this report to describe the changes in the coagulation mechanism in 4 children with severe varicella infection, 3 of whom had hemorrhagic chickenpox. All cases had a malignant disease at the time of their viral infection; 2 with acute leukemia in remission, 1 acute leukemia in relapse, and 1 with metastatic retinoblastoma. All were receiving an antineoplastic drug but none were on corticosteroids. None had bacterial sepsis or shock at the time of their chickenpox. Hemorrhagic varicella only occurred in the 3 leukemic patients, and all 3 died. The non-hemorrhagic case survived. The coagulation data revealed that the patients with the hemorrhagic form demonstrated thrombocytopenia, reduced levels of coagulation factors II, V, and VIII, hypofibrinogenemia, positive fibrin split products, and normal euglobulin lysis. In the non-hemorrhagic patient all studies were normal. Heparin therapy was given to one patient with questionable improvement only noted in the fibrinogen level. Although hepatic necrosis may be found in fatal cases of varicella the coagulation data suggest that the multiple defects were due to DIC. In addition, the data further suggest that the mechanism by which this virus elicits DIC is different from bacterial sepsis since the DIC was clearly present in the absense of hypotension or shock.

The effect of toxic agents commonly ingested by children on antibacterial defenses in the lung. STEPHAINE BURLEY and GARY HUBER (Intr. by J. Klein). *Channing and Thorndike Memorial Labs, Harvard Med. Unit, Boston City Hosp., Boston, Mass.*

Kerosene ingestion, a common cause of accidental poisoning in children, is often followed by serious bacterial pulmonary infection. The effect of kerosene ingestion (10 ml/kg) on pulmonary antibacterial defense mechanisms was studied acutely (4 hr) and subacutely (24 hr) in pretreated mice exposed to an aerosol inoculum of radiotracer-tagged (^{32}P) *Staphylococcus aureus*. Intrapulmonary bacterial inactivation was determined by quantitating the change in bacterial viability and isotope clearance in the lungs of each animal. Controls inactivated 86.6 ± 1.0% of the inoculum. Kerosene ingestion resulted acutely in a depression of host defenses, with only 59.1 ± 4.5% of the inhaled bacteria cleared. In animals challenged with aerosolized bacteria 24 hours after kerosene ingestion, intrapulmonary bacterial replication exceeded inactivation and bacterial clearance did not return to normal until 96 hours after ingestion. Pulmonary histology, correlated with bacterial clearance, revealed a chemical pneumonitis, with alveolar hemorrhage, bronchial necrosis and pulmonary edema. Aspiration of the ingested kerosene increased the severity of the anatomical and functional alterations. Similar structural and functional responses were demonstrated following ingestion of other toxic agents commonly ingested by children, with acute and subacute inactivation values of 70.5 ± 3.9% and 32.2 ± 11.7% for linseed oil, 46.3 ± 5.6% and 70.4 ± 4.8% for gasoline, 73.4 ± 2.9% and 70.6 ± 5.7% for lighter fluid and 54.3 ± 6.5% and 71.3 ± 3.2% for turpentine.

The unusual severity of mycoplasmal pneumonia in children with sickle cell disease. S. T. SHULMAN, J. BARTLETT, W. CLYDE, and E. M. AYOUB. *Univ. Fla., Gainesville, Fla.; Univ. of North Carolina, Chapel Hill, N.C.*

Respiratory infection with *Mycoplasma pneumoniae* in children is uniformly considered to be mild and benign. Patients with sickle cell disease may have frequent episodes of pulmonary infection and/or infarction and are known to be unusually susceptible to pneumococcal disease including overwhelming sepsis. We recently observed 4 children (ages 4–12 years) with sickle cell disease who had pulmonary infection attended by a severe course of illness. Clinical features included diffuse pneumonia (4 patients), pleural effusion (2), prolonged febrile states (3), respiratory distress (3), moderate to marked leukocytosis (4) and pleuritic pain (3). None of these patients responded to penicillin and/or ampicillin. All 4 patients had significantly elevated cold hemagglutinin titers. *M. pneumoniae* was isolated from both patients cultured for this organism. In 3 patients serologic evidence of *M. pneumoniae* infection, as manifested by a rise in the mycoplasma complement fixation (CF) or growth inhibition (GI) titer, was obtained. One patient showed no rise in CF titer but an elevation of the GI titer. The course of this disease was of a severity rarely observed in *M. pneumoniae* infection. The reason for the unusual severity of this ordinarily benign disease in this group of patients is not clear at present but may be related to concomitant pulmonary infarction or to an underlying immune defect. In addition to pulmonary infarction and pneumococcal infection, the differential diagnosis of pulmonary disease in patients with sickle cell disease and leukocytosis must include mycoplasmal infection, especially when penicillin unresponsiveness is noted.

The EB virus infection within families of cases of infectious mononucleosis. J. H. JONCAS (Intr. by J. R. Ducharme). *Univ. of Montreal and l'Hôpital Ste-Justine, Montreal, Que., Canada.*

The incidence and rise of the EBV antibodies were measured by indirect immunofluorescence in 1033 sera from a group of 175 pediatric and older cases of infectious mononucleosis and from 344 family and social contacts. Cases of infectious mononucleosis with eleven exceptions were EBV seropositive in acute and/or convalescent sera. A rise in EBV antibodies of two dilutions or more was demonstrated in 23 of the 175 cases. The EBV antibody titres of mononucleosis sera were significantly higher than those of contacts's sera ($P < 0.01$). The incidence of these antibodies in contacts reached 35 to 67% in four different age groups. A seroconversion was demonstrated in only 9 of 110 EBV negative family contacts and a significant antibody rise encountered in only 6 additional contacts giving an attack rate of less than 15%. Interinfection or interdisease periods varied from 1 week to 2 years. The infectivity of the EB virus and its horizontal transmission seem to be as low in nature as they appear to be experimentally in the laboratory. The epidemiological behaviour of the EB virus infection suggests that its relationship to infectious mononucleosis may be analogous to that of the V-Z virus to zoster.

The ToRCH complex——perinatal infections associated with toxoplasma and rubella, cytomegol- and herpes simplex viruses. ANDRÉ J. NAHMIAS, KENNETH W. WALLS, JOHN A. STEWART, KENNETH L. HERRMANN, and WILLIAM J. FLYNT, JR. *Emory Univ. Sch. of Med., and Ctr. for Disease Control (CDC), Atlanta, Ga.*

It is difficult in most cases to differentiate clinically among perinatal infections associated with Toxoplasma (To), Rubella (R), Cytomegalovirus (C) and Herpes simplex virus, type 1 or 2 (H). To evaluate this problem, sera submitted to CDC from infants (<2 yrs.) with various abnormalities were tested for all agents in the ToRCH complex, besides those requested by the physician. Antibodies to To, R and C were measured by conventional technics, and antibodies to H type 1 and 2 by microneutralization and IgM fluorescent antibody tests. Interpretation of results were complicated by such factors as prior immunization,

blood transfusions and the possible acquisition of antibodies either transplacentally or from a postnatal infection. Nevertheless, serological findings suggested perinatal infection with the ToRCH agents in 61 of 192 cases (37%). The type of involvement associated with individual agents is presented in the table:

	Agent implicated			
	To	R	C	H
Total number of cases	11	16	22	12
Type of involvement*				
Central nervous system	4	9	10	7
Ocular	5	4	5	3
Growth retardation	1	5	2	1
Visceral organs	2	2	10	2
Other	2	1	1	2

* A single case may have shown more than one type of involvement.

Ecological contrasts between bacterial species commonly found in impetigo. ADNAN S. DAJANI, PATRICIO FERRIERI, and LEWIS W. WANNAMAKER. *Univ. of Minnesota Med. Sch., Minneapolis, Minn.*

An opportunity to study the interrelationships between and the significance of the two bacterial species commonly associated with impetigo was provided by intensive observations on 38 children in a population with endemic skin infections. Cultures of the respiratory tract, 3 normal skin sites and lesions (when present) were done 3 times weekly from July to October 1969. Impetigo developed in all children. Group A streptococci alone were recovered from 21% of 361 lesions, staphylococci alone from 14% and both from 62%. Lesions in early stages (before crusting) were more often pure streptococcal (34%) than staphylococcal (8%). Phage type 75 accounted for the majority of the staphylococcal isolates from all sites. 74 lesions were serially cultured at least 3× each (mean 4.9×) over a period of 6 days or longer (mean 12.6 days) until healing occurred. Of 17 initially pure streptococcal lesions 41% remained so, 59% became mixed and none became staphylococcal. Of 54 initially mixed lesions 69% remained so, 24% became streptococcal and only 7% became staphylococcal. Of the 3 initially pure staphylococcal lesions 2 became mixed. In 85% of the instances, the same streptococcal serotype was recovered repeatedly from a lesion. However, staphylococcal phage types changed in 57% of instances. In contrast to the sequence of spread of streptococci from normal skin sites to lesions to respiratory tract, staphylococci spread from the respiratory tract to normal skin to lesions. These studies reveal important differences in the migration of streptococci and staphylococci to various body sites and suggest a subsidiary role for staphylococci in impetiginous lesions yielding both organisms.

HEMATOLOGY

Irreversible oxidant injury in the erythrocytes of the newborn infant. FRANK A. OSKI and BERTRAM LUBIN. *Univ. Pennsylvania Sch. Med., Children's Hosp. of Philadelphia, Philadelphia, Pa.*

It is generally recognized that the red cells of the newborn are more susceptible to injury, i.e. the appearance of Heinz bodies and glutathione instability, upon exposure to oxidant compounds. A more complete examination of the extent and nature of this injury was made. RBC's were incubated for 2 hours with and without glucose in the presence of acetylphenhydrazine (APH) or menadione (K_3) and then reincubated in glucose media. Red cell hexokinase, phosphofructokinase, and glyceraldehyde-3-phosphate dehydrogenase activity, all SH containing enzymes, were irreversibly lost in the cells of the newborn when incubated in APH or K_3 with no glucose in the medium. The cell's ability to consume glucose was reduced from 50 to 95%. The red cells of adults showed some fall in enzyme activity during drug exposure but full activity was restored and red cell glycolysis was unimpaired when reincubated in glucose. Incubation of the cells of the newborn in a carbon monoxide atmosphere during drug exposure prevented their adverse effects. In addition, in the presence of glucose, K_3 increased the rate of fatty acid incorporation into adult cells and depressed the rate in newborn cells. Oxidant drugs apparently through hydrogen peroxide generation, produced irreversible metabolic alterations in the cells of the newborn and their use in the neonatal period appears contraindicated.

Intracellular control of the 2,3-diphosphoglycerate (DPG) concentration in fetal red cells. ROBERT C. TRUEWORTHY and JAMES T. LOWMAN. *Univ. of Kansas Med. Ctr., Kansas City, Kan.*

The stress of anoxia produces an elevation of red cell DPG which results in a shift of the oxygen dissociation curve. The net result of these changes is to increase the oxygen delivered to the tissues. DPG occurs in the red cell in two pools: one, hemoglobin bound, and the other free or unbound. Major alterations of either pool can occur without altering the total red cell DPG content. Fetal hemoglobin (HbF) does not bind DPG. Therefore, in infants one of the mechanisms for preventing tissue anoxia is not operative. A review of the DPG cycle suggests that changes in the conc. of either of the DPG pools might alter the rate of reaction of the rate limiting enzymes 2,3-diphosphoglyceromutase (DPGm'ase) and 2,3-diphosphoglycerophosphatase (DPGp'ase). The complete DPG cycle was studied in cells with normal and altered DPG-Hb binding in order to delineate the factors controlling red cell DPG conc. Assays of hemolysates of 18 cord blood samples revealed the following: the mean HbF conc. was 51%, DPG levels = 13.5 mμM/mgHb (normal = 12.5), DPGp'ase activity = 0.111 mμM DPG/mg Hb/hr (normal = 0.055), DPGm'ase activity = 95 mμM DPG/mg Hb/hr (normal = 85). The DPG binding of cord blood was 33% of that bound by adult blood. The oxygen dissociation curves revealed a P-50 for cord blood samples of 29.5 mmHg (normal = 31.5). These studies of fetal cells with elevated unbound DPG demonstrate *no* inhibition of DPGm'ase. Product inhibition at this step has been postulated by other investigators. The significant elevation of DPGp'ase is in response to the increased unbound DPG. Therefore, DPGp'ase appears to be more important as a controlling mechanism for DPG conc. than does DPGm'ase.

Fetal erythrocyte deformability——physiologic, rheologic, and clinical considerations. GARY P. GROSS and WM. E. HATHAWAY. *Univ. of Colo. Med. Ctr., Denver, Colo.*

Investigation of fetal red blood cell (RBC) deformability by filtration and viscosimetry has shown that the fetal RBC varies significantly from the adult. Cord blood from 15 newborns was compared with 14 adults. Triple washed RBC's in Eagle's albumin buffer with a hematocrit of 10 ± .5% were passed through a polycarbonate filter with a 3 μ × 13.5 μ cylindrical pore under