with the β-lipoprotein as a dominating fraction with contributions from other lipoprotein fractions seen in normal adult sera as elucidated by means of agar electrophoresis.

During the same period the fatty acid pattern also changed. At birth low values of oleic acid and linoleic acid and high values of palmitic acid and arachidonic acids were found in cord serum as compared to the corresponding values in the mothers' blood. During the 1st week the content of palmitic and arachidonic acids decreased slightly, whereas the oleic acid was found to increase.

Somewhat different values were found in infants of low birth weight, where the linolic acid was found to be very low.

Related changes in serum levels of vitamin E will be discussed.

15. Intravenous fat loads in low birth weight infants. A. GUSTAFSON, I. KJELLMER, R. OLEGÅRD, and L. VICTORIN. *Univ. of Göteborg, Sweden.*

When the clinical course in low birth weight (LBW) infants is complicated by extreme immaturity, respiratory distress, or hyperbilirubinemia, the peroral route of feeding becomes difficult. In an attempt to investigate whether the caloric demands could be met by intravenous fat infusions, fat loads were performed in normal LBW infants. The fat was given as 20% Intralipid (a soybean oil emulsion) either in single injections or during extended infusions. The concentration of total lipids was followed in serum samples, and the distribution of the lipoproteins was evaluated by means of agar gel electrophoresis. In preterm infants the maximal removal capacity of fat from the intravascular compartment corresponded to some 6–8 g fat/kg in 24 hr. The fat particles injected had a half-life of 1–5 min. In small-for-date infants the initial maximal removal capacity was of the same order but the removal rate rapidly decreased concomitant with the appearance of a secondary generation of fat particles in the blood stream. These were identified as pre-β-lipoproteins on the gel electrophoresis and were considered to originate in the liver. It is speculated that the slower removal of exogenous fat from the intravascular compartment of the small-for-date infants is due to a competition with the pre-β-lipoproteins for the same elimination mechanisms.

16. Evolution of water and electrolyte content of muscle and skin tissues during growth. The concept of chemical maturity. J. DUBOIS and H. L. VIS. *Univ. Libre de Bruxelles, Brussels, Belgium.*

Variations in the hydroelectrolytic composition of skeletal muscle have been studied in 69 normal children aged 2 weeks to 18 months by neutron activation analysis of needle micro biopsies and in 41 adults by the analysis of surgical biopsies with classical chemical methods. The criteria of normality for age of the various elements measured (HOH, Na, K, Cl, P) were established by means of the statistical analysis of the results obtained. The same elements were also measured in the skin of 35 children. It was shown that hydroelectrolytic composition of muscle and skin tissues changes quite distinctly with age. During the first 6 months of life there is a relative diminution of water and extracellular electrolyte muscle values. This evolution is reversed in old age. In cutaneous tissue, during the first 18 months of life there is a gradual fall in the value of water, sodium, and chloride. There is no significant variation in muscle and skin potassium and phosphorus content in relation to age. On the basis of our results, the notion of chemical maturity as defined in the literature must be reconsidered as far as muscle tissue is concerned. In normal children, no correlation was found in the sum concentration of sodium and potassium in the plasma and in the water of the two tissues investigated. This observation implies that the regulation of osmotic equilibrium between plasma and tissue does not depend exclusively on the water and electrolytes movements.

The role of amino acids in this regulation is illustrated by preliminary studies on the free amino acid content of muscle tissue in subjects of various ages.

17. Total body potassium, lean body mass and fat determination in children by $^{40}K$ measurements with a liquid scintillation whole body counter. A. DONATH, G. PORETTI, and A. ZUPPINGER. *Univ. of Berne, Switzerland.*

Normal values of total body potassium are established by measuring 441 healthy children, expressing the results according to an obesity index (O.I. $= W/10 \cdot H^3$, where $W$ = weight in kg and $H$ = height in m) and classifying the children according to sex and age. While after puberty boys increase their K/kg and keep their O.I. constant, girls' O.I. goes up, but their total K/kg remains unchanged. Total potassium reflects the cellular mass and allows an objective evaluation of muscle waste in progressive muscular dystrophy. The calculation of the lean body mass and, by deduction, of the total fat shows extreme values of practically no fat in anorexia mentalis and 750 g/kg in obesitas permagnia. Total body water has been determined simultaneously in 62 children, and their lean body mass calculated and compared to the values obtained from K determination; the correlation between the two methods is satisfactory. Daily measurements of total body potassium and simultaneous potassium balance studies for 8 days in a case of newly diagnosed diabetes also correlated well.

18. Synthesis and release of plasma proteins by isolated perfused human fetal liver. M. KEKOMÄKI, M. SEPPÄLÄ and A. L. SCHWARTZ. *Children's Hosp.*, and *Univ. of Helsinki, Finland.*

Plasma protein constituents are synthesized by explants of cultured human embryonic liver after the 5th week of gestation. To quantify the incorporation and release of protein in an abstracted physiological system, three human fetal livers of gestational ages of (*a*) 10, (*b*) 14, and (*c*) 20 weeks were perfused for 4 hr through the umbilical vein with an amino acid mixture and glucose in oxygenated Krebs-Ringer bicarbonate. L-Leucine-$^{14}C$ tracer was added to the medium at 60 min, when protein was released to the medium at constant rates of 0.45, 0.60, and 0.15 μg/min/mg of liver protein in *a*, *b*, and *c*, respectively. The incorporation of $^{14}C$ into the protein was characterized at 240 min by autoradiography of both (*1*) immunodiffusion in agar gel and (*2*) electrophoresis on cellulose acetate. (*1*) $^{14}C$ was incorporated into albumin, α-fetoprotein, α- & β-lipoprotein, Gc-protein, and transferrin, but not into haptoglobin; (*2a*) a constant fraction (72%) of the label incorporated was found in (albumin + α-fetoprotein) at all three gestational ages; (*2b*) the albumin/α-fetoprotein incorporation of the label was 1.6, 2.3, and 4.4 for *a*, *b*, and *c*, respectively; these values related to each other like the albumin/α-fetoprotein found in the plasma of corresponding fetuses: 2.9, 7.5, and 17; (*2c*) the (stored) protein released by the livers during the first 60 min was mainly albumin.

19. Studies of sulfur amino acids in the immature human: Is cyst(e)ine essential? G. E. GAULL, J. A. STURMAN, and N. C. R. RAIHA. *N.Y. State Inst. Basic Res. Mental Retard., Mt. Sinai Hosp. Sch. of Med., N.Y. and Univ. of Helsinki, Finland.*

Cystathionase activity was not measurable in the liver or brain of 24 human fetuses and 3 prematures. Methionine-activating