542 CIRCULATING IMMUNOREACTIVE PANCREATIC CATIONIC AND ANIONIC TRYPSIN(OGEN) IN PANCREATIC INSUFFICIENCY. Peter R. Durie, Corey Largman, James W. Brodrick, Marie O'Rourke, Kevin J. Gaskin, Gordon G. Forstner and Michael C. Geokas. (Spon. by J. R. Hamilton). Enzymology Laboratory, Veterans Administration Medical Centre, Martinez, CA. and The Hospital for Sick Children, Toronto, Canada.

Two normal variants of trypsin(ogen), cationic (CATRYP) and anionic (ANTRYP) trypsin(ogen), can be identified by the immunoassay technique. In normal subjects CATRYP exceeds ANTRYP by approximately 4:1 in both pancreatic secretions and in the peripheral circulation. We measured random serum CATRYP and ANTRYP in 19 patients with varying degrees of pancreatic insufficiency, including 8 with Shwachman's syndrome (SHW) and 11 CF patients (> 3 years of age). Total duodenal tryptic activity had been determined by quantitative collection of duodenal secretions following stimulation with cholecystokinin/secretin. There was a high degree of correlation between serum CATRYP and total duodenal tryptic activity in both SHW ($r = 0.90$) and CF patients ($r = 0.93$). There was no correlation, however, between serum ANTRYP and duodenal tryptic activity (SHW; $r = 0.46$: CF; $r = 0.07$) due to persistence of serum ANTRYP in 5/8 patients with < 5% of normal pancreatic function. In contrast, duodenal juice samples failed to show persistence of ANTRYP and both CATRYP and ANTRYP were diminished proportionately in a ratio of 4:1. Unlike CATRYP, serum ANTRYP is a poor index of pancreatic function, due to the apparent persistence of this material in the serum of patients with severe pancreatic insufficiency.

543 EFFECT OF RACE AND OTHER VARIABLES ON TRANSCUTANEOUS BILIRUBINOMETRY. Rolf R. Engel, Beth B. Henis, Roland E. Engel, and Calvin Bandt. Hennepin County Medical Center, Minneapolis, Minnesota.

A non-invasive device for measuring cutaneous bilirubin has been evaluated on newborn infants to assess the effect of race, serum albumin level, site of measurement, breast feeding, and phototherapy. More than 560 comparisons between the Minolta transcutaneous bilirubinmeter (Pediatrics 65:195) and conventional serum bilirubin determinations (A.O. Bilirubinometer) confirmed Yamanouchi and Lucey's report (Ped. Res. 14:604) of a correlation coefficient near 0.9, $P < .001$. Phototherapy produced a pronounced decrement in the correlation, apparently by reducing cutaneous bilirubin levels and increasing melanin pigmentation. Both of these effects of phototherapy were circumvented by placing an opaque patch on a skin site between measurements. Formula-fed black ($n = 32$), Oriental ($n = 24$), and white ($n = 47$) babies all had similar slopes (1.0), but the background signal was progressively higher for the darker races and phototherapy augmented this rise in the intercept. Native Americans ($n = 24$) had a lower slope (0.55) but a higher intercept than the other races. Surprisingly, the correlation coefficient for each of the other three racial groups was higher for bottle-fed ($n = 103$) than for breast-fed ($n = 137$) infants. As predicted, the ratio of skin to serum bilirubin level was inversely related to the serum albumin concentration for formula-fed infants ($P < 0.05$) which raises the question of whether skin or serum measurements provide a better index of critical CNS levels.

544 EVALUATION OF FOUR DIAGNOSTIC STUDIES FOR CHILDREN WITH SUSPECTED GASTROESOPHAGEAL REFLUX (GER). Arthur R. Euler, William J. Byrne, Arkansas Children's Hospital, Little Rock, Arkansas 72201.

No systematic evaluation of one (1 hr. pH) and twenty-four hour (24 hr. pH) esophageal pH probe tests, barium esophagrams and esophageal manometrics (EM) has been made in pediatric age patients. We therefore studied twenty-two children without gastrointestinal disease (WNL) and twenty-seven with symptoms of GER. The former differed from the latter in thirteen of seventeen parameters analyzed on the 24 hr. pH studies ($F = 10.40$; $p < 0.001$). Twenty-one of the twenty-seven symptomatic children had positive 1 hr. pH studies (sensitivity = 77.7%) while all (WNL) ones had negative tests (specificity = 100%). Lower esophageal sphincter pressures were similar during EM in both groups (21.1 ± 1.7 mm Hg vs 21.7 ± 1.7; $p > 0.5$). Motility patterns were also similar. GER was seen on esophagrams in eighteen symptomatic children (sensitivity = 50%) and thirteen (WNL) ones (specificity = 18%).

Conclusions:

1. 24 hr. pH studies are the most sensitive and specific method for diagnosing gastroesophageal reflux in children.
2. One hr. pH probe studies are very specific but lack some sensitivity.
3. Esophageal manometrics are not useful for diagnosing GER during the pediatric years.
4. Barium esophagrams are neither sensitive nor specific in diagnosing gastroesophageal reflux among pediatric age patients.

545 NATURAL HISTORY OF GASTROESOPHAGEAL REFLUX (GER) IN APNEIC INFANTS. Michael K. Farrell, James K. Walsh, Susan Wolske, Milton Kramer (Spon. by William F. Balistreri), Univ. Cinti. Coll. Med., Depts. Peds. and Psychiatry.

To assess the natural history of GER in apneic infants we serially evaluated 23 infants with GER and apnea. GER was quantitated by continuous pH monitoring. Sleep state, abdominal respiratory effort, nasal and oral airflow were monitored. Periodic breathing (PB) was the chosen respiratory variable. Infants were studied at presentation, 2 and 4 months later. Apnea began at 5.8 weeks (range 1-8). 11 infants had GER and normal PB (group I); 12 had GER and abnormal PB (group II). 20 infants with GER and no history of apnea are group III. pH scores (normal > 64; values as median, range)

	Initial	+2 Months	+4 Months
Group I	175 (91-706)	80 (39-313)	52 (32-159)
Group II	230 (86-566)	82 (27-690)	40 (16-100)
Group III	210 (78-760)		45 (16-79)

Initially abnormal PB also improved (Normal: #PB/100 min < 0.5, % sleep time in PB < 0.5).

	Initial	+2 Months	+4 Months
#PB/100 min	3.0 (1-5.5)	0.8 (0-6)	1.0 (0.2-4)
% Time PB	2.0 (0.6-7)	0.4 (0-1)	0.4 (0.1-0.8)

GER was treated by positioning 4.9 ± 1.5 months; infants with abnormal PB were home monitored 6.2 ± 2.9 months. Mean followup is 11.8 (8-16) months. All infants are alive; six required stimulation at home. We conclude that the resolution of GER is similar in apneic and non-apneic infants. Respiratory parameters also improve in parallel fashion, suggesting a common underlying process such as central nervous system maturational delay.

Abstract Withdrawn

547 HOMOGENEITY OF PHOSPHATE AND REDOX POTENTIALS IN THE SIMPLE LIVER ACINUS. David N. Finegold, Amal K. Ghosh, Kathleen Zawalich, Wanda White, Franz M. Matschinsky. University of Pennsylvania, Departments of Pediatrics and of Biochemistry, Diabetes Research Center (Spon. by John B. Watkins).

The microcirculatory or Rappaport model of the simple liver acinus is consistent with existing O_2 concentration gradients which decrease from Zone 1 (arteriolar) to Zone 3 (venous), and which might impose gradients on oxidative energy metabolism. To test directly whether the intra-acinar O_2 gradient manifests itself in corresponding gradients of phosphate and/or redox potential, quantitative histochemical methods and enzyme cycling were used together with oil well techniques and fluorometry to measure ATP, ADP, Pi, αglycerol-P (α GP), and dihydroxy acetone-P (DHAP) in samples of acinar Zones 1 and 3 from normal and ischemic liver of ether anesthetized rats. Results are means ± SEM, mmol/kg dry weight.

Zone	ATP	ADP	Pi	GP	DHAP
1	13.7±.6	6.12±.48	15.8±1.5	1.09±.18	.179±.026
3	14.5±.6	6.08±.32	15.1±0.8	1.16±.31	.190±.037

In the control state (Table), the parameters measured were the same in both Zones 1 and 3. During 30-150 seconds of ischemia, the phosphate potential (ATP/ADPxPi) fell and redox potential (α GP/DHAP) rose as expected. However, at no time did a difference develop between Zones 1 and 3. The data imply that, physiologically, O_2 does not become a limiting factor for energy metabolism of the venous portion of the liver acinus. Zonal analysis is a sensitive means to test models of hepatic function.

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