1051 THE EFFECT OF LEAD INTOXICATION DURING DEVELOPMENT UPON THE KIDNEY. Abraham Aviv, Eunice John, David I. Goldsmith and Adrian Spitzer. Albert Einstein College of Medicine, Department of Pediatrics, Bronx, New York.

Retrospective clinical studies have suggested that exposure to lead in early life may result in chronic renal disease during adulthood. We established an animal model to test this hypothesis. Sprague-Dawley rats received either tap water (C) or a 1% lead acetate solution in water (E) from 3 to 9 weeks of age and were studied in pairs either 2-6 weeks or 14-18 weeks after exposure. Since no statistical differences in renal function between C and E as a function of age were found, the results were pooled and analyzed by paired t-test.

	n	C ($\bar{x}$ ± SEM)	E ($\bar{x}$ ± SEM)	p
Body Weight (gm)	15	426 ± 15.4	324 ± 16.6	<.001
GFR (ml/min/gm)	10	1.27 ± .08	.88 ± .08	<.01
SNGFR (nl/min)	10	73.23 ± 3.3	51.50 ± 2.6	<.005

Lead intoxicated animals failed to grow. Total kidney GFR was lower in E than C; proportional changes in SNGFR indicated homogenous distribution of the functional impairment among various nephron populations. There was no difference in intrarenal distribution of blood flow between C and E. The blood pressure expressed as the ratio of E/C increased from .99 ± .02 in the animals studied shortly after lead exposure to 1.10 ± .04 in those studied long after it, $p<.02$. Thus, limited exposure to lead in early life results in a significant and persistent impairment in renal function and in a rise in systemic blood pressure.

1052 CO-EXISTENCE OF DISTAL RENAL TUBULAR ACIDOSIS (dRTA) AND NEPHROGENIC DIABETES INSIPIDUS (NDI) IN TWO PATIENTS: IMPLICATIONS FOR THE PATHOGENESIS OF DISTAL RENAL TUBULAR ACIDOSIS. J. Balfe, A. Folami, B. Stinebaugh, M. Halperin. Dept. of Pediatrics and Medicine, University of Toronto, Toronto, Canada and Baylor College of Medicine, Houston, Texas. (Spon. by Donald Fraser).

dRTA was documented in 2 females (Case 1 - 14 yrs, Case 2 - 8 mo). The diagnosis of dRTA was based upon a urine pH of 6.9 for each case during an acute metabolic acidosis (blood pH 7.01 and 7.14), a normal HCO_3^- threshold (fractional HCO_3^- excretion 4.7 and 3.4%) and a low urine minus blood PCO_2 gradient in alkaline urine (U-B PCO_2 2 and 3). The diagnosis of NDI was suspected because of polyuria, persistent hypotonic urine and confirmed when investigated in detail. Maximum spontaneous urine osmolality (U Osm) for Case 1 and 2 were 139 and 93 mOsm/kg and increased slightly after infusion of antidiuretic hormone to 180 and 122 mOsm/kg respectively. 2 controls given a similar infusion achieved U Osm's >800 mOsm/kg. Thus our cases have a distal nephron which is impermeable to water and also dRTA with a low U-B PCO_2. The low U-B PCO_2 can be due to an increased permeability of the distal nephron to H^+ in acid urine and H_2CO_3 in alkaline urine. However our cases had a distal nephron with reduced permeability to H_2O and dRTA. Therefore unless there is a selective increased permeability to H_2CO_3 and H^+ but decreased permeability to water, the low U-B PCO_2 observed in these cases is more compatible with a failure of H^+ secretion in the distal nephron. Animal studies supporting this will be presented.

1053 *ENCEPHALOPATHY IN CHILDREN WITH CHRONIC RENAL FAILURE* *H.J. Baluarte, A.B. Gruskin, L. Hiner, C. Foley, W. Grover, Temple Univ. Med. School, Dept. Pediatrics, St. Christopher's Hospital for Children, Philadelphia, Pa.*

A distinct neurologic syndrome characterized by varying degrees of myoclonus, dysarthria, seizures, dementia, coma, and abnormal EEG occurred in 6 children with chronic renal failure. EEG findings were similar to those described in adults with dialysis dementia and consisted of diffuse slowing with bursts of 2-4 hz polyspike wave discharges. The children (4 male and 2 female) had congenital renal disorders. The encephalopathy could not be attributed to hypertension or known metabolic disturbances due to uremia. Encephalopathy occurred between the ages of 26 months and 10 years, when renal failure was advanced (GFR 5-10 ml/min/1.73 m^2). All had received high doses (240-800 mg/kg/day) of aluminum containing phosphate binding gels for periods of 9 months to 5 years prior to the onset of their encephalopathy. Dialysis and successful renal transplantation did not significantly alter the clinical course. The encephalopathy may be related to aluminum intoxication. However, these children differ from previously described adults with dialysis related encephalopathy attributed to aluminum toxicity in that they had not been dialyzed prior to the onset of neurologic signs. Perhaps the nervous system of growing children is more susceptible to trace metal intoxication. These observations suggest that the use of large quantities of aluminum containing gels needs reevaluation in children with renal failure. Supported by NIH grants RR-75 and RR 5624.

1054 DIFFUSE BILATERAL METANEPHRIC ADEMONA COMPLICATING DIFFUSE RENAL MALFORMATION. Dinyar B. Bhathena, Kevin E. Bove, Robert J. Wyatt, Bruce A. Lucas and Nancy H. Holland. Depts. of Path., Ped., and Surgery. Univ. of Ky. Med. Ctr., Lexington, Ky. and Cincinnati Children's Hospital, Cincinnati, Ohio.

Bilateral renal wedge biopsies of a 2 month old male infant presenting with failure to thrive and uremia showed diffuse renal malformation with microcystic tubular dilatation and fetal-type glomeruli, a few showing glomerulosclerosis. Only in retrospective studies were 2 microscopic foci of nodular renal blastema found. Kidneys removed at 7 years of age after renal transplantation showed a histologically benign monomorphous neoplasm compromised predominantly of microtubular structures with psammoma bodies (diffuse metanephric adenomatosis). Primitive blastema or stromal elements typical of Wilms' tumor were absent. There was no evidence of extrarenal extension.

Nodular renal blastema and derivatives have been described in association with the highly malignant Wilms' tumor. The diffuse lesion in our patient resembles both the focal lesion derived from renal blastema described by Bove et al (Cancer 24, 323, 1969) (metanephric hamartoma) and a diffuse psammomatous Wilms' tumor described by Chatten (Pers. Ped. Path., Vol. III, 1976). The lesion in this patient demonstrated no malignant potential after 7 years and appears to be a benign neoplasm in the Wilms' tumor spectrum.

1055 SODIUM EXCRETION ($U_{Na}V$) AND RENAL CORTICAL RENIN CONTENT (RCRC) IN ACUTE EXPERIMENTAL RENAL FAILURE (ARF) Anil K. Bidani, Larry E. Fleischmann, Paul Churchill (Spon. by Sanford Cohen). Wayne State University, Children's Hospital of Michigan, Detroit.

We investigated the interrelationships of RCRC, $U_{Na}V$ and protection from ARF. Six groups of 225-300 Gm female Sprague Dowley rats received H_2O (GR.A) or 1% Saline (S) to drink. Gr. B & C received S for 3d, D & E, S for 7d, F, S for 6 wks. C & E received deoxycorticosterone 2.5 mg IM for 3 & 7d respectively. $U_{Na}V$ was measured for the 24 hr. preceeding the experiment. Approximately ½ of each group was sacrificed. Kidneys were analyzed for RCRC. The other ½ received 10 ml/kg of 50% glycerol IM. Results are expressed as mean ± SEM.

Group (no)	$U_{Na}V$/100 gm (mEq)	48 h	BUN (mg%)	72 h	RCRC (no) (ng Angio I/hr/mg tissue
A (19)	0.357 ± 0.05	87 ± 16	107 ± 26		443 ± 89 (10)
B (22)	2.53 ± 0.29	28 ± 5	45 ± 15		729 ± 167 (10)
C (18)	3.35 ± 0.27	32 ± 9	34 ± 13		442 ± 98 (9)
D (19)	4.75 ± 0.82	20 ± 3	19 ± 2		509 ± 49 (10)
E (19)	4.82 ± 0.41	14 ± 1	14 ± 1		542 ± 115 (10)
F (23)	5.29 ± 0.42	19 ± 2	18 ± 2		199 ± 49 (12)

The inverse correlation of $U_{Na}V$ and BUN (r -0.9, $p<0.001$) is consistent with a feedback hypothesis of regulation of GFR in ARF but, contrary to current concepts, the lack of correlation of RCRC and severity of ARF argues against a local role for the renin angiotensin system in it. Protection from ARF occurs long before RCRC depletion during the course of saline drinking.

1056 ACUTE RENAL FAILURE(ARF)FOLLOWING EXPERIMENTAL RHABDOMYOLYSIS. Yoram Blachar, Sean O'Regan, Keith N. Drummond and Jack S.C. Fong. McGill Univ.-Montreal Children's Hosp. Research Inst., Dept. of Nephrology, Montreal, Canada.

While ARF following rhabdomyolysis or crush syndrome is well documented, its pathophysiology has not been defined. Myoglobin, thought to be responsible for the pathogenesis of ARF, is not toxic unless dehydration or acidosis is already present. To elucidate the pathophysiology of ARF, a new experimental model was established using a crude muscle extract (ME) prepared by homogenization of saline perfused rat thigh muscle followed by centrifugation and filtration. Experimental rats were injected i.v. with ME and control groups with saline, boiled ME, and myoglobin in normal rat serum. ME caused death at doses >10 mg ME protein/100 g and ARF at 5-10 mg. Oliguria, proteinuria, hemepigmenturia with an active urine sediment, hypocomplementemia, leucopenia and thrombocytopenia developed shortly after ME injection. These findings were not present in the control groups; transient harmless myoglobinuria was present in the control rats given myoglobin. Involvement of the coagulation system suggested by experimental data led to studies using heparin as an anticoagulant. Ten of 10 rats pretreated with heparin before ME injection lived whereas 9 of 10 controls died. This experimental model closely resembles clinical ARF secondary to rhabdomyolysis. Our data also suggest that other biological systems are activated and that muscle constituents other than myoglobin are involved in the pathogenesis of ARF following muscle injury.