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