofibrate-feeding. It is concluded that both oxidation and esterification of very long chain fatty acids are limited by the capacity of the chain-shortening system which is localized extramitochondrially, most probably in peroxisomes. The peroxisomal oxidation system may also contribute to the oxidation of palmitate especially when carnitine palmitoyltransferase is rate-limiting.

UPTAKE, TRANSBILAYER DISTRIBUTION, AND MOVEMENT OF CHOLESTEROL IN GROWING MYCOPLASMA CAPRICOLUM CELLS. S. Clejan, R. Bittman, and S. Rottem, *Biochemistry* 17, 4579–83 (1978). The sterol-requiring mycoplasma, *M. capricolum*, was adapted to grow in a medium containing low fetal calf serum (FCS) concentrations, providing cells in which unesterified cholesterol comprised only about 3.6% by weight of the total membrane lipids. The native strain grown with 10% FCS contained a sixfold higher cholesterol concentration than the adapted strain. When an early exponential-phase culture of the adapted strain was transferred to a medium containing 10% FCS, cell growth was stimulated and the cells accumulated cholesterol into their cell membrane. These studies established that free cholesterol is translocated rapidly from the external surface of the bilayer of *growing M. capricolum* cells at 37°C.

CHOLESTEROL AND PHOSPHOLIPIDS IN PROTEIN FRACTIONS OF HUMAN LENS AND SENILE CATARACT. E. Cotlier, Y. Obara and B. Toftness, *Biochim. Biophys. Acta* 530, 267–78 (1978). The lipid composition in protein fractions of human lens and senile cataracts was determined. Cholesterol is the only sterol found in human lens and in senile cataract by gas-liquid chromatography. The proportion of long-chain fatty acid ($C > 20$ carbons or longer) in humans lens phospholipids is 40%; 39% of all fatty acids are unsaturated. The high cholesterol/phospholipid ratio, predominance of sphingomyelin and of long-chain and unsaturated fatty acids in lens membranes indicates tight packing of phospholipids and less fluidity in comparison to other cytomembranes.

COMPOSITION OF LIPIDS OF BOVINE OPTIC NERVE. S.K. Das *et al.*, *Lipids* 13, 679–84 (1978). Lipids from bovine optic nerve were analyzed. The total content of 16.5% by weight included 27.2% nonpolar lipids, 26.1% glycolipids, and 46.7% phospholipids by weight. Free cholesterol was the major component of the nonpolar lipid fraction. The cerebrosides, 73.5% of total glycolipids, were separated by thin layer chromatography (TLC) into two bands (upper and lower) that were present in equal proportion. Lower cerebroside band and cerebroside sulfates contained large amount of hydroxylignoceroyl (cerebronoyl) and hydroxynervonoyl groups.

SYNTHESIS OF 1α-HYDROXY(7-$^3$H)CHOLECALCIFEROL AND ITS METABOLISM IN THE CHICK. S. Edelstein *et al.*, *Biochem. J.* 176, 111–7 (1978). 1α-Hydroxy(7-$^3$H)cholecalciferol (specific radioactivity of 2Ci/mmol) was synthesized, and its metabolism in chicks studied. 1α-Hydroxy(7-$^3$H)cholecalciferol was metabolized very rapidly in the chick to 1α,25-dihydroxy(7-$^3$H) cholecalciferol and to a metabolite less polar than 1α-hydroxycholecalciferol. Intestine exhibited highest accumulation of 1α-25-dihydroxy(7-$^3$H)cholecalciferol, and liver exhibited highest accumulation of the non-polar metabolite. The vitamin D status of the chicks did not appear to affect the metabolic profile of the administered 1α-hydroxy(7-$^3$H)cholecalciferol.

ON THE RATE-DETERMINING STEP OF FATTY ACID OXIDATION IN HEART. INHIBITION OF FATTY ACID OXIDATION BY 4-PENTENOIC ACID. J.C. Fong and H. Schulz, *J. Biol. Chem.* 253, 6917–22 (1978). The hypoglycemic compound 4-pentenoate was used to inhibit fatty acid oxidation in coupled rat heart mitochondria. It was found that this compound in contrast to *n*-pentanoate caused the inhibitions of 3-ketoacyl-CoA thiolase (EC 2.3.1.16) and of acetoacetyl-CoA thiolase (EC 2.3.1.9) but did not affect any of the other enzymes of β oxidation. A time study demonstrated that the inhibition of the two thiolases paralleled the inhibition of palmitoylcarnitine-supported respiration. The evidence presented in this study leads to the conclusion that the specific and pronounced inhibition of fatty acid oxidation by the hypoglycemic compound 4-pentenoate is due to the inhibition of 3-ketoacyl-CoA thiolase.

DISTINCTIVE PROTEIN PROFILES OBTAINED FROM EXTRACTS OF NORMAL AND ATHEROSCLEROTIC HUMAN AORTA. D.B. Gilbert, Diane F. Dukes and F. Birinyi, *Atherosclerosis* 31, 137–53 (1978). Specific areas of fourteen autopsied abdominal aortas were layer-dissected, histologically graded and solubilized with SDS, dilute saline or SDS-urea and β-mercaptoethanol. Comparisons were made between intima, media, lesions of progressive severity and an in-vivo thrombus. Extracts of minor lesions resemble normal media; higher grade lesions demonstrate increased amounts of characteristic intimal bands. The major medial band is also seen on gels of thrombus extracts. Both of the bands most characteristic of atherosclerotic lesions stain for carbohydrate. Isolation and characterization of these (glyco)proteins will provide material for binding studies. Quantitation of characteristic lesion proteins may provide insights into the proliferative phase of this disease.

EFFECT OF CATECHOLAMINES AND β-BLOCKERS ON LINOLEIC ACID DESATURATION ACTIVITY. I.N.T. de Gomez Dumm, M.J.T. De Alaniz, and R.R. Brenner, *Lipids* 13, 649–52 (1978). The effect of catecholamines and adrenergic blocking agents on the oxidative desaturation of linoleic acid in rat liver microsomes was studied. Epinephrine (1 mg/kg/body weight) produced a significant decrease on the conversion of (1-$^{14}$C)linoleic acid to γ-linolenic acid. The effect of the catecholamines was postulated to be mediated through β receptors by an enhancement of the intracellular levels of cyclic AMP.

UDP-GLUCURONOSYLTRANSFERASE: PHOSPHOLIPID DEPENDENCE AND PROPERTIES OF THE RECONSTITUTED APOENZYME. J.P Gorski and C.B. Kasper, *Biochemistry* 17, 4600–5 (1978). The effect of membrane lipid on the stability and catalytic activity of microsomal UDP-glucuronosyltransferase (EC 2.4.1.17) from rat liver was examined. Ninety-eight percent of membrane phospholipid was separated from total microsomal protein by gel filtration on a deoxycholate-equilibrated Sephadex G-50 column. Lipid removal reduced transferase activity, using *p*-nitrophenol as acceptor, to 0–6% that of a deoxycholate-treated control preparation. Incubation of the apoenzyme with liposomes, prepared from microsomal lipid, restored 30–44% of the original activity. Collectively, our results establish the phospholipid requirement of microsomal UDP-glucuronosyltransferase for maximal catalytic activity and implicate the involvement of lipid in the stabilization of the active enzyme.

STUDIES ON ABDOMINAL FAT WITH FOUR COMMERCIAL STRAINS OF MALE BROILER CHICKEN. L. Griffiths, S. Leeson and J.D. Summers, *Poult. Sci.* 57, 1198–203 (1978). Cockerels from four commercial broiler strain crosses were used to study strain differences in abdominal fat deposition. Ninety birds of each strain were floor reared to four weeks of age. At this age, 40 birds of each strain were transferred to individual cages, while the remainder were used for carcass studies. Individual bird feed intake was measured to eight weeks of age, at which time all birds were killed for carcass and abdominal fat measurements. Comparable groupings based on body weight and feed conversion had no significant influence on abdominal fat. These results raise the question as to whether or not meaningful extremes within a population could provide the basis for a selection program aimed at reducing abdominal fat pad size.

METABOLIC FATE OF THE PHOSPHATIDYLCHOLINE COMPONENT OF VERY LOW DENSITY LIPOPROTEINS DURING CATABOLISM BY THE PERFUSED RAT HEART. P.H.E. Groot and A. Van Tol, *Biochim. Biophys. Acta* 530, 188–96 (1978). The fate of the phosphatidylcholine component of very low density lipoproteins was studied during degradation by the isolated perfused rat heart, using $^{32}$P-labelled phospholipid and $^3$H-labelled triglycerides on rat very low density lipoprotein.

BINDING OF GLYCERALDEHYDE-3-PHOSPHATE DEHYDROGENASE TO PHOSPHOLIPID LIPOSOMES. J. Gutowicz and T. Modrzycka, *Biochim. Biophys. Acta* 512, 105–10 (1978). The binding of glyceraldehyde-3-phosphate dehydrogenase prepared from rabbit muscle to phospholipid model membranes (liposomes) as a function of pH, ionic strength, and the influence of the binding on specific activity of the enzyme was studied. The existence of a dominant interaction of electrostatic character was found.

ISOLATION AND PURIFICATION OF Le$^a$ BLOOD-GROUP ACTIVE AND RELATED GLYCOLIPIDS FROM HUMAN PLASMA OF BLOOD-GROUP A Le$^a$ INDIVIDUALS. P. Hanfland, R.G. Kladetzky and H. Egli, *Chem. Phys. Lipids* 22, 141–51 (1978). From 81 of human plasma of blood-group A Le$^a$ nonsecretors three different Le$^a$ blood-group active ceramide pentasaccharides (a total of 4.65

mg) have been isolated, all revealing glucose, galactose, *N*-acetylglucosamine and fucose in molar ratios of 1:2:1:1 as determined by gas liquid chromatography. Due to low blood group A glycolipid in plasma (0.17 mg/81), previously negative erythrocytes readily become agglutinable by anti $Le^a$ sera and not by anti A sera after incubation with appropriate plasma.

LIPID METABOLISM BY THE GALL-BLADDER. II. THE IN VITRO CONVERSION OF LYSOPHOSPHATIDYLCHOLINE TO PHOSPHATIDYLCHOLINE. C.K. Harmon and D.H. Neiderhiser, *Biochim. Biophys. Acta* 530, 217–26 (1978). Lysophosphatidylcholine acyltransferase, which catalyzes the acylation of lysophosphatidylcholine with fatty acid coenzyme A to form phosphatidylcholine, was assayed in gall-bladder mucosa. Studies with saturated and unsaturated substrates demonstrated highest activity when oleoyl coenzyme A and palmitoyl lysophosphatidylcholine were used and the lowest activity when palmitoyl coenzyme A and palmitoyl lysophosphatidylcholine were used.

EFFECT OF THE LIPID ENVIRONMENT ON PROTEIN MOTION AND ENZYMATIC ACTIVITY OF THE SARCOPLASMIC RETICULUM CALCIUM ATPASE. C. Hidalgo, D.D. Thomas, and N. Ikemoto, *J. Biol. Chem.* 253, 6879–87 (1978). In order to investigate the roles of the physical states of phospholipid and protein in the enzymatic behavior of the $Ca^{2+}$-ATPase from sarcoplasmic reticulum, we have modified the lipid phase of the enzyme, observed the effects on the enzymatic activity at low temperatures, and correlated these effects with spectroscopic measurements of the rotational motions of both the lipid and protein components. These results are consistent with the proposal that both lipid fluidity and protein rotational mobility are essential for enzymatic activity.

LAG PHASE DURING THE ACTION OF PHOSPHOLIPASE $A_2$ ON PHOSPHATIDYLCHOLINE MODIFIED BY ALKANOLS. M.K. Jain and R.C. Apitz-Castro, *J. Biol. Chem.* 253, 7005–10 (1978). The action of pig pancreatic phospholipase $A_2$ (EC 3.1.1.4) on phosphatidylcholine bilayer is studied under a variety of substrate modification conditions including the incorporation of long chain alcohols (hexanol and several isomeric octanols) into the bilayer. The rate of hydrolysis shows a biphasic dependence upon the concentration of the activating alcohol. The hexanol to lipid molar ratio in the bilayer is approximately 1.4:1 at the optimal alkanol concentration. It is postulated that the biphasic activation profile as a function of hexanol concentration may be a consequence of two-site interactions between the enzyme and the substrate interface.

EFFECTS OF EXCESS FREE FATTY ACIDS ON MECHANICAL AND METABOLIC FUNCTION IN NORMAL AND ISCHEMIC MYOCARDIUM IN SWINE. A.J. Liedtke, S. Nellis and J.R. Neely, *Circ. Res.* 43, 652–61 (1978). We evaluated the consequences of excess free fatty acids (FFA) on mechanical and metabolic functions in globally perfused working swine hearts. In one group of eight hearts, treatments with heparin and 10% fat emulsion (Intralipid) produced a 3- to 5-fold elevation in serum FFA levels as contrasted with levels in 10 untreated hearts. Thus, excess FFA caused significant impairments in cardiac function in association with elevations in tissue acyl CoA and acyl carnitine derivatives during ischemia. Accumulations of these products of fatty acid metabolism may interfere with enzyme functions and membrane transport systems.

EFFECT ON SPHINGOMYELIN-CONTAINING LIPOSOMES OF PHOSPHOLIPASE D FROM CORYNEBACTERIUM OVIS AND THE CYTOLYSIN FROM STOICHACTIS HELIANTHUS. R. Linder and A.W. Bernheimer, *Biochim. Biophys. Acta* 530, 236–46 (1978). The toxic, sphingomyelin-specific phospholipase D (phosphatidylcholine phosphatidohydrolase EC 3.1.4.4) from *Corynebacterium ovis* was purified to near homogeneity. It had a molecular weight of 31,000 and a pI of approx. 9.8. Although not cytolytic itself, it protected red cells from hemolysis by staphylococcal sphingomyelinase ($\beta$-hemolysin) and helianthus toxin. Both toxins demonstrated binding to sphingomyelin-containing liposomes, but only the bacterial sphingomyelinase catalyzed the release of choline from these vesicles.

ENZYMATIC SULPHATION OF BILE SALTS IN HUMAN LIVER. L. Loof and B. Wengle, *Biochim. Biophys. Acta* 530, 451–60 (1978). An enzyme catalyzing the transfer of the sulphate group from 3′-phosphoadenosine-5′-phosphosulphate to lithocholate and glycolithocholate is identified in the cytosol of human liver. The rate of sulphation was greatest with unconjugates lithocolate. $K_m$ values for lithocholate and glycolithocholate were $2 \cdot 10^{-6}$ and $3.3 \cdot 10^{-6}$ M, respectively. No enzyme activity was found in human kidney cytosol. A simple method for quantitative assay of the enzyme in percutaneous liver biopsy specimens is described.

ENZYMES CATALYZING THE HYDROLYSIS OF LONG-CHAIN MONOACYLGLYCEROLS IN RAT ADIPOSE TISSUE. H. Tornqvist, P. Nilsson-Ehle and P. Belfrage, *Biochim. Biophys. Acta* 530, 474–86 (1978). Acetone-ether preparations of epididymal fat pads from fasted or fed rats contained two enzymes catalyzing the hydrolysis of long-chain monoacylglycerols. The enzymes were identified as monoacylglycerol lipase and lipoprotein lipase by their apparent p*I* values after electrofocusing in non-ionic detergent, selective inhibition properties, substrate specificity and positional specificity.

IN VIVO UPTAKE OF HUMAN AND RAT LOW DENSITY AND HIGH DENSITY LIPOPROTEIN BY PARENCHYMAL AND NONPARENCHYMAL CELLS FROM RAT LIVER. T.J.C. Van Berkel and A. Van Tol, *Biochim. Biophys. Acta* 530, 299–304 (1978). The relative contribution of the parenchymal and nonparenchymal rat liver cells to the hepatic uptake of human and rat high density lipoprotein (HDL) and low density lipoprotein (LDL) was determined in vivo. These results indicate that nonparenchymal liver cells play a substantial role in the hepatic uptake of human and rat HDL and LDL in vivo.

DEVELOPMENT OF GLYCOGEN AND PHOSPHOLIPID METABOLISM IN FETAL AND NEWBORN RAT LUNG. W.M. Maniscalco *et al.*, *Biochim. Biophys. Acta* 530, 333-46 (1978). Glucose, a major metabolic substrate for the mammalian fetus, probably makes significant contributions to surface active phospholipid synthesis in adult lung. We examined the developmental patterns of glycogen content, glycogen synthase activity, glycogen phosphorylase activity and glucose oxidation in fetal and newborn rat lung. These patterns were correlated with the development of phosphatidylcholine synthesis, content and the activities of enzymes involved in phosphatidylcholine synthesis. The possible contributions of carbohydrate derived from fetal lung glycogen to phospholipid synthesis are discussed.

GLYCOSAMINOGLYCAN-LIPOPROTEIN COMPLEXES FROM AORTAS OF HYPERCHOLESTEROLEMIC RABBITS. PART 1. ISOLATION AND CHARACTERIZATION. T.P. Mawhinney, J.M. Augustyn and K.E. Fritz, *Atherosclerosis* 31, 155-67 (1978). Glycosaminoglycan-lipoprotein complexes were isolated from rabbit aortas exhibiting nearly confluent cholesterol-induced foam cell lesions by extraction with 0.15 M NaCl. Analysis showed that these complexes consisted of very low density lipoproteins, heparan sulfate, chondroitin sulfate-C and hyaluronic acid. The demonstration that rabbit intimal foam cell lesions contain extractable glycosaminoglycan-lipoprotein complexes makes this animal model an excellent tool for further studies on the role of these complexes in the atherogenic process.

EFFECTS OF ETHYNYL ESTRADIOL ON SERUM LIPOPROTEIN LIPIDS IN MALE AND FEMALE RATS. I. Weinstein *et al.*, *Biochim. Biophys. Acta* 530, 394-401 (1978). Female and male rats were administered 5 or 15 μg/kg of ethynyl estradiol in sesame oil for 14 days by subcutaneous injection, and were killed on the 15th day following a 12-14 h fasting. The very low density lipoproteins, low density lipoproteins and high density lipoproteins were isolated from the serum and the concentrations of triglyceride, cholesterol and cholesteryl esters were determined in each lipoprotein class. It is postulated that, under these conditions, production rates of very low density lipoprotein lipids exceed utilization rates. It is further postulated that the hypocholesterolemia produced by ethynyl estradiol therapy results from increased utilization of low density lipoprotein and high density lipoprotein sterol despite increased output of cholesterol in the very low density lipoprotein.

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