- 1105** RENAL CLEARANCE STUDIES WITH INULIN AND PARA-AMINO HIPPUIC ACID IN CYSTIC FIBROSIS PATIENTS. H. Jose-
phine Rose, Abraham Jelin, Daniel B. Caplan (Spon. by
Albert W. Pruitt). Dept. Pediatrics, Emory Univ. Sch. Med. Atlanta
Cystic fibrosis (CF) patients (pts) have been reported to have
increased capability for renal clearance (C) of antibiotics (A) i
e. dicloxacillin. To gain more knowledge of renal function of CF,
inulin (I) and para-amino hippurate (PAH) were measured in 12 CF
pts with a mean (M) age of 15.6 yrs $\pm$ 0.7, range 12-21 yrs, M
body surface area 1.21m² $\pm$ 0.05, range 0.94-1.48m². The pts were
in 2 groups; i no A, Shwachman and Kulczycki (S) 91-96; ii A S
20-65. I and PAH were given as a load followed by a continuous
infusion to maintain constant plasma (P) levels. After equilibri-
um at least 3 C periods were obtained. U was collected by
timed spontaneous voidings. P and U were analyzed by specific
methodology for I and PAH.
	C _I ml/min	C _I ml/min/1.73m ²	C _{PAH} ml/min	C _{PAH} ml/min/1.73m ²
(12)	115 $\pm$ 8.0	163 $\pm$ 7.0	(11) 493 $\pm$ 29.9	698 $\pm$ 24.3
range	62-156	107-194	299-612	512-774
i (4)	165 $\pm$ 9.5	(4)	729 $\pm$ 7.2	
ii (8)	162 $\pm$ 6.9	(7)	680 $\pm$ 38.2	
- () number of pts; values mean and SEM. W.H. Smith (The Kidney,
1951) reports for mixed sexes C_I 118 $\pm$ 28.1SD (50), C_{PAH} 640 $\pm$ 164
SD (40) ml/min/1.73m². By non-paired t when each of the 3 groups
was compared with Smith's values there was a significant increase
p < 0.001 in all cases. By non-paired t there was no significant
difference between groups i and ii. These investigations suggest
that currently recommended drug regimens for CF need re-evaluation

- 1106** POSTNATAL RENAL MATURATION IN LOW BIRTH WEIGHT IN-
FANTS. Barbara S. Ross, Richard M. Cowett, and
William Oh. Brown University Program in Medicine,
Women and Infants Hospital of R.I., Department of Pediatrics,
Providence, Rhode Island.
- The postnatal contraction of extracellular fluid in low birth
weight (LBW) infants is associated with increased solute excre-
tion. Patterns of postnatal renal maturation were assessed with
the assumption that changes in body composition are mediated in
part by the developing kidney. Twenty-two appropriate for gesta-
tional age, LBW infants, (birth weight m = 1380 gms, gestational
ages m = 31 wks) were studied between 12 hours and 61 days to eval-
uate simultaneously glomerular and tubular functional maturation.
Since most LBW infants have respiratory morbidities (respiratory
distress followed by chronic lung disease) the infants were group-
ed into: Group I, (13 infants) transient or absent respiratory
morbidities and Group II, (9 infants) persistent and severe re-
spiratory morbidities. Creatinine clearance correlated directly
with postnatal age in both groups, (Group I r = 0.868 p < 0.001 and
Group II r = 0.646 p < 0.01). Sodium intake did not vary signifi-
cantly with age in either group. Percent fractional sodium excre-
tion was inversely related to postnatal age, (Group I r = -0.613
p < 0.01 and Group II r = -0.646 p < 0.01) and no significant differ-
ence was observed between the two regression lines. Increased
fractional sodium excretion in the first 10 days of life may re-
flect extracellular solute losses and persistent respiratory mor-
bidities did not alter this homeostatic regulation.

- 1107** EFFECT OF FUROSEMIDE THERAPY ON RENAL FUNCTION IN
LOW BIRTH WEIGHT (LBW) INFANT. B.S. Ross and W. Oh.
Brown University Program in Medicine, Women and In-
fants Hospital of R.I., Dept. of Pediatrics, Providence, R.I.
- Furosemide is frequently used in LBW infants. We studied its
pharmacologic effects in 4 infants (mean gestation 32 wks, birth
weight 1.4 Kg) at ages 10-57 days. Furosemide (1 mg/Kg as re-
quired clinically) was given intravenously over 1 minute and
data collected over the ensuing 24 hours.

	Control	Hours post furosemide therapy				
		0-1	1-3	3-6	6-18	18-24
Ccr*	17 $\pm$ 4	30 $\pm$ 13	19 $\pm$ 6	17 $\pm$ 5	23 $\pm$ 8	37 $\pm$ 17
CH ₂ O*	0.3 $\pm$ 0.2	0.7 $\pm$ 0.3	0.7 $\pm$ 0.3	0.1 $\pm$ 0.1	0.05 $\pm$ 0.4	0.5 $\pm$ 0.7
COSM*	0.7 $\pm$ 0.1	4.1 $\pm$ 2	2.9 $\pm$ 0.8	1.1 $\pm$ 0.2	0.9 $\pm$ 0.3	0.8 $\pm$ 0.1
V*	0.4 $\pm$ 0.1	1.9 $\pm$ 0.6**	1.3 $\pm$ 0.3**	0.4 $\pm$ 0.1	0.4 $\pm$ 0.1	0.6 $\pm$ 0.3
%FNa	1.7 $\pm$ 0.6	11.5 $\pm$ 3.5**	12 $\pm$ 2.6**	4.5 $\pm$ 1.7	2.9 $\pm$ 1.6	0.8 $\pm$ 0.4
NaE*	1.7 $\pm$ 0.6	21.5 $\pm$ 6.7**	14 $\pm$ 3.8**	4.2 $\pm$ 1.3	2.8 $\pm$ 1.5	1.1 $\pm$ 0.5
KE*	2.0 $\pm$ 0.6	4.6 $\pm$ 1.6	4.4 $\pm$ 2	5.4 $\pm$ 2.8	1.7 $\pm$ 0.1	2.5 $\pm$ 0.8

m $\pm$ SEM; *ml/min/1.73 m²; **p < 0.05.

As shown in table, creatinine clearance (Ccr) was unchanged,
urine volume (V), free water clearance (CH₂O), osmolar clearance
(COSM), fractional Na excretion (%FNa), urinary Na and K excre-
tion (NaE, KE) increased with furosemide treatment. The onset of
action occurred within 60 minutes, the peak action lasted 3 hrs.
and the duration of increased COSM was 6 hrs. Solute loss ap-
peared to be in excess of water loss and postnatal age did not
alter this effect. The mechanism, peak and duration of action of
furosemide in LBW infants is similar to adult (Cannon et al.
Prog. Cardvasc. Dis. 12:99, 1969).

- 1108** SUGAR TRANSPORT IN ISOLATED NEWBORN RAT RENAL TUBULES;
A POSSIBLE EXPLANATION FOR THE ABSENCE OF NEONATAL
GLUCOSURIA. Karl S. Roth, Shing-Mei Hwang, Marc Yud-
koff, Stanton Segal. Univ. of Pa. School of Med., Children's
Hospital of Philadelphia, Phila., Pa.

Although glycosuria is absent in the newborn rat, uptake of
galactose and alpha-methyl-D-glucoside (AMG) a non-metabolized
transport model for glucose by newborn cortical slices is known
to be impaired. We have shown concentration-dependent active
uptake of AMG by isolated renal tubules from the newborn Sprague-
Dawley rat and have confirmed the validity of this *in vitro* up-
take phenomenon by an *in vivo* demonstration of AMG uptake by the
newborn kidney. A kinetic analysis of the entry phenomenon for
AMG in the newborn tubule reveals two distinct membrane transport
systems, only one of which is present in the adult tubule. Glu-
cose was shown to competitively inhibit uptake on the shared,
high-capacity system, with a K_i of 2 mM in both newborn and adult
tubules. The low-capacity system in the newborn (K_m = 0.533 mM)
was not affected by either 10 mM fructose or complete anoxia, al-
though both glucose and galactose (10 mM) exerted inhibition on
uptake by this system.

These data suggest that the newborn rat shares a sugar-trans-
port system with the adult, but is able to transport less on
this carrier per unit time. This deficit is offset by the pres-
ence of an additional system with a very high affinity, not
present in the adult. The net result is a relatively efficient
transport of sugar, impervious to anoxic insult, which approxi-
mates that of an adult.

- 1109** NEONATAL LACTIC ACIDOSIS AND ACUTE RENAL FAILURE:
THE ROLE OF PERITONEAL DIALYSIS. Janita C. Russo and
Martin A. Nash, (Spon. by R.W. Winters), College of
Physicians and Surgeons of Columbia University, Department of
Pediatrics, New York, New York.

The treatment of hypoxic lactic acidosis with acute renal
failure was studied in 2 neonates requiring peritoneal dialysis.
In infant I pre-dialysis blood pH was 7.23, serum HCO₃⁻ 13 mEq/L,
and R fraction [(serum Na - (Cl⁻ + HCO₃⁻))] 39 mEq/L representing
accumulation of lactate, 35 mM/L. After 24 hours of peritoneal
dialysis with a commercial solution containing 35 mEq/L sodium
lactate, acidosis failed to improve and in fact worsened. HCO₃⁻
fell to 8 mEq/L while R rose to 47 mEq/L and plasma lactate to
40 mM/L. Increased acidosis was presumably due to loss of
bicarbonate into dialysate. After dialysis with a solution con-
taining 40 mEq/L of bicarbonate instead of lactate, acidosis was
corrected with blood pH 7.45, serum HCO₃⁻ 24 mEq/L, and R 22 mEq/L.
In infant II predialysis blood pH was 7.18, serum HCO₃⁻ 12 mEq/L,
R 53 mEq/L, and plasma lactate 50 mM/L. Dialysate containing
40 mEq/L of sodium bicarbonate and no lactate was used. With
concentration gradient favoring movement of HCO₃⁻ into and lac-
tate out of extracellular fluid, serum HCO₃⁻ rose to 19 mEq/L and
R fell to 39 mEq/L, blood pH 7.36. Improved circulation and
oxygenation permitted metabolism of remaining lactate, producing
a transient metabolic alkalosis. In acute renal failure with
lactic acidosis, a peritoneal dialysate should be prepared con-
taining sodium bicarbonate rather than lactate. Likewise acetate
or other organic anions would not be metabolized effectively in
hypoxic states.

- 1110** ANTIBODY RESPONSE TO A GLOMERULONEPHRITIS RELATED
STREPTOCOCCAL ANTIGEN. Inge Sagel, Kurt Lange,
Gerhard Treser, Edward Wasserman. Renal Service,
Department of Medicine & Pediatrics, New York Medical College,
New York, N.Y. 10029

An antigenic protein can be isolated from the water soluble
supernatant of disrupted group A streptococci. This antigen
(Endostreptosin: ESS) can be detected in the glomeruli of
patients with acute glomerulonephritis in the early days of the
disease. ESS is not related to known streptococcal exo-enzymes
and is not excreted by intact streptococci. Antibody levels to this
antigen were studied in 400 individuals of various ages using a
microcomplement fixation test. Infants had usually negative
titers. 41% of normal children were found to have moderately
elevated (above 1:16) ESS antibody although 14% still had no ESS
antibody. 90% of normal adults have low (less than 1:16) titers;
only 3% have no detectable ESS antibody titer. Symptomatic and
asymptomatic patients with acute glomerulonephritis have very
high titers (up to 1:258). Patients with recent group A strep-
tococcal infections without signs of nephritis also had con-
sistently elevated titers, but titers were usually not as high
as titers found in patients with acute glomerulonephritis. 61%
of patients with lipid nephrosis (minimal change disease) have
no ESS antibody independent of activity of disease, steroid
therapy, absence of proteinuria and years of remission. ASLO
and streptozyme titers do not parallel ESS antibody levels.
Penicillin therapy does not influence the emergence of titer
elevation.