blanching which gradually coalesced to form a homogeneous pale area. Infants 30–35 weeks had a very rapid response which persisted from 30 minutes to 8 hours. A response was no longer apparent by 21 days of postnatal life. Infants 36–37 weeks had a longer lag period and responded less intensively. Infants 38–42 weeks failed to exhibit blanching in most cases. The degree of permeability correlated inversely with gestational age. Surface temperatures on strongly blanched and contiguous unblanched skin were identical when measured simultaneously. Toxicologic implications are clear. Other considerations include the intrauterine role of fetal skin as a dialyzing membrane, the relationship of skin structure to barrier function and the potential of further pharmacologic studies on the accessible cutaneous circulation.

Post-natal transient cataracts in pre-term infants. PETER HAHN, ANDREW Q. MCCORMICK, and SYDNEY SEGAL. *Univ. of British Columbia, Vancouver, B. C., Canada.*

An additional 15 cases have been added to the 7 cases reported originally in 1968. In contrast to those where the cataracts occurred in infants weighing 1500 gms or less, and where they appeared at 7 to 10 days following birth, the new cases include infants weighing up to 2610 gms, the cataracts appearing as late as 3 weeks of age.

Speculation in the original report is now supported by evidence that these opacities may be the result of a delayed capability to metabolize one of the ingested carbohydrates.

The only cataracts in infancy known to be reversible are those associated with galactosemia. Therefore it seemed reasonable to study the galactose-1-phosphate uridyl transferase in those small infants who developed transient cataracts. In 3 cases examined this enzyme was found to be completely absent and was present at extremely low levels in 2. In a pair of twins, the larger one with normal enzyme levels maintained clear lenses, while its smaller brother who was shown initially to have no measurable level of the enzyme developed transient cataracts.

The possible effects of excess galactose will be discussed. A question to explore is whether infants should be fed a carbohydrate which they are unable to metabolize.

Coagulation studies in the newborn. LILY M. YOUNG and JUDITH G. POOL. *Stanford Univ. Sch. of Med., Stanford, Calif.* (Intr. by Herbert C. Schwartz).

Hemorrhagic tendency has been cited as a serious complication in certain sick newborn infants. A prospective study was undertaken to determine the coagulation status of sick newborn infants with the aim of differentiating conditions such as disseminated intravascular coagulation from the normally low coagulation factors characteristic of the newborn period. Forty-two premature and 15 full-term newborn infants admitted to an intensive care unit for diagnosis and treatment necessitating umbilical vessel catheterization, were studied. Parameters studied were (1) clinical observation of hemorrhage, (2) coagulation factors by Partial Thromboplastin Time (PTT), Prothrombin Time (PT), Thrombin Time (TT), Prothrombin and Proconvertin Time (P & P), Factor V, Factor VIII and Platelet Count, (3) autopsy findings of hemorrhage and microthrombi. Nine premature and 2 full-term infants bled. The results of the coagulation factors for these infants who bled indicated prolonged PTT, normal PT, normal TT, mean values of P & P 20%, Factor V 57%, Factor VIII 81%, Platelet count 147000/mm^3. These values were consistent with values for the newborn period and no significant difference was observed between bleeders and non-bleeders. These results did not provide convincing evidence that disseminated intravascular coagulation was the basis of bleeding in these sick newborn infants.

Disseminated intravascular coagulation (DIC) and hyaline membrane disease (HMD). CARMI Z. MARGOLIS, MARCELLO M. ORZALESI, ALLEN D. SCHWARTZ, and MICHAEL G. BLACKBURN (Intr. by C. D. Cook). *Yale Univ. Sch. of Med., New Haven, Conn.*

A prospective study was planned to determine whether or not DIC contributes to the pathogenesis of HMD and to ascertain the possible role of DIC in the production of the intra-cranial hemorrhages (ICH) frequently found at autopsy in HMD.

In order to detect DIC, platelet counts, fibrinogen, factors V and VIII levels, ethanol gelation tests and tanned red cell hemoagglutination inhibition immuno-assays were performed on the first or second day of life in 11 premature infants with the typical clinical and radiological findings of severe HMD. In 5 infants the tests were repeated on one or more occasions during the first 10 days of life.

16 normal premature infants of similar gestational and postnatal ages were also studied and served as controls; none of these infants had evidence of DIC and they all survived.

Conclusive evidence of DIC was found only in 2 infants with HMD: one had DIC on day 1 and died; the other developed DIC on day 8 while on the respirator and survived. Four of the remaining 9 infants with HMD died; autopsy was performed in 3 and showed extensive HMD in all and severe ICH in 2.

These data, although preliminary, suggest that DIC does not play a major role in the pathogenesis of HMD and that it is not an important contributing factor in the high mortality and frequent ICH in babies with HMD.

Effect of exchange transfusion (ET) on serum ionized calcium (Ca^{++}). M. JEFFREY MAISELS, TING-KAI LI, JOSEPH T. PIECHOCKI, and MILTON W. WERTHMAN (Intr. by Nicholas M. Nelson). *Walter Reed Army Institute of Research, Walter Reed General Hosp., and Washington Hosp. Ctr., Washington, D. C.*

The citrate in ACD blood is known to complex Ca^{++} and calcium gluconate is usually infused during ET to counteract this effect. We have measured Ca^{++} with a Ca^{++} selective electrode during ET with non-buffered ACD and heparinized blood and have studied the effect of administering 0.1g calcium gluconate per 100 ml ACD blood exchanged. Heparinized blood produces negligible changes in Ca^{++}, whereas with ACD blood a profound fall in Ca^{++} occurs even when calcium gluconate is given. Values for Ca^{++} during ET and ACD blood and added calcium gluconate are much lower in premature than in full term infants ($p < 0.001$). Omitting calcium gluconate further lowers Ca^{++} levels in full term infants ($p < 0.05$). The injection of calcium gluconate produces a transient rise in Ca^{++} which is rapidly neutralized by the infused citrate. Cessation of ET produces a prompt return toward normal values. No relationship was shown between Ca^{++}, total Ca and protein. In spite of frankly hypocalcemic levels of Ca^{++} (particularly in prematures) no clinical evidence of tetany was seen. Ca^{++} levels could not be correlated with the infant's clinical state during the ET. We conclude that in full term infants the use of calcium gluconate in ET using ACD blood exerts a small but significant

effect on Ca^{++}. The clinical significance of this observation requires further evaluation.

Controlled clinical trial of phenobarbital (PB) and light for management of neonatal hyperbilirubinemia in a predominant Negro population. O. S. VALDES, H. M. MAURER, C. N. SHUMWAY, D. DRAPER, and A. HOSSAINI. *Med. Coll. of Virginia, Richmond, Va.* (Intr. by W. E. Laupus).

Low birth weight infants, less than 24 hrs of age, were randomly assigned to receive either oral PB, 5 mg/kg/day for 5 days, blue light (200–300 footcandles) continuously for 4 days, a combination of PB and light, or no treatment. 90% or more of the infants in each group were Negroes. Infants with a positive Coomb's test were excluded.

	No.	Total serum bilirubin concentration, mg% (mean ± S.E.)					
		day 1	day 2	day 3	day 4	day 5	day 6
Control	15	2.4±0.5	5.0±0.7	8.0±0.8	8.2±0.8	8.0±1.0	6.7±1.2
PB	23	2.4±0.4	4.0±0.5	5.1±0.6	5.5±0.7	5.6±0.7	4.7±0.8
Light	19	1.9±0.5	3.1±0.6	3.4±0.7	3.0±0.7	3.4±0.8	2.9±1.0
PB + light	18	2.0±0.5	3.3±0.6	3.6±0.7	3.7±0.8	3.4±0.9	3.2±0.9

By the 3rd day, infants receiving PB, light, and PB and light had significantly lower mean bilirubin concentrations than the controls. Those receiving light had the lowest values. Combining PB with light did not have an additive effect. Bilirubin concentrations of 10 mg% or higher were found in 66% of the controls, 26% of the PB group and in none of the other 2 groups. Mild lethargy occurred in 5 infants receiving PB and mild diarrhea occurred in 2 receiving light. The findings indicate that in Negroes continuous phototherapy is more effective than PB in lowering the serum bilirubin concentration. Results are not improved by combined therapy. PB may be useful when phototherapy is not available.

Hepatic metabolism and transport of bilirubin during physiologic jaundice in the newborn rhesus monkey. LAWRENCE M. GARTNER and DONNA LANE. *Albert Einstein Coll. of Med., N. Y., N. Y.*

Maximal hepatic uptake, conjugation and excretion of bilirubin was studied simultaneously in 12 newborn rhesus monkeys ranging in age from 4 hours to 19 days. In this model of human physiologic jaundice, maximum serum bilirubin concentrations prior to infusion of bilirubin were 4.5 mg/100 ml between 12 and 36 hours of life and less than 1.0 mg/100 ml by 48 hours. Endogenous bilirubin excretion in bile in monkeys 12 hours to 19 days of age was 2 to 10 times greater than in normal adult rhesus monkeys. During the first 36 hours of life maximal cumulative hepatic uptake of bilirubin was 35% of adult capacity; hepatic conjugation of bilirubin *in vitro* and *in vivo* was 5% of adult capacity; and hepatic excretory capacity was 10% of adult capacity. Each of these functions increased rapidly to adult levels by the fourth day of life. The rate-limiting step in the transfer of bilirubin from blood to bile at 12 to 36 hours of age is the capacity to conjugate bilirubin with glucuronic acid. In the period immediately following this, significant accumulation of direct-reacting bilirubin occurs in liver and sera during infusion of unconjugated bilirubin, indicating that excretion is the rate-limiting process after 36 hours of age. These studies suggest that physiologic jaundice results from a markedly increased load of bilirubin presented to the liver either from increased bilirubin synthesis or enhanced intestinal reabsorbtion and marked limitation in the capacity to conjugate.

Studies performed at 4 hours of age in a monky born 2 weeks post-maturely revealed that hepatic transport and conjugation of bilirubin was fully mature, indicating that maturation of each of these functions may occur in utero.

A controlled study of intravenous fibrin hydrolysate supplement in prematures <1.3 kg. M. HEATHER BRYAN, PATRICK WEI, RICHARD HAMILTON, SANFORD H. JACKSON, INGEBORG C. RADDE, GRAHAM W. CHANCE, and PAUL R. SWYER. *Univ. of Toronto and The Research Inst., The Hosp. for Sick Children, Toronto, Ont. Canada.*

We have compared the effect of early supplemental intravenous 3.5% fibrin hydrolysate plus 10% dextrose to 10% dextrose alone on the mortality, morbidity, weight gain and biochemical changes in 2 equal groups of 15 low birth weight infants of appropriate gestation. The initial alimentation was intravenous with gradual replacement by oral formula over the first 2 weeks of life. Total fluid intake of 200 ml/kg/day was maintained. Total caloric intake and urinary output did not differ between groups. The amino acid infants received twice the amount of protein (g/kg/day) as the controls. Mortality did not differ between groups when infants were assessed by body weight. In the survivors apnoea was significantly less frequent in those receiving amino acid and regain of birth weight more rapid. Total protein and BUN were higher in those on amino acid reflecting increased N_2 intake, and serum PO_4 lower. Serum electrolytes, sugar, osmolality, HCO_3 did not differ. Fatal cases in the amino acid group, many <1.0 kg, exhibited an excessive rise in BUN, and high plasma osmolality within 3 days of infusion.

	Cals/kg/day		Mortality		Regain of birthweight in survivors
	oral	IV	1.0–1.3 kg	<1.0 kg	
Amino acid	79	30	2/8	5/7	14 days
Control	84	21	2/12	2/3	22

Fetal-maternal metabolic fuel adaptations to caloric deprivation in human pregnancy. YOUNG J. KIM, VINCENT LYNCH, and PHILIP FELIG. *Yale Univ. Sch. of Med., New Haven, Conn.* (Intr. by Charles D. Cook).

Although glucose is considered the sole metabolic fuel utilized by the fetus to meet its energy requirements, induction of ketone-oxidizing enzymes in fetal brain tissue has recently been demonstrated in experimental animals fasted during pregnancy. The significance of such enzyme induction to fetal fuel economy is dependent ultimately on substrate availability. To examine the latter during caloric deprivation in human pregnancy, 14 physically healthy pregnant women (PW) undergoing theraputic abortion for pychiatric reasons during week 16–22 of gestation and 6 non-pregnant women (NP) were fasted for 84 hours. In PW, blood β-OH-butyrate and acetoacetate rose to 4.2 and 0.9 mM/L respectively, and were 2–3 fold higher than in NP for the first 60 hours of the fast. Throughout the fast plasma glucose was significantly lower ($P < .005$) in PW falling to 47 ± 1 mg%, 25% below NP levels. Maternal