289 DRUG ADMINISTRATION ERRORS IN NURSERIES. Paul H. Perlstein, Cornelia B. Callison, Barbara Barnes and Neil K. Edwards. University of Cincinnati College of Medicine, Department of Pediatrics, Cincinnati.

Ninety-five nurses were tested for their ability to correctly fulfill 10 physicians' orders that included a drug name, amount, route of administration and the patient's weight. Each nurse was asked to calculate the precise amount of a specified concentration of a stock solution of the drug ordered. For purposes of analysis, errors were declared only when the nurse's computation resulted in an administered dose 10 times greater or less than the ordered dose. The nurse was also asked to indicate whether the dose ordered was appropriate for the infant specified in the problem. Of the 95 nurses, 31 had more than 1 year's professional experience; 64 were inexperienced nurses who were tested less than 1 year after their graduation from nursing school. The mean computational test score of the 31 experienced nurses was 88.1 ± (SE)1.7%. This was not significantly different from the 85.1 ± (SE)1.4% score of the 64 inexperienced nurses. Experienced nurses incorrectly judged the appropriateness of ordered doses in 17% of the problems; this is a significantly higher error rate ($p<.05$) than the 14% wrong judgements made by the inexperienced nurses. From this study we conclude that infant care may be maladministered because of the computational and judgmental errors that occur when drug doses are prepared for administration to high risk newborns. There are sufficient anecdotal experiences also to conclude that this is a serious and real problem impeding the delivery of intended care to sick newborn babies.

290 ALTERATIONS IN FETAL GLUCOSE HOMEOSTASIS FOLLOWING MATERNAL MORPHINE ADMINISTRATION
John R. Raye, Joseph W. Dubin, and Jack N. Blechner (Spon. by Arnold J. Altman) University of Connecticut Health Center, Departments of Pediatrics and Obstetrics and Gynecology, Farmington, Connecticut

Prolonged fetal narcotic exposure has been demonstrated to result in intrauterine growth retardation in both humans and in animal models. The mechanism of this growth impairment is unclear. For this reason the effects of maternally administered morphine on fetal nutrition have been examined in the chronically catheterized fetal lamb. The ewes exhibited a transient increase in blood glucose levels 15 to 30 minutes following a single intramuscular injection of morphine. No significant changes in umbilical blood flow or fetal oxygen consumption were noted during the 120 minute observation period. Fetal glucose uptake fell in spite of the rise in maternal glucose levels. In most cases this fall resulted in a net fetal glucose excretion. Fetal glucose excretion appeared to be the result of elevations in umbilical arterial glucose concentration. Umbilical vein glucose concentrations tended to fall slightly. Consistent changes in fetal lactate and pyruvate uptakes were not seen.

These data suggest that morphine induced hyperglycemia occurs in both mother and fetus. This response resulted in fetal glucose excretion and may be important in altering the intrauterine environment in a manner which results in intrauterine growth retardation during chronic narcotic administration (supported by funds from SOADAP, NIMH-DA00633-01).

291 ALTERATION OF HUMAN DRUG METABOLISM BY GROWTH HORMONE
Geoffrey P. Redmond, Jennifer J. Bell and James Perel Columbia University College of Physicians and Surgeons, Dept. of Pediatrics, NY.

Six children with documented idiopathic or secondary deficiency of growth hormone (GH) received amobarbital (3-5 mg/kg p.o.) before and six weeks after replacement therapy with human growth hormone (hGH). In order to determine whether hepatic microsomal oxidizing ability was affected by hGH, the volume of distribution (V), half-life ($T_{\frac{1}{2}}$), and plasma clearance (Cl) of amobarbital were determined.

	V (l/kg)	$T_{\frac{1}{2}}$ (hrs)	Cl (ml/kg x hr)
Before hGH	1.29 ± 0.55	13.89 ± 2.78	62.2 ± 15.2
After hGH	1.02 ± 0.40	22.75 ± 3.97	31.2 ± 11.4
p	n.s.	< 0.005	< 0.02

These results confirm those of Wilson, J.T. & Frohman, L.A. (J. Pharmacol. Exp. Ther. 189: 255, 1974) in the rat and suggest that GH may play an important role in developmental changes in drug metabolism.

(hGH was generously supplied by the National Pituitary Agency)

292 MILK TRANSPORT OF [^{3}H]MELATONIN TO SUCKLING RATS.
Steven M. Reppert and David C. Klein (Spon. by Joseph D. Schulman), NIH, Bethesda, MD.

Milk transport of melatonin (MEL), the putative antigonadotropic pineal hormone, was investigated to determine if milk could provide suckling rats with an exogenous source of MEL. First, we established that [^{3}H]MEL in the maternal circulation was rapidly transferred into lactating mammary tissue but not stored there in significant amounts. In the second phase of study we found that milk in the stomachs of rats suckling these mothers contained [^{3}H]MEL. To study the fate and tissue distribution of [^{3}H]MEL from the stomach, suckling rats were gavage fed 0.2 nmol of [^{3}H]MEL; 15 and 60 min later [^{3}H]MEL was recovered from 7 tissues and plasma. GI absorption of [^{3}H]MEL produced sustained plasma (1 nM) and tissue concentrations. Brain contained 0.3% of the [^{3}H]MEL administered; liver and kidney contained 1.0 and 0.2% respectively. The tissue distribution of [^{3}H]MEL after gavage was similar to that found in adult rats after injections. Finally, we found that in vitro [^{3}H]MEL metabolism to water-soluble products could not be detected in lactating mammary tissue, was very low in neonatal stomach, and highest in neonatal liver (5 nmol/g/hr). Our finding that milk can transport MEL to suckling rats is important because endogenous MEL production does not occur in the rat prior to the second week of life. Thus, maternal MEL transported via milk could influence reproductive physiology in the neonate, perhaps through the inhibitory effects of MEL on LHRH-regulated secretion of LH by the neonatal rat pituitary gland (Science 191: 301, 1976).

293 PARATHYROID HORMONE (PTH) AND $Na_2CaEDTA$ (EDTA):THEIR EFFECTS ON BONE LEAD (Pb), CALCIUM (Ca) AND HYDROXYPROLINE (HOP) IN BONE ORGAN CULTURE. John F. Rosen, Albert Einstein Coll. Med., Montefiore Hosp. & Med. Ctr., Dept. Pediatrics, The Bronx, New York.

Bone is the primary reservoir of Pb and the major source of Pb chelation by EDTA. To define further the interactions of Pb with bone mineral and matrix, the effects of EDTA and PTH have been compared in bone organ culture. Pregnant rats were intoxicated with Pb (5mg/ml) by adding it to the drinking water. On day #19 of gestation, paired fetal bones were placed on grids in BGJ medium to which either PTH or EDTA were added. After 72 hours in culture, bones were removed, cartilage ends were separated from the shafts of each bone, and concentrations of Pb, Ca and HOP were measured separately for both parts of bone. The results (* $p < .01$ vs controls) of bone shafts were:

	HOP, µg	Pb, µg	Ca, mg
Control	9.29 ± .10	.69 ± .04	.15 ± .04
PTH	6.82 ± .15*	.49 ± .05*	.09 ± .03*
EDTA	5.42 ± .16*	.20 ± .03*	.05 ± .07*

Increasing the concentrations of phosphate in the medium markedly inhibited the actions of both agents; and very little Pb (≤ .08µg) was found in cartilage.

These data indicate that EDTA has similar effects on the collagen of bone shafts to PTH. Furthermore, besides its chelation of Pb from bone shafts, EDTA produces solubilization of bone mineral and matrix in vitro.

294 PROLONGED RELEASE OF LEAD-203(^{203}Pb) AFTER BRIEF EXPOSURE TO PARATHYROID HORMONE (PTH) AND $CaNa_2EDTA$ (EDTA) IN BONE ORGAN CULTURE. John F. Rosen, Albert Einstein Coll.Med.,Montefiore Hosp.& Med.Ctr.,Dept.Ped.,Bronx,NY.

Prolonged stimulation of bone resorption (release of ^{45}Ca) by PTH from fetal rat bones does not require its continuous presence. Previously, this phenomenon has been termed "induction". Since a mobile compartment of bone Pb has been described in vitro, timed experiments were carried out to determine if ^{203}Pb from bone explants was released after brief exposure to PTH or EDTA. Pregnant rats were injected with 500µCi of ^{203}Pb on day #18 of pregnancy. On day #19, paired fetal bones were placed on grids in BGJ medium that contained either EDTA or PTH--the experimental medium (EM). For various periods of time, bones were exposed to either agent and then washed with and transferred to control medium (CM). ^{203}Pb released into the EM's was measured and compared to that released into the CM; and the data were expressed as cpm EM/CM ratios. The results (* = $p < .05$, different from 1.00) were:

Time of Exposure (H):	0 - 8	0 - 16	0 - 24	0 - 48	0 - 72
EDTA	.92±.04	1.56±.11*	2.35±.04*	2.50±.11*	2.46±.01*
PTH	1.06±.09	1.76±.09*	2.55±.06*	2.60±.14*	2.59±.04*

Hence, exposure of bones to either agent for 24H produced similar EM/CM ratios as those for 72H continuous cultures; and "induction" of ^{203}Pb release has been shown.

These data indicate that this Pb compartment in bone explants responds rapidly to very brief exposure to PTH and EDTA. These observations provide further evidence that this compartment of bone Pb is regulated like bone mineral.