tion, the PH test should be positive. The PH test was performed in 20 patients age 7 weeks to 7 months with documented obstructive liver disease. Eighteen of these patients came to surgery. All of the biliary atresia (BA) patients, regardless of age, had a positive PH test. One patient with BA had a positive PH test prior to corrective surgery. The PH test became normal when bile flow was restored. In contrast, the PH test was variable in neonatal hepatitis. Some patients with complete obstruction demonstrated by Rose Bengal excretion the obstruction ceased. Others were normal at the outset.

We conclude that the PH test is a simple and useful adjunct in evaluation of jaundiced infants. If normal, BA has been ruled out. If initially abnormal, but corrected with oral vitamin E, BA has also been ruled out. Thus the PH test rapidly provides as much diagnostic information as Rose Bengal excretion. It is not associated with sampling difficulties or radiation exposures and should be used as a diagnostic test for complete biliary obstruction in neonatal liver disease.

- 162 *Dipeptide Transport Across the Intestinal Brush Border.* ARMIDO RUBINO, MICHAEL FIELD and HARRY SHWACHMAN, Depts. of Ped. and Med., Harvard Med. Sch., The Children's Hosp. Med. Center and Beth Israel Hosp., Boston, Mass.

Recent observations suggest that some oligopeptides are hydrolyzed within the mucosal cells and not in the lumen. The possibility that there are specific transport processes for dipeptides in the brush border was explored in rabbit ileum. The unidirectional influx across the brush border of ^{14}C -glycyl-L-proline (GlyPro), ^3H -glycine (Gly) or ^3H -proline (Pro) was determined by measuring tissue radioactivity following 30–60 sec exposure of the mucosal surface to a solution containing the substrate [SCHULTZ *et al.*, J. gen. Physiol. 50: 1241, . . .]. GlyPro influx, measured over the concentration range 0.1 to 32 mM, displays an easily saturated component with $K_m = 1.0$ mM and $V_{max} = 0.7$ $\mu\text{moles/cm}^2\text{ h}$ and a difficult to saturate component which may represent simple diffusion. Influx of 0.5 mM GlyPro was $40\% \pm 5.1$ (1 SE) less in Na-free, choline Ringer than in Na-Ringer ($n = 4$). Percent inhibition (± 1 SE) of the influx of 0.5 mM GlyPro was determined in the presence of 20 mM concentrations of the following amino acids and peptides: Gly (4 ± 0.5 $p > 0.5$), Pro (10.5 ± 3.5 $p < 0.05$), L-leucine (23 ± 4.2 $p < 0.01$), glycylglycine (52 ± 2.8 $p < 0.01$), L-leucyl-L-leucine (85 ± 2.5 $p < 0.01$) and L-phenylalanylglycine (63 ± 2.9 $p < 0.01$). 20 mM GlyPro did not inhibit the influx of 2 mM Gly ($n = 8$) or 2 mM Pro ($n = 8$).

It is concluded that (1) GlyPro is transported across the brush border of rabbit ileum by a Na-stimulated, saturable process which is shared by other dipeptides and for which amino acids have a low affinity, and (2) GlyPro has no measurable affinity for the Gly and Pro transport processes.

- 163 *Neutral Amino Acid Absorption in Diabetic Rats.* M. KABIR YOUNOSZAI and HAROLD P. SCHEDL, Univ. of Iowa Coll. of Med., Univ. Hosps., Depts. of Ped. and Med., Iowa City, Iowa (introduced by Samuel J. Fomon).

Small intestinal function is altered in diabetes: hexose absorption is increased in diabetic rats, and glucose absorption is elevated in human juvenile diabetes. Because the transport mechanisms for hexoses and amino acids are inter-related, it is important to

characterize effects of the diabetic state on amino acid transport. To dissociate metabolic from transport effects of diabetes, we used the non-metabolized neutral amino acid, α -aminoisobutyric acid (AIB). We perfused *in situ* the mid 30 cm segment of the small intestine of control (C) and diabetic (D) rats. We have previously shown this to be the site of maximal AIB transport [Amer. J. Physiol. 216: 1131, 1969]. AIB absorption rate was significantly greater ($p < 0.05$) in the diabetic animals: $\mu\text{moles}/0.5$ h/cm; C, 0.44; D, 0.56; $\mu\text{moles}/0.5$ h/g wet weight; C, 6.56; D, 7.88. The intestinal tissue concentrations of AIB ($\mu\text{moles/g}$ tissue water) were significantly greater ($p < 0.001$) in the diabetic rats in both mucosa (C, 1.74; D, 3.15) and underlying tissues remaining after scraping off the mucosa (C, 1.42; D, 2.89). These tissue concentrations suggest that the primary step in transport stimulation is at the brush border of the mucosal cell. In normal rats, we have already shown that the segment absorbing most rapidly (mid-intestine) has the lowest tissue AIB concentration. In the present study, however, transport enhancement by diabetes was associated with increased intestinal tissue AIB concentration. Thus, there appear to be two mechanisms for increasing intestinal transport: (1) at the brush border in diabetes and (2) at the basal-lateral cell membrane for the normal longitudinal gradient.

- 164 *Studies on Infant Diarrhea. V. Mechanisms of the Impaired Jejunal Absorption.* CARMEN LUGO-DE-RIVERA, HELEN RODRIGUEZ-DE-CURET and RAMÓN TORRES-PINEDO, Gen. Clin. Res. Center and Dept. of Ped., Sch. of Med. of the Univ. of Puerto Rico, San Juan, Puerto Rico (introduced by Antonio Ortiz).

Studies on infants with diarrhea and in recovery have shown that there is impaired jejunal absorption of carbohydrates. It is not known whether this malabsorption is due to interference with normal active transport processes or to alterations in the permeability characteristics of the intestinal mucosa. To clarify this, the following experiments were undertaken. A series of perfusion studies with amino acids and hexoses were performed on 12 infants with acute diarrhea and on 18 infants who were either normal or in the process of recovery. Absorption velocities were lower in diarrhea and the response to increasing concentrations tended to follow a saturation pattern. In recovery, the response to increasing concentrations was linear and K_m and V_{max} values could not be calculated. These results suggest that *in vivo*, the rapid removal of substrate from the mucosal cell by the circulation is a factor which markedly modifies the kinetics of absorption. A probable explanation of the impaired jejunal absorption in diarrhea is a derangement in the permeability characteristics of the mucosa which results in intracellular accumulation of the absorbed substrate.

- 165 *Clinical Emphysema with Hereditary Alpha₁-antitrypsin and Antielastase Deficiency in Childhood.* RICHARD C. TALAMO, HENRY LEVISON, MATTHEW J. LYNCH, ALBERT HERCZ and HARRY W. BRAIN, Dept. of Ped., Harvard Med. Sch., Boston, Mass., and Dept. of Ped., Univ. of Toronto, and Res. Inst. Hosp. for Sick Children, Toronto.

Hereditary deficiency of serum alpha₁-antitrypsin and anti-elastase is associated with clinical familial emphysema with onset usually in the third or fourth