ABSTRACTS

R. A. REINERS, Editor. ABSTRACTORS: J. Iavicoli, S. Kawamura, F. A. Kummerow, H. S. Liles, C. C. Litchfield, Louise R. Morrow, E. G. Perkins, and T. H. Smouse

• Fats and Oils

MICROANALYTIC METHODS FOR OILS AND FATS. E. Fedeli (Stazione Sperimentale Oli e Grassi, Milano). *Rivista Ital. delle Sostanze Grasse* **9**, 401–403 (1961). Several micro- and semimicroanalytic methods developed or modified by the author are described, including saponification number, peroxide number, iodine number, acid number.

THE SEPARATION OF FATTY ACID AND GLYCERIDE MIXTURES INTO THEIR SOLID LIQUID COMPONENTS. O. J. Debrus (Bruxelles). *Rivista Ital. delle Sostanze Grasse* **9**, 404–407 (1961). A description is given of various industrial processes for fractionating fatty mixtures by emulsifying with water or with aqueous solutions of an emulsifying agent and subsequently separating the various components by sedimentation, centrifugation or filtering. Several patents by Henkel, Lummus, Sabo, and Sharples are described.

THE USE OF INFRARED SPECTROSCOPY TO IDENTIFY TRANS ISOMERS IN ESTERIFIED OLIVE OILS. U. Pallotta (Instituto di Chimica Agraria, Univ. of Bologna) and L. Matarese. *Rivista Ital. delle Sostanze Grasse* **9**, 387–400 (1961). Infrared spectroscopy permits quantitative identification of *trans* isomers in olive oils and other fats (as well as in their methyl esters), the absorption maximum being at 10.36 μ. Minimum *trans* content detectable is 1% with good reproducibility at 5% and above. *Trans* isomers were never found in untreated olive oils but were often present (2.5 to 4.0%) in esterified oils. Neither natural oxidation through aging nor acidity (up to 4%) appeared to affect the *trans* content.

CHEMISTRY AND TECHNOLOGY OF EDIBLE FATS. A. Montefredine (Lab. Chim. Prov., Pescara) and S. Anselmi. *Olearia* **5**, 235–249 (1961). Recent progress is reviewed with particular reference to the nutritional qualities of fats. The effect of refining and that of hydrogenation are described with detailed comments on the nutritional effects of the *trans* isomers.

VAPOR PHASE CHROMATOGRAPHY OF FATS. III. ANALYSIS OF BUTTER AND ALLIED PRODUCTS. S. Anselmi, L. Boniforti, R. Monicelli (Istituto di Sanita, Rome). *Rivista Italiana Sostanze Grasse* **38**, 436–442 (1961). The authors describe the techniques used for vapor phase chromatography of butter, margarine, etc. Best results are obtained by making two chromatograms: one with the esters up to C_{10} and the other one on the total sample. Methyl esters are not suitable because of appreciable losses in the lower acids; ethyl esters are satisfactory and require lower temperatures than butyl esters. Temperatures were 200C, 150C, and 125C.

MANUFACTURE OF A HARD, DRY FAT CONTAINING FEED PELLET. E. J. Guidarelli (Cargill, Inc.). *U. S. 3,014,800.* Feed pellets having a fat content greater than 4% are prepared by forming the feed into pellets and then coating them with a uniform distribution of liquefied fat while the pellets are hot. The pellets are kept hot to permit them to absorb the fat prior to cooling.

PROCESS FOR IMPROVING FRYING FATS AND THE RESULTING COMPOSITION. E. G. Becker and T. Wieske (Lever Bros. Co.). *U. S. 3,015,566.* Emulsions of water and fat suitable for frying are improved by incorporating in them a surface-active substance containing carbon, hydrogen, and oxygen, and any other element present being nitrogen. The substance contains: 1 to 5 —CO groups each forming part of a radical selected from the class consisting of —COOH and COOCO radicals, not more than 3 being COOH radicals, together with at least 1 acid radical selected from the class consisting of aliphatic polycarboxylic, aminocarboxylic, and hydroxycarboxylic acids, not more than 3 additional hydrophilic groups (the number at the most being equal to the sum of the carboxyl and any anhydride groups present) and at least 2 lipophilic groups each containing 6 to 30 carbon atoms (saturated or olefinically unsaturated aliphatic or cycloaliphatic hydrocarbon radicals or heterocyclic radicals containing only carbon and oxygen in the ring. The ratio between the total number of carbon atoms and the sum of the carboxyl groups and any anhydride groups present should be at least 40:1 when hydrophilic groups other than carboxyl groups and anhydride groups are absent and at least 55:1 when such other groups are present. The molecular weight should not be greater than 2000.

HYDROGENATION PROCESS. L. H. Ruiter and J. M. Van Schaik (Lever Bros. Co.). *U. S. 3,015,667.* A process is described for hydrogenating unsaturated higher fatty acids in the vapor phase. Hydrogenation is carried out with a mixture of water vapor and hydrogen in the molecular proportion of from 2:100 to 200:100.

METHOD FOR IMPROVING BUTTER SPREADABILITY. S. T. Coulter (Univ. of Minnesota). *U. S. 3,017,275.* A method for improving the spreadability of conventionally churned butter prepared from normal cream as customarily used in buttermaking consists of rapidly chilling the butter after formation of butter granules and separation of buttermilk to a temperature between 25 and 45F by direct agitating contact with a refrigerated brine.

DRILLING FLUIDS. P. W. Fischer (Union Oil Co. of California). *U. S. 3,017,349.* An oil-base drilling fluid consists of a mineral oil-containing liquid suspending medium, a wall-building agent, and the reaction product of an alkaline earth metal base with the undistilled bottoms fraction obtained by vacuum distilling at 5 to 25 mm. and at a temperature of at least 220F, the fatty acid portion of the product is obtained by reacting water with animal or vegetable fats or oils at temperatures of 350 to 600F, and pressure between 150 and 1600 p.s.i. to maintain the water in liquid state. The reaction product is used in an amount sufficient to maintain the wall-building agent dispersed in the liquid suspending medium but insufficient to increase the viscosity of the suspending medium to such an extent that the drilling fluid cannot be circulated in a well bore.

EMULSION-BASE DRILLING FLUIDS. P. W. Fischer (Union Oil Co. of California). *U. S. 3,017,350.* The described fluid consists of a liquid suspending medium comprising between 10 and 90% by volume of mineral oil and between 90 and 10% of water, a clay wall-building agent, and an emulsifying agent which is the product of reaction between an alkali metal base and the undistilled bottoms fraction obtained by vacuum distilling off at 5 to 25 mm. at a temperature of at least 225F, the crude fatty acid portion of the product obtained by hydrolyzing with water, animal or vegetable fats, or oils at temperatures of 350 to 600F and pressures between 150 and 1600 p.s.i. to maintain the water in a liquid state. The emulsifying agent is used in an amount sufficient to maintain the oil and water stably emulsified.

ISOLATION OF FATTY ACIDS FROM AQUEOUS SOLUTIONS THEREOF. J. J. Bulloff (Commonwealth Eng. Co. of Ohio). *U. S. 3,017,434.* Water-soluble alkyl-substituted acetic acid is isolated from aqueous solutions produced by hydrolysis of butylcyclopentadiene and in a solution mixed with other water-soluble carboxylic acids by saponifying the solution, adding the saponified solution to an excess of an aqueous solution of a water-soluble aluminum salt (alum or aluminum sulfate) to precipitate the insoluble aluminum soap of the alkyl-substituted acetic acid, filtering the resultant soaps and treating them with cold concentrated phosphoric acid.

• Fatty Acid Derivatives

METHOD FOR WATERPROOFING SOLUBLE SALTS AND COMPOSITIONS CONTAINING SUCH SALTS. G. B. Young (American Cyanamid Co.). *U. S. 3,014,783.* Urea or a soluble nitrate in the form of small discrete particles is completely covered by a thin film of a metal resinate overlaid with a thin film of a gelled hydrocarbon lubricating oil. The gelling agent is a metal salt of a fatty acid of 8 to 22 carbon atoms, dimers thereof, or mixtures of the fatty acid and dimer salts. The metal resinate is a mixture of a salt of wood rosin modified by the addition of 10–40% of a melting point depressant such as stearic acid, tall oil pitch, paraffin wax, 12-hydroxystearin, tall oil, abietic acid, sapinic acid, pimaric acid, or the anhydrides of such acids, stearic acid being a necessary ingredient used at 5–15% by weight of the metal resinate, and a metal such as barium, strontium, or zinc. The modified wood rosin is present at a concentration of 0.5 to 2.0% of the water soluble compound and the gelled hydrocarbon oil at a concentration of 1 to 8%.

THERAPEUTICAL ANTIBIOTIC COMPOSITION. H. Jacobsen (Novo Terapeutisk Laboratorium A/S, Copenhagen). *U. S. 3,016,330.* A non-oral antibiotic composition which exhibits a protracted therapeutic effect consists of a combination of a pharmaceutical oil and pre-coated particles of an antibiotic substance in sus-

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pension in the oil. The particles are pre-coated with an aluminum salt of a higher fatty acid with at least 12 carbon atoms.

FLUID EMULSIFIER FOR ICE CREAM. W. H. Knightly (Atlas Chem. Ind., Inc.). *U. S. 3,017,276.* A fluid food emulsifier composition, stable against the separation of solids at normal refrigeration temperaures for dairy products, consists of 5 to 25% by weight of propylene glycol and from 75 to 95% by weight of a mixed partial glyceride of saturated and unsaturated higher fatty acids of from 40 to 70% mono ester content, of which at least 87% by weight of the acyl radical is that of 14– to 18-carbon unsaturated acids and the remainder is that of saturated fatty acids.

• Biology and Nutrition

STEROL METABOLISM. 6. THE INTERCONVERSION OF CHOLESTEROL, 7-DEHYDROCHOLESTEROL AND LATHOSTEROL IN THE RAT. E. I. Mercer and J. Glover (Univ. of Liverpool). *Biochem. J.* **80**, 552–6 (1961). 7-Dehydrocholesterol and lathosterol are readily interconverted in the intestine of the rat *in vivo* and *in vitro*, the equilibrium of the enzyme system favoring lathosterol. The enzyme involved may be a reductase, which has been tentatively called "7-dehydrocholesterol-5-ene reductase." A little 7-dehydrocholesterol is simultaneously reduced to cholesterol in the same tissue but at a much lower rate. The back reaction, cholesterol to 7-dehydrocholesterol, proceeds even more slowly. The enzyme system responsible for this step has been tentatively called "7-dehydrocholesterol-7-ene reductase." These results imply that the cholest-7-enols are precursors of cholesterol rather than metabolites.

CHROMATOGRAPHIC SEPARATION OF BRAIN LIPIDS. 2. ETHANOLAMINE CONTAINING PHOSPHOLIPIDS. C. Long and D. A. Staples (Royal College of Surgeons of England, London). *Biochem. J.* **80**, 557–62 (1961). Chromatography of mixed rat-brain lipids on an alumina column by a gradient method in which the water content of a chloroform-methanol solvent was raised from 7 to 12.5% resulted in the elution of a peak containing all the ethanolamine-based phospholipids. The main components were phosphatidylethanolamine and ethanolamine plasmalogen, but smaller quantities of sulphatide, lysophosphatidylethanolamine and "excess ester" resulting from the transesterification: phosphatidylethanolamine + methanol → lysophosphatidylethanolamine + methyl ester, were also present. Chromatography of this partially purified material on silicic acid eluting with a chloroform-methanol solvent system in which the methanol content was raised from 2 to 9% produced a satisfactory separation into the following fractions: (a) "excess ester," (b) a mixture of phosphatidylethanolamine and ethanolamine plasmalogen, (c) a mixture of sulphatide and lysophosphatidylethanolamine.

PHOSPHOLIPIDS OF ISOLATED WHEAT GLUTEN. O. B. Coulson and Elspeth A. Somerville (Arthur D. Little Res. Inst., Inveresk, Midlothian). *Biochem. J.* **80**, 45P–46P (1961). A rapid simple method for estimating the amount of phospholipid in a solution has been developed for use with column eluates. A linear relation between the amounts of phospholipid in solution and the intensity of color obtained, when a standard amount of Rhodamine 3GO is added to the solution, exists over quite a range. Various solvents have been tested: ethanol, methanol, methanol-chloroform (1:1, v/v), 90% aqueous acetic acid, and water-saturated butanol. When the solvent was immiscible with water, a chloroform solution of the dye was used. Phospholipid levels as low as 0.25 mg./ml. (approx. 10 μg of P) can be detected. The addition of ammonia did not significantly increase the color intensity of the solution although the spot color on the chromatogram is enhanced by ammonia fumes. Wheat gluten was macerated in chloroform-methanol (2:1, v/v) or water-saturated butanol, chromatographed on silic acid-impregnated paper, developed with isobutyl ketone-acetic acid-water (40:20:3), and stained with Rhodamine. Thirteen components were found.

PHOSPHOLIPID METABOLISM IN NERVOUS TISSUE. 4. INCORPORATION OF P^{32} INTO THE LIPIDS OF SUBCELLULAR FRACTIONS OF THE BRAIN. C. August, A. N. Davison, and Faith Maurice-Williams (Guy's Hospital Med. School, London). *Biochem. J.* **81**, 8–12 (1961). Radioactive phosphate and sulphate were injected into neonatal rats, and most of the persistent radioactivity was found in the lipids of the brain mitochondria. In other experiments, radioactive phosphorus as phosphate was injected into neonatal and adult rats and a myelin-enriched fraction isolated from the brain. Relatively more radioactive lipid was found in the myelin-enriched fraction of the neonatal rats than in the rest of the brain lipid; in contrast less radioactive phospholipid was obtained from the myelin-enriched fraction from adult rats than from the remaining brain lipid.

STUDIES OF FATTY ACID OXIDATION. 7. THE EFFECTS OF FATTY ACIDS ON THE PHOSPHATE METABOLISM OF SLICE MITOCHONDRIAL PREPARATIONS OF RAT LIVER. K. Ahmed and P. G. Scholfield (McGill-Montreal General Hospital Res. Inst.). *Biochem. J.* **81**, 37–45 (1961). Fatty acids increased the respiratory activity of rat-liver and -kidney slices. At higher concentrations of the fatty acids, the initial stimulation of the rate of oxygen uptake was followed by a gradual decrease. The inhibitory effects increased with chain length. dodecanoate having the greatest effect. Fatty acids containing an odd number of carbons were less effective inhibitors than those with one more or less carbon atom. Decanoate (1 m*M*) inhibited the oxidative phosphorylation associated with glutamate oxidation in rat-liver mitochondria by approximately 50%; it also decreased the P/O ratio associated with the oxidation of succinate and reduced cytochrome *c*. Decanoate and other fatty acids inhibited incorporation of P^{32} phosphate into rat-liver slices at a concentration of 1.34 m*M* which caused a stimulation of respiratory activity. 1-C^{14} Decanoate was oxidized to $C^{14}O_2$ at these concentrations.

STUDIES OF FATTY ACID OXIDATION. 8. THE EFFECTS OF FATTY ACIDS ON METABOLISM OF RAT-BRAIN CORTEX IN VITRO. *Ibid.*, 45–53. Decanoate and other fatty acids initially stimulated the respiratory activity of rat-brain-cortex slices incubated in Krebs-Ringer glucose medium. Subsequently the respiratory activity ceased gradually and irreversibly. Of the fatty acids from heptanoate to myristate, heptanoate was the least effective as an inhibitor and decanoate was the most effective. Saturated fatty acids of greater chain length were less effective. The greatest inhibitory effects were obtained when glucose was present as the substrate; when the acids of the carboxylic acid cycle were used, the respiration was not inhibited to the same extent, nor was the inhibition complete. Decanoate inhibited phosphate incorporation into all the organic phosphate compounds at concentrations which did not significantly alter the respiratory activity of the rat-brain-cortex slices.

FURTHER STUDIES ON THE ABSORPTION OF VITAMIN *A*. S. Mahadevan and J. Ganguly (Indian Inst. of Sci., Bangalore). *Biochem. J.* **81**, 53–8 (1961). A circular paper-chromatographic procedure for the separation of higher fatty acid esters of vitamin A, with silicone-impregnated paper and a solvent system of methanol-butanol-water (85:10:5) is described. Rats raised on a vitamin-A low diet and starved for 24 hours were dosed with vitamin A alcohol in the carriers Tween 20, Tween 40, Tween 60, groundnut oil, sesame oil, coconut oil, or safflower oil. The vitamin A ester fractions of the contents, mucosae and muscels of the small intestine, and of blood and liver were analyzed. After the feeding of colloidal vitamin A, mostly vitamin A palmitate was found in all the fractions. The types of the esters of the contents and mucosae in all other cases were governed by the fatty acids of the carrier. No such relationship was found for the ester composition of intestinal muscles and blood which contained almost entirely the palmitic acid ester. The liver, under all conditions studied, stored exclusively the palmitate.

THE METABOLISM OF ELAEOSTEARIC ACID IN THE RAT. T. Moore and I. M. Sharman (Univ. of Cambridge). *Biochem. J.* **81**, 10P (1961). α-Elaeostearic acid has 3 conjugated double bonds which cause intense absorption at 272 mμ. Young rats given a diet containing 30% of tung oil continued to grow and remained in fair health for many months. When they were killed their adipose tissues contained nearly 50% of an acid absorbing at 232 mμ, indicative of only 2 conjugated double bonds. Extracts of their organs, with the exception of brain, all showed absorption at 232 mμ. In contrast, extracts of the contents of the intestinal tract still absorbed at 272 mμ, which suggests that conversion took place in the intestinal walls. The acid absorbing at 232 mμ had the same chain length (C_{18}) as the elaeostearic from which it was formed, suggesting hydrogenation of one of the double bonds.

THE LIPID COMPOSITION OF RAT-LIVER-CELL SAP. G. S. Getz, W. Bartley, F. Stirpe, B. M. Notton, A. Renshaw, and D. S. Robinson (Univ. of Oxford). *Biochem. J.* **81**, 214–20 (1961). The cell sap of rat liver was separated, the constituent lipids fractionated on silicic acid and their fatty acid composition determined. A similar study was conducted on the "floating fatty supernatant" of the rat liver. Of the total liver fatty acid esters, 4.6% were in the cell sap and 5.1% in the fatty supernatant. Both these fractions were largely neutral lipid. About ⅓ of the cell sterol esters were in the cell sap and about the same proportion of the total lipid in this fraction was sterol ester. More than 90% of the "floating fatty supernatant" was triglyceride, representing about ¼ of the total cell triglycerides. Experiments in which corn oil was fed to rats showed that the "fatty supernatant" did not rapidly equilibrate with the dietary fat.

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COMPOSITION OF PHOSPHOLIPIDS OF RABBIT, PIGEON, AND TROUT MUSCLE AND VARIOUS PIG TISSUES. G. M. Gray and Marjorie G. Macfarlane (Lister Inst. of Preventive Med., London). *Biochem. J.* 81, 480–8 (1961). The lipid was extracted from pig spleen, lung and kidney, pigeon, trout, and rabbit muscle and the phospholipid was fractionated quantitatively on silicic acid columns. The constituent fatty acids and aldehydes from the phospholipids and some triglyceride fractions were identified and estimated by gas chromatography. In general, there was a preponderance of C_{18} saturated acids or aldehydes and of polyenoic acids in the cephalins, and of the C_{16} saturated compounds in phosphatidylcholine and choline plasmalogen, with the exception of liver and trout-muscle lecithins, which contained large amounts of C_{22} acids. Data are presented in numerous charts and tables.

THE ISOLATION OF A NEW LIPID, TRIPHOSPHOINOSITIDE, AND MONOPHOSPHOINOSITIDE FROM OX BRAIN. J. C. Dittmer and R. M. C. Dawson (Agr. Res. Council Inst. of Animal Physiology, Babraham, Cambridge). *Biochem. J.* 81, 535–40 (1961). Triphosphoinositide was found to contain inositol, phosphate, glycerol, and fatty acid in the molar ratios of 1:3:1:2. All of the fatty acid was acyl ester-linked. The lipid contained no nitrogen as an integral part of its molecule. Evidence is presented that triphosphoinositide is tightly attached to brain protein. Pretreatment of the brain tissue with acetone partially breaks the linkage in the complex, and triphosphoinositide then becomes a component of the "diphosphoinositide" fraction of brain tissue. Monophosphoinositide was isolated from brain tissue and chemically characterized. Its degradation products on acid and alkaline hydrolysis indicate that it has the structure of diacylglycerylphosphorylinositol.

EVIDENCE FOR THE STRUCTURE OF BRAIN TRIPHOSPHOINOSITIDE FROM HYDROLYTIC DEGRADATION STUDIES. R. M. C. Dawson and J. C. Dittmer (Agr. Res. Council Inst. of Animal Physiology). *Biochem. J.* 81, 540–5 (1961). Mild acid hydrolysis produced inositol triphosphate as a major product as well as inositol diphosphate and glycerophosphate. Diglyceride and monoglyceride were also isolated from the reaction mixture. Deacylation with alkali produced glycerylphosphorylinositol diphosphate as the major product, together with some inositol triphosphate, inositol diphosphate, and a little normal and cyclic glycerophosphate. On acid hydrolysis, the first compound split, producing inositol triphosphate, inositol diphosphate, and glycerophosphate. From these results it was deduced that triphosphoinositide is a diacylglycerylphosphorylinositol diphosphate (phosphatidylinositol diphosphate).

THE COLORIMETRIC REACTION BETWEEN VITAMIN A_2 ALDEHYDE AND ANTIMONY TRICHLORIDE. P. A. Plack (Natl. Inst. for Res. in Dairying, Shinfield, Reading). *Biochem. J.* 81, 556–61 (1961). Crystalline vitamin A_2 aldehyde was prepared from vitamin A_1 aldehyde. With purified antimony trichloride, 14% (w/w) in chloroform containing 2% (v/v) acetic anhydride, the wavelength of maximum absorption of the green-blue color produced increased with the concentration of the aldehyde and decreased with time. In the absence of acetic anhydride, the wavelength of maximum absorption was steady at 741 mμ, the color developed remained at full intensity for about 15 sec., the maximum extinction varied linearly with concentration of aldehyde and $E^{1\%,1\,cm.}$ was 4200 (range 4000–4400). Some observations on antimony pentachloride and glycerol dichlorohydrin (1:3-di-chloropropan-2-ol) as colorimetric reagents for vitamin A_2 aldehyde are presented.

A COMPARATIVE SURVEY OF THE DISTRIBUTION OF VITAMIN A ALDEHYDE IN EGGS. P. A. Plack and S. K. Kon (Natl. Inst. for Res. in Dairying). *Biochem. J.* 81, 561–70 (1961). A method is described for the determination of vitamin A_1 and A_2 aldehydes in solutions containing mixtures of the two. Values are given for the content of total vitamin A_1 and A_2 esters and alcohols, the amount of the A_2 form and the carotenoid content of the eggs or ovaries of various cephalochordate, lampreys, marine elasmobranchs, marine teleosts, freshwater teleosts, salmon, amphibians, reptiles, and the domestic hen.

THE EFFECTS OF CORN OIL ON THE AMOUNTS OF CHOLESTEROL AND THE EXCRETION OF STEROL IN THE RAT. T. Gerson, F. B. Shorland (Fats Res. Lab., D.S.I.R., Wellington, New Zealand) and Yvonne Adams. *Biochem. J.* 81, 584–91 (1961). Supplementation of a low-fat diet with 2 or 10% corn oil led to an increase in the cholesterol content of the tissues and organs of rats, particularly the hearts, aortas, livers, intestines, and muscle. These increases were accompanied by a large decrease in the concentration of serum lipids and a considerable decrease in the concentration of serum cholesterol; the effects were relatively greater in young animals. Some indication of changes in the body cholesterol of rats can be gained by measuring the rate of sterol excretion. The fatty acid composition of the tissue and serum lipids showed an inverse relationship between the concentrations of cholesterol in the tissues and that of arachidonic acid in the lipids; the reason for this is not understood.

DIETARY ALTERATIONS OF FATTY ACIDS OF ERYTHROCYTES AND MITOCHONDRIA OF BRAIN AND LIVER. L. A. Witting, C. C. Harvey, B. Century, and M. K. Horwitt (L. B. Mendel Research Lab., Elgin State Hosp., Elgin, Ill.). *J. Lipid Research* 2, 412–418 (1961). The fatty acid composition of erythrocyte and liver mitochondrial lipids was drastically and easily altered by varying the fatty acid content of the diet. Nonessential polyunsaturated fatty acids were found in these tissues when the tissue level of linoleic acid fell below 10% of the total fatty acids. In an essential fatty acid deficiency, two isomeric eicosatrienoic acids appeared except when the diet supplied other more highly unsaturated nonessential fatty acids. Brain mitochondrial lipids were also altered by variations of dietary fat; nonessential polyunsaturated fatty acids from cod liver oil were also incorporated into these lipids.

EFFECTS OF MEDIUM FATTY ACID CONCENTRATION, EPINEPHRINE, AND GLUCOSE ON PALMITATE-1-C^{14} OXIDATION AND INCORPORATION INTO NEUTRAL LIPIDS BY SKELETAL MUSCLE IN VITRO. P. Eaton and D. Steinberg (Lab. of Cellular Physiology and Metabolism, National Heart Inst., N.I.H., Bethesda 14, Maryland). *J. Lipid Research* 2, 376–382 (1961). The rate of oxidation of palmitate-1-C^{14} to $C^{14}O_2$ by rat skeletal muscle *in vitro* was shown to increase markedly as a function of the concentrations of free fatty acids (FFA) in the medium. Neither epinephrine nor glucose had any important effect. The rate of incorporation of palmitate-1-C^{14} into tissue neutral lipids was also increased by higher FFA levels in the medium. The deposition of triglyceride reported to occur in muscle after epinephrine or norepinephrine administration is due to the effects of these hormones on serum FFA levels and not to a direct effect on muscle metabolism.

EVIDENCE FOR THE PHYSIOLOGICAL OCCURRENCE OF LYSOLECITHIN IN RAT PLASMA. H. A. I. Newman, Ching Tong Lin, and D. B. Zilversmit (Dept. of Physiology, Univ. of Tenn., Memphis 3, Tenn.). *J. Lipid Research* 2, 403–411 (1961). An improved separation of phospholipids on activated silicic acid columns was achieved by stepwise elution with increasing concentrations of methanol in chloroform. Rat plasma was shown to contain about 17.5% of its lipid phosphorus in the form of lysolecithin. Evidence was obtained which indicated that plasma lysolecithin is not an *in vitro* breakdown product.

EFFECT OF INGESTED FAT ON THE FATTY ACID COMPOSITION OF SERUM LIPOPROTEINS. J. H. Bragdon (Sect. of Metabolism, Nat. Heart Inst., Nat. Inst. Health, Bethesda, Md.) and A. Karmen. *J. Lipid Research* 2, 400–402 (1961). The fatty acid composition of several serum lipoprotein fractions of a human subject was studied before and after the ingestion of a fat meal composed of corn oil. The fatty acids of the chylomicrons, of the low density lipoproteins ($d<1.019$), and of the $d>1.21$ fraction tended to resemble the fatty acids of the recently ingested fat. This was not the result of an exchange *in vitro* from chylomicrons to other fractions. Small changes in the composition of other lipoprotein fractions were observed.

RELEASE OF FREE FATTY ACIDS BY ADIPOSE TISSUE IN VIVO. J. J. Spitzer and F. J. Hohenleitner (Dept. of Physiology, Hahnemann Med. Coll. and Hospital, Philadelphia 2, Penn.). *J. Lipid Research* 2, 396–399 (1961). A technique is described to determine changes in plasma free fatty acids (FFA) on passage through adipose tissue *in vivo*. The subcutaneous adipose tissue of the abdominal region was shown to be constantly releasing FFA. Insulin depressed the mobilization of FFA in normal and diabetic dogs. Lymph infusion from fat absorbing donors did not seem to influence the release of FFA by adipose tissue to the recipient animals.

THE ROLE OF LIVER AND OF EXTRAHEPATIC TISSUES IN THE TRANSPORT AND METABOLISM OF FATTY ACIDS AND TRIGLYCERIDES IN THE DOG. R. J. Havel and A. Goldfien (Cardiovascular Res. Inst. and Depts. of Medicine and Obstetrics and Gynecology, Univ. of Calif. Med. School, San Francisco). *J. Lipid Research* 2, 389–395 (1961). Labeled free fatty acids (FFA) and chylomicron triglycerides were injected intravenously into intact and hepatectomized dogs. Hepatectomy reduced the rate of removal of FFA from the circulation moderately but almost abolished the formation of radioactive triglycerides indicating that the liver is the chief site of conversion of plasma FFA to plasma triglycerides which enter the circulation through the hepatic sinusoids. Hepatectomy or temporary exclusion of the liver from the circulation reduced the rate of removal of chylomicron triglycerides variably. Most of the triglycerides removed from the circulation of hepatectomized dogs appeared

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to enter adipose tissue. Evidence was obtained which indicated that these triglycerides were hydrolyzed prior to entrance of their constituent fatty acids into adipose tissue cells.

METABOLISM OF STEARATE-1-C^{14} IN THE ISOLATED COW UDDER. Monique Laurpsens, R. Verbeke, and G. Peiten (Dept. of Physiology, Veterinary College, Univ. of Ghent, Ghent, Belgium). *J. Lipid Research* 2, 383–388 (1961). One-half of a lactating cow's udder was perfused with heparinized and oxygenated cow blood at 38C for 150 minutes; after 30 minutes, 200 μc of stearate-1-C^{14} (albumin bound) was added to the perfusing blood, together with inactive acetate and glucose. Almost all of the blood's stearate-1-C^{14} was absorbed by the gland, and much of the added C^{14} was recovered from the glyceride of the udder tissue. Stearic and oleic acids of the glycerides showed significant specific activities. Negligible activities were detected in the shorter chain fatty acids of the glycerides.

THE EFFECT OF BILIARY DRAINAGE UPON THE SYNTHESIS OF CHOLESTEROL IN THE LIVER. N. B. Myant and H. E. Eder. (Albert Einstein College of Medicine, Yeshira Univ., New York 61, N.Y.). *J. Lipid Research* 2, 363–368 (1961). Synthesis of cholesterol and fatty acids was measured *in vitro* in the livers of rats from which the bile had been drained for various time periods and in control rats with normal enterohepatic circulation. After draining the bile for 12 hours or longer there was an increase in cholesterol synthesis from acetate, but not from mevalonate and a slight depression of fatty acid synthesisi. Liver cholesterol content was unchanged.

THE USE OF CHOLESTEROL-4-C^{14}-LABELED LIPOPROTEINS AS A TRACER FOR PLASMA CHOLESTEROL IN THE DOG. D. Porte, Jr. and R. V. Hassel (Cardiovascular Research Inst. and Dept. of Medicine, Univ. of Calif. School of Medicine, San Francisco 22, Calif.). *J. Lipid Research* 2, 357–362 (1961). A method is described for labeling lipoprotein cholesterol with cholesterol-4-C^{14}. The specific activity of the labeled cholesterol is equal in low and high density lipoproteins and none of the label is associated with other serum proteins. Lipoproteins labeled in this manner were used to define the quantity of cholesterol exchanged with plasma free cholesterol in 30 hours. This quantity is approximately three times the amount of cholesterol contained in blood plasma, red blood cells, and liver.

THE EFFECT OF DIETARY FATTY ACIDS ON COPROSTANOL EXCRETION BY THE RAT. Jean D. Wilson (Dept. of Internal Medicine, Univ. of Texas Southwestern Medical School, Dallas 35, Texas). *J. Lipid Research* 2, 350–356 (1961). By means of gas liquid chromatography, coprostanol excretion has been studied in rats fed diets containing either no fat, or varying amounts of linoleic acid, palmitic acid, or oleic acid. Coprostanol excretion was accelerated by linoleic acid and depressed by oleic and palmitic acids. The acceleration of coprostanol formation by linoleic acid was demonstrated to occur in the large intestine. Cholesterol and coprostanol were the only neutral excretion products of cholesterol-4-C^{14}.

INHIBITION OF CHOLESTEROL BIOGENESIS BY ARSENITE: PREPARATION OF LABELED LANOSTEROL. Mary L. Moller and T. T. Tchen (Dept. of Chemistry, Wayne State Univ., Detroit 2, Mich.). *J. Lipid Research* 2, 342–343 (1961). When mevalonic acid-2-C^{14} was incubated with rat liver homogenate with the usual co-factors plus $10^{-3}M$ arsenite, the formation of labeled cholesterol was inhibited and labeled lanosterol accumulated. This inhibitory effect of arsenite provides a convenient method of preparing labeled lanosterol in high yield (>10%) from commercially available C^{14} mevalonic acid.

THE NITROGENOUS CONSTITUENTS OF THE LIPIDS OF SEVERAL DOG TISSUES. J. M. McKibben, S. Meltzer, and Mary J. Spiro (Dept. of Biochemistry, State Univ. of New York, Coll. of Medicine, Syracuse 10, N.Y.). *J. Lipid Research* 2, 328–334 (1961). A technique is described for the resolution and quantitative determination of the nitrogenous constituents of dog tissue lipids. The lipid nitrogen occurs essentially as choline, ethanolamine, serine, other amino acids, ammonia, sphingosine, and hexosamine.

THE ISOLATION AND CHARACTERIZATION OF PHOSPHOLIPIDS CONTAINING MONO- AND DIMETHYLETHANOLAMINE FROM NEUROSPORA CRASSA. M. O. Hall and J. F. Rye (Dept. of Physiol. Chem., Univ. of Calif., Los Angeles, 24, Calif.). *J. Lipid Research* 2, 321–327 (1961). Mono- and dimethylethanolamine containing phospholipids have been isolated from a choline requiring mutant strain of *Neurospora crassa* with the aid of silicic acid chromatography. These phospholipids have been chemically degraded, and shown to be the phosphatidyl esters of mono- and dimethylethanolamine. The implications of the accumulation of these compounds by the mutant of *Neurospora* are discussed.

THE METABOLISM OF ADIPOSE TISSUE IN VITRO. Martha Vaughan (Laboratory of Cellular Physiology and Metabolism, National Heart Inst., N.I.H., Methesda, Md.). *J. Lipid Research* 2, 293–316 (1961). The evidence for the metabolism of adipose tissue is presented and discussed in several sections. Reactions leading to the accumulation or removal of free fatty acids in the adipose tissue cell are discussed and the mechanisms of fatty acid release in intact tissue presented. The enzymatic pathways of fatty acid metabolism, fatty acid synthesis, glyceride synthesis and hydrolysis are summarized. The metabolism of carbohydrates, and the effects of hormones on the metabolism of adipose tissue are discussed.

FATTY ACIDS OF HUMAN BRAIN CEREBROSIDES. N. S. Radin and Y. Akahori (Biochemistry Dept., Northwestern Univ. Med. School, Chicago, Ill.). *J. Lipid Research* 2, 335–341 (1961). Four regions of two human brains were analyzed for the individual cerebroside acids: cerebral cortex white and grey matter, cerebellum (mainly grey matter) and corpus callosum. The total lipids were extracted from each section and chromatographed on Florisil to remove cholesterol and phosphatides. Cerebroside sulfate was removed from the crude cerebrosides with ion exchange resins and the resulting lipid purified by elution from a silicic acid column. The acids were cleared from the cerebrosides and separated into four classes: normal saturated, hydroxy saturated, normal unsaturated and hydroxy unsaturated, and analyzed by gas liquid chromatography. The cerebroside content of each brain region differed somewhat as did the relative contents of hydroxy acids. The distribution of acids within each class was rather independent of brain location. The normal saturated acids contained stearic and lignoceric as the major acids, but fairly large amounts of the C_{22}, C_{23}, and C_{25} acids were also present. The hydroxy saturated acids were similar, but contained little hydroxy stearic acid. The unsaturated acids of both classes contained the C_{24} acid as the major constituent together with considerable amounts of the C_{25} and C_{26} acids.

A STUDY OF THE SEPARATION OF SUBSTITUTED CHOLANIC ACIDS BY GAS LIQUID CHROMATOGRAPHY. J. Sjörall, C. R. Meloni, and D. A. Turner (Biochem. Res. Div., Dept. of Medicine, Sinai Hospital, Baltimore 15, Md.). *J. Lipid Research* 2, 317–320 (1961). Suitable conditions for the gas liquid chromatography of a number of substituted methyl cholanates are described. Those studied were the methyl esters of some hydroxy-, acetoxy-, and ketocholanic acids. The effects of these functional groups on the retention times were studied using two types of silicone gum rubbers of varying structure on Celite supports and an argon ionization detector.