●1284 GLUCOCORTICOID AND THYROID HORMONE STIMULATION OF PHOSPHATIDYLCHOLINE (PC) SYNTHESIS IN CULTURED HUMAN FETAL LUNG. Linda K. Gonzales and Philip L. Ballard. University of California, Department of Pediatrics and Cardiovascular Research Institute, San Francisco.

We examined effects of dexamethasone (DEX) and T_3 on PC synthesis in 40 specimens of human fetal lung (15-22 wk gestation) cultured for 4-8 d in serum-free Waymouth's medium with 95% air/5% CO_2 on a rocker platform. In the absence of hormones, there was no consistent change in choline incorporation into PC and saturated PC during culture; PC content was 18.3 ± 2.3 μg PC-Pi/mg DNA in preculture tissue and 39.4 ± 3.4 (n=13) after 7 d culture. Choline into PC was stimulated by T_3, DEX, and T_3+DEX 11.9 ± 4.8, 36.6 ± 11.7, and 107 ± 36.5% (n=7), respectively, after 2 d exposure, and 51.6 ± 12.6, 103.4 ± 14.2, and 165 ± 16.8% after 6 d exposure. The content of PC increased 37.0 ± 7.6, 90.3 ± 16, and 125 ± 22% after 6 d with T_3, DEX, and T_3+DEX, respectively. The % saturation of newly synthesized PC was 19.9 ± 1.8, 20.9 ± 2.1, 26.4 ± 1.5 ($P < .05$), and 26.0 ± 1.8 ($P < .05$) in control, T_3-, DEX-, and T_3+DEX-treated cultures, respectively. Stimulation occurred by 24 h and was optimal after 4-6 d of exposure to the hormones. DEX was optimal at ∿10 nM and T_3 at ∿1 nM. Cortisol was about 10% as potent as DEX and estriol was inactive. T_4 and rT_3 were about 10% and 1% as potent as T_3.

We conclude that both DEX and T_3 increase saturated PC synthesis in cultured human lung, apparently acting through receptor-mediated mechanisms. We suggest that combined hormonal treatment may be more effective than glucocorticoid alone in stimulating surfactant synthesis.

1285 DEVELOPMENTAL ASPECTS OF THE IMMUNE SYSTEM IN VERY SMALL PREMATURE INFANTS. M. Ballow, K.L. Cates, J.C. Rowe, C. Goetz, (Spon. by J.R. Raye). Dept. of Pediatrics, University of Connecticut Health Center, Farmington.

The degree and duration of hypogammaglobulinemia in very small (≤32 weeks)premature infants has not been fully appreciated. Longitudinal studies of immunoglobulin levels and T-cell subsets were performed in two groups of AGA premature infants:GpI: 26-28 wk GA ($\bar{x}$ BW=854 g) and GpII: 29-32 wk GA($\bar{x}$ BW=1274 g).

Age	GpI	GpII	IgG<200*	IgG<100*
0-10 da	259*±40	387*±35	–	–
2-4 mo	46 ± 7	126 ±42	11/11	9/11
5-6 mo	88 ±36	150 ±27	16/19	7/19

*IgG in mg/dl ± SEM, measured by ELISA.

At 2-4 mo 100% (11/11) of infants had significant hypogammaglobulinemia(IgG<200)and 82%(9/11)had serum levels<100. IgG levels began to rise by 5-6 mo. Serum IgM and IgA increased with age. GpI, but not GpII, had a transient rise in serum IgA from 1-2 mo of age(GpI=7.9 mg/dl vs GpII=2.1, $p<0.01$)which may represent an altered response to antigenic stimulation. Mean T 4/8 ratios were higher at 10-35 days(n=24, $\bar{x}$=3.59)than at 60 -240 days($\bar{x}$=2.58, $p<0.005$),or than adult values($\bar{x}$=2.3 $p<0.01$). The relationship of the elevated T 4/8 ratio to these infants' hypogammaglobulinemia is unclear. 13 of 14 infants followed for ≥ 6 mo(range 6-12 mo) had36 episodes of infection. 5 infants were rehospitalized for lower resp infection;2 required ventilators. We conclude that very small premature infants have prolonged periods of profound hypogammaglobulinemia which may contribute to their well-recognized increased susceptibility to infection in early infancy.

1286 AUDIOMETRIC BRAINSTEM RESPONSES (ABR) IN PREMATURE INFANTS WITH NORMAL AND ABNORMAL PNEUMOCARDIOGRAMS (PCG). Raul C. Banagale, Charles A. Tait, and William F. Howatt. Department of Pediatrics and Speech and Hearing Sciences, The Univ. of Michigan, Ann Arbor, MI.

Apnea has been associated with abnormality in brain stem function in infants. For this reason we performed PCG (Resp Care 28:1569, 1983) and ABR on 14 infants (gestational age 31.2±0.7 wks; birth wt 1665±240 gms). They were divided into 2 groups: G I (n=7) have normal PCGs and G II (n=7) have abnormal PCGs. The gestational age, birth wt, apgar scores and postnatal age at time of test (G I 4.1±2.3, G II 3.7±1.9 wks) were similar. The absolute latencies (Table) for waves I, III, and V at 60 ndB and 45 ndB were not different between groups. The interwave latencies at 60 ndB were similar in G I and G II. The I-III latencies [but not I-V] at 45 ndB was longer in G II compared to GI. This difference could be due to possible wave asymmetry at the lower intensity (45 ndB). The absence of abnormalities in ABR absolute and interwave latencies in the 2 groups does not support the speculation that neonatal apnea is correlated with abnormality in the brain stem function in premature infants.

	Absolute Latencies (msec)						Interwave Latencies (msec)					
	60dB			45dB			60dB			45dB		
	I	III	V	I	III	V	I-III	I-V		I-III	I-V	
GROUP I	2.5± 0.4	5.6± 0.4	8.0± 0.4	3.5 ±0.5	6.1 ±0.5	8.6 ±0.4	3.0± 0.1	5.5± 0.4		2.6± 0.2	5.1± 0.4	
GROUP II	2.7± 0.2	5.8 ±0.3	8.1± 0.4	3.1± 0.3	6.2± 0.3	8.6± 0.4	2.9± 0.3	5.4± 0.3		3.0± 0.3	5.4± 0.3	
MULTIVARIATE ANALYSIS	NS	NS	NS	NS	NS	NS	NS	NS		S	NS	

MEAN ± SD
NS = Not significant
S = significant ($p < 0.01$)

† 1287 THE EFFECT OF INTRAVENTRICULAR HEMORRHAGE (IVH) ON REGIONAL CEREBRAL BLOOD FLOW (rCBF) IN NEWBORN DOGS. Daniel G. Batton, Elizabeth E. Nardis, Jonathan Hellmann (Spon. by M. Jeffrey Maisels). Penn State Univ Col of Med, M. S. Hershey Med Ctr, Dept of Peds, Hershey, PA.

To further understand cerebral hemodynamics associated with IVH we measured rCBF in newborn dogs following infusion of blood into the lateral ventricle. The puppies were anesthetized, tracheostomized, paralyzed, ventilated and a cannula placed through the skull into the lateral ventricle. Cardiac and respiratory variations of the pressure tracing verified proper cannula position. Once stabilized, 3 cc/kg of autologous blood were infused through the ventricular cannula over 20 min at which time rCBF was determined by [^{14}C]iodoantipyrine autoradiography. Control animals underwent the identical protocol except for the infusion of blood. Brain sectioning revealed the presence of blood throughout the ventricular system and subarachnoid space.

Physiological Data:	Control	IVH
ICP (mm Hg)	3±4	17±8
MABP (mm Hg)	67±9	75±17
$PaCO_2$ (mm Hg)	41.7±4.3	31.1±1.1
PaO_2 (mm Hg)	117±13	148±16
Hct (%)	37±9	35±6

(Values are Mean±S.D.)

% Δ rCBF with IVH	
Cortical Gray	-35%
Central Gray	-33%
Brain Stem	- 8%
Subcortical White	-42%

The reason for the acute decrease in gray and white matter CBF is unclear but is probably related to increased intracranial pressure (ICP) and, in part, to the modest decrease in $PaCO_2$. Nevertheless, this secondary cerebral ischemia following induced IVH may be relevant to the neurological morbidity seen in the human newborn.

1288 DETERMINATION OF MEAN ENVIRONMENTAL RADIANT TEMPERATURES FOR PREMATURE NEONATES NURSED UNDER RADIANT WARMERS. S. Baumgart. (Spon. by W.W. Fox). Division of Neonatology, Department of Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, PA.

Infants nursed under radiant warmers are exposed to significant quantities of short wavelength, infrared power density distributed over their skin surface facing the heating element. The remainder of infant skin surface not facing the warmer is exposed to the walls of the nursery which are cooler than the skin, resulting in radiant heat loss in a longer wavelength infrared spectrum. Net radiant heat transfer in kcal/kg/hr (combined radiant heat losses and gains), has been calculated from a heat loss/heat gain partition we have previously reported for 10 neonates ($\overline{WT}$ 1.39 ± .08 SEM kg, $\overline{GA}$ 31 ± 1 wks) nursed naked and supine under radiant warmers servocontrolled to maintain abdominal skin temperature at 35.5, 36.5. and 37.5 °C. A specifically described application of the Stefan-Boltzman law which describes radiant heat transfer across a surface-to-surface temperature gradient (Bell and Rios, Pediatr Res, 17:135, 1983) was then applied to these data and the mean radiant temperatures these infants experienced over their entire exposed body surface area were calculated. Mean radiant temperatures in the infrared spectrums experienced were 40.8 ± 1.3 °C at 35.5°C skin temperature, 46.0 ± 1.4°C at 36.5°C and 48.6 ± 1.3°C at 37.5°C. These data suggest that net radiant heat transfer is in the direction of the infant. Spectral irradiance in the infrared range may be important in determining the infant's mean environmental radiant temperature when exposed to a radiant heat source.

1289 SARAN BLANKET SIGNIFICANTLY REDUCES OXYGEN CONSUMPTION, INSENSIBLE WATER LOSS, AND RADIANT HEAT DEMAND IN PREMATURE NEONATES UNDER RADIANT WARMERS. S. Baumgart. (Spon. by W.W. Fox). Division of Neonatology, Department of Pediatrics, The Children's Hospital of Philadelphia, Philadelphia, PA.

Radiant warmer beds offer the advantages of increased accessibility and visibility for the intensive care of critically ill infants. Two problems associated with radiant warming are increased insensible water loss (IWL) and oxygen consumption ($\dot{V}O_2$). Covering babies with a Saran plastic blanket has been suggested to alleviate these problems. Eight premature neonates (wt 1.11 ± .05 SEM kg, EGA 30 ± 1 wks, age 9 ± 2 days) were studied for 90 minutes each both naked and covered by a Saran blanket while nursed supine under servocontrolled (36.1°C) radiant warmers. $\dot{V}O_2$ was measured by computer assisted open circuit method, IWL was measured by Potter Scale, and radiant power demand from the heater (RPD) was measured by wattmeter and thermopile. Vital signs and temperatures were also measured. Results (mean ± SEM) show:

	$\dot{V}O_2$ ml/kg/min	IWL ml/kg/hr	RPD mw/cm^2	HR bpm	T skin °C	T heel °C
Naked	9.00 ± 1.10	1.86 ± .18	14.3 ± 1.3	152 ± 2	36.1 ± .3	33.3 ± .6
Saran	7.99 ± 1.13	1.25 ± .20	9.9 ± 1.4	147± 2	36.1 ± .3	33.9 ± .6
p	< .001	< .01	< .001	<.05	NS	< .02

A Saran blanket has proven to be an effective and therapeutic adjunct in the thermal regulation of the very low birthweight premature infant nursed under a radiant warmer in our nursery.