F.E. GLORIEUX*, C.R. SCRIVER*, E.M. EICHER*, J.L. SOUTHARD* and R. TRAVERS* (Intr. by L. Paunier). MRC Genetics Group, Montreal Children's Hosp. & Genetics Unit, Shriners Hosp., Montreal, Canada; Jackson Lab., Bar Harbor, Maine. X-linked hypophosphatemia in Hyp/Y mouse a model of the human disease.

Serum Pi in dwarfed, rachitic C57BL/6J Hyp/Y mice is low (4.6 ± 0.9 mg/dl) vs normal +/Y male littermates (7.6 ± 1.0 mg/dl, $p < 0.001$). Serum calcium is low normal in Hyp/Y. The Hyp/Y renal "excretion index" (mg Pi in urine/mg creat.)/(mg Pi/ml serum) is 103 ± 25 , vs 65 ± 16 in +/Y mice ($p < 0.001$). The trait is X-linked and is thus a model of X-linked hypophosphatemia in man. Kidney cortex Pi is $290 \mu\text{g/g}$ wet wt in +/Y and 288 in Hyp/Y despite hypophosphatemia. Concentration-dependent uptake of ^{32}Pi into organic and inorganic pools in kidney cortex slices is normal in Hyp/Y under initial-rate and steady-state conditions. The mutant gene product in Hyp/Y is apparently limited to the luminal surface in the kidney tubule, since net reabsorption *in vivo* at the luminal membrane is depressed, while *in vitro* uptake by slices at the basilar membrane is normal. These findings offer the first evidence for our hypothesis that the X-linked hypophosphatemia gene permits excess back-flux of Pi into urine from renal epithelium during tubular absorption.

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Response of renal handling of sodium (Na) and bicarbonate (HCO_3^-) to secretin (S) in normals and patients with cystic fibrosis (CF).

Studies in patients not affected with CF show that at any given plasma- HCO_3^- concentration more HCO_3^- is excreted in the urine under S. Simultaneously the excreted fraction of filtered Na increased. The increase of urinary HCO_3^- and of volume is comparable to the stimulation of the exocrine pancreas by this gastrointestinal hormone. - The secretory response of the pancreas to the administration of S is markedly decreased in patients with CF. Therefore the renal response to S was studied in these patients. In contrast to five control patients such a renal response was not observed in six patients with CF: At comparable plasma- HCO_3^- levels and comparable pCO_2 , they excreted distinctly less HCO_3^- than did the controls under S. The excreted fraction of filtered Na also remained unchanged in most of the patients with CF. - The data demonstrate a similarity between the effect of the hormone on the pancreatic ducts and on the renal tubules. They suggest the possibility that pathophysiological mechanisms of CF should also be studied on the renal tubules in this disorder.

L. SIGSTRÖM⁺, E. ENGBER⁺ and H. HALJAJAN⁺ (Intr. by B. Karlberg), Department of Pediatrics I and Institute of Histology, University of Göteborg, Göteborg, Sweden. Membrane dysfunction of cation transport in Bartter's syndrome.

Four patients with Bartter's syndrome were studied concerning cellular membrane transport capacity of cations, as estimated from potassium transport characteristics of isolated single skeletal muscle cells during *in vitro* incubation and from ATPase activity (total and ouabain-inhibited) determinations of red cell membranes. The potassium transport characteristics as well as the ATPase activity were markedly changed in connection with Bartter's syndrome. The cells from the patients with the syndrome contained less potassium and not even during prolonged *in vitro* incubation were they capable of accumulating potassium up to the levels of control cells. The ATPase levels showed relative Na^+/K^+ -ATPase deficiency in two patients and absolute deficiency in one patient. The experimental results as well as the clinical symptoms speak in favour of the existence of a generalized cellular membrane dysfunction in the handling of cations in connection with Bartter's syndrome. Such a membrane dysfunction could be a primary inherited disturbance and the observed hormonal changes could be the result of secondary compensatory mechanisms.

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Placental pore radius in the sheep.

Transplacental passage of water soluble inert molecules was studied in chronic sheep preparations of 125-140 days gestation following injection of radio tracers into the foetus. Samples were collected from fetal pedal artery (a), Maternal femoral artery (A) and uterine vein (V). Transplacental flux (Q) was calculated using Ficks principle $Q = F(V-A)$, where the uterine blood flow (F) was measured by the antipyrine infusion method. Gel filtration was used to confirm stability and non-binding of test molecules and to estimate their molecular radius.

$$\text{Clearance (K)} = \frac{Q}{a-A} \quad (\text{ml.min}^{-1}).$$

	Urea	Erythritol	Mannitol	Cr EDTA
K $\pm$ SEM	70 ± 6	1.9 ± 2	$0.17 \pm .01$	0.01
n	9	8	4	2

There was little variation in results between animals or on different days after surgery in the same animal. In 3 sheep (4 experiments) clearances of at least 3 isotopes were measured on the same day and analysis of these results in terms of pore theory suggests a pore radius of $4.5\text{\AA}$ (range $4.4 - 4.6\text{\AA}$). This is in striking contrast to the rabbit where radii of up to $400\text{\AA}$ have been estimated. (J.J. Faber in Foetal and Neonatal Physiology ed. Comline Cambridge, 1973).