European Society for Paediatric Research Abstracts for Poster Presentations

GLUCOSE OXIDATION IN NEONATES, INDIRECT CALORI-

45 GLUCOSE OXIDATION IN NEONATES, INDIRECT CALORI-METRY OR STABLE ISOTOPES? P. Sauer*, J. Van AERDE*, J. Smith*, P. Pencharz*, & P. Swyer* Depts. Paed. & Med. Eng. University Toronto; Res. Inst., Hosp. Sick Children, Toronto, Canada. Sponsor: HKA Visser Intravenous glucose is used frequently in newborn in-fants to cover their energy needs. Whether this infused glucose is directly oxidised is questionable. Indirect calorimetry (IC) may overestimate the glucose oxidation rate (GOR) due to the conversion of glucose into fat. We therefore compared GOR measured by IC and ¹³CO2 produ-ction from U-¹³C-glucose. IC was performed for 6 hr, metabolic rate (MR), and GOR was calculated from the protein-free RQ and VO2. Simultaneously a primed constant infusion of U-¹³C-glucose was given, GOR calculated from the increase in ¹³CO2 excretion above baseline. A plateau was obtained after ~2 hr. 10 AGA infants were studied. BW 2.450.4 kg, gestational age 37±2 wks, age 918 days, weight 2.3±0.4 kg. Energy intake 70±14 kca1/kg/d, glucose intake 15±2.5 g/kg/d, protein intake 2.7±1.1 g/kg/d. Results: n=10, MeantSE. MR GOR Fat Oxid. (MR-GOR)

	MR	GOR	Fat Oxid. (MR-GO	()
	kcal/kg/d	g/kg/d	g/kg/d	
IC	45.3±1.2	10.1±0.7†	0.1±0.3†	_
U-13C-gluc		7.0±0.3	1.4±0.2	
	t p < 0.001 by paired t-test			

 \pm p < 0.001 by paired t-test CONCLUSIONS: 1) IC shows a significantly higher glucose oxidation than U- 13 C methodology. 2) This difference represents glucose converted into fat with concomitant fat oxidation. 3) GOR measured by IC increased with glucose intake, but GOR calculated from U- 13 C-gluc showed no correlation with glucose intake. 4) GOR calculated from J- 13 C-gluc showed endogenous glucose production found in previous studies.

46 SUBSTRATE UTILISATION OF NEWBORN INFANTS FED INTRAVENOUSLY WITH OR WITHOUT A FAT EMULSION. P. Sauer*, J. Van Aerde*, J. Smith*, P. Bencharz*, P. Swyer. Depts. Paed. & Med. Eng. Univ. Cornoto; Res. Inst., Hospital Sick Children, Toronto, Canada. Sponsor: HKA Visser. Total parenteral nutrition (TPN) is important in the management of ill newborns. The difference in metabolic rate (MR) and substrate use (SU) between infants re-ceiving TPN with and without fat emulsion have not been fully defined. We compared MR and SU by indirect calori-metry (IC) in infants receiving a glucose/amino acid mix-ture only (2% Vamin/DIOW), group I, with infants (group II) receiving a fat emulsion (Nutralipid 10%) as well. Birthweight, gest. age, postnatal age and weight were Birthweight, gest. age, postnatal age and weight were similar. IC was performed for 4±1 h. MR and SU are cal-culated from the protein-free RQ and VO2.

Patie	nts	(Mean±SE)	Energy	Glucose	Fat	Protein
	1	Weight	Intake	Intake	Intake	Intake
Group	n	kg	kcal/kg/d	g/kg/d	g/kg/d	g/kg/d
I	11 7	2.8±0.1	83.3±2.8	10.3±0.9	0	3.0±0.1
II	11	2.9±0.2	84.3±2.4	13.5±0.4	1.9±0.2	2.7±0.3
		MR	VCO2	Glucose Oxid.	Fat Oxid.	Protein Oxid.
	kc	al/kg/d	ml/kg/min	g/kg/d	g/kg/d	g/kg/d
I	4	9.4±1.1	6.5±0.2	12.9±0.8	-0.5±0.3	1.1±0.1
II	4	4.8±1.6	5.9±0.2	9.1±0.6	0.5±0.2	1.1±0.1
	1	p<0.05	p<0.05	p<0.001	p<0.025	ns
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CONCLUSIONS: 1) MR is significantly higher in infants receiving glucose-amino acids alone. 2) VCO_2 is higher in group I. 3) This might be caused by a higher con-version of glucose to fat in group I which is energy con-suming. 4) We found no effect on protein balance. 5) TPN with lipids has advantages over TPN without lipids.

Heart-rate control in 8 to 10-year-old healthy

47 heart-rate control in 8 to 10-year-old healthy and diabetic children LINDQVIST, A.*, HEINONEN, E.*, ERKOLAHTI, R.* and VALIMAKI, I. Department of Paediatrics and Cardiorespiratory Research Unit, University of Turku, 20520 Turku 52, Finland Autonomic cardioneuropathy is a late complication in Autonomic cardioneuropathy is a late complication in adult diabetic patients (Wheeler,T. & Watkins,P.J.,Br Med J 4;584, 1973). The problem of this project was whether disturbed cardiac chronotropic control could be detected by computerized heart-rate (HR) analysis early in juve-nile diabetes mellitus. 11 children with diabetes (duration 3-5 yrs) and a similar number of sex- and age-matched healthy control subjects, age 8-10 yrs, were investigated. The HR was recorded by a hybride computer system in supine position during spontaneous breathing, deep regular breathing and tilting at a rate of 0.1 Hz. For each record of 2 min two indices of heart-rate varia-bility (HRV) and power spectrum of HRV were computed. <u>Results</u>: The diabetic patients had a higher mean HR both in spontaneous and stimulated conditions. The indices of Results: The diabetic patients had a higher mean HR both in spontaneous and stimulated conditions. The indices of HRV increased (p<0.01) indeep breathing test similarily in both test groups. The HRV did not change during tilt test. The negative slope of linear regression between the HR and HRV was significantly (p=0.008) steeper in healthy than in diabetic subjects in spontaneous condi-tions only. In the power spectrum the entrainment of HRV caused by deep breathing was identical in both groups. The results indicate evidence of limited HRV regonse in relation to HR already after 3 yrs' duration of diabetes, although respiratory HRV is produced in a normal way by deep breathing. deep breathing.

ENZYNE PROFILES AND POTENTIAL INVASIVENESS OF PSEUDONONAS **48** AERUGINOSA(PA)ISOLATES IN INTENSIVE NEWBORN UNIT(INU). Chiesa C., Pacifico L., Messina E., Laurenti F., Cianfrano V.,

Cipollone C., Fiorucci P., Bucci G., Midulla M. Institute of Pediatrics, University of Rome and Department of Experimental Medicine, CNR, V. le Regina Elena, 324,00161-Rome(Italy).

PA is one of the most important bacterial pathogens involved in INU. Because of the resistance of this microorganism to many antibiotics and the high mortality rate associated with systemic infection, the significance of a local colonizing isolate, which may act as a focus for dissemination, is critical to patient management. Recently some authors have correlated PA invasiveness with the production of extra cellular enzymes. Therefore we examined the production of 8 enzymes, including protease, elastase, gelatinase, Dnase, hemolysin, lipase, chondro itinase and lecithinase, by 100 strains of PA recovered from both clini cal and environmental sites in INU.25 strains were recovered from naso pharynx,31 from stools,14 from umbilicus,8 from skin,8 from systemic sources(blood, cerebro-spinal fluid), 17 from environment.Enzymes were determined by substrate tube or plate assays.Protease,gelatinase,Dnase, lecithinase were mainly associated with clinical isolates of systemic source;moreover the percent of these activities decreased progressively in strains recovered, respectively, from nasopharynx, stool, umbilicus and skin. The environmental isolates were almost enzymatically inert. Therefore our data suggest that these enzymes may play an important role in the dissemination of PA from local or superficial sites and their detection could predict potential invasiveness.

Interactions of branched-chain amino

50 TRANSPLANTATION AND IN VITRO ANALYSIS OF SOY-BEAN-AGGLUTININ SEPARATED MOUSE SPLEEN CELLS

W.MANNHARDT*, J.DÜBER*, F.ZEPP*, H.SCHULTE-WISSERMANN Dept. of Pediatrics, Univ. of Mainz, 6500 Mainz, FRG In human bone marrow allotransplantation, an in vitro method using soybean agglutinin(SBA) for enrichment of stem cells and depletion of mature T cells in the graft stem cells and depletion of mature T cells in the graft has been described (Reisner et al.;Lancet 2:1320,1980).To define the quality of the method,mouse spleen cells (C3R, C57/B6,BALB/c)containing about 30% of mature T cells were separated by SBA.The composition and functional capacity of the cell fraction known to contain the stem cells were characterized in vitro after each of two SBA-separation steps.In addition, the ability of the cell fraction to reconstitute successfully allogenetic irradiated (900B) reconstitute successfully allogeneic irradiated (900R) reconstitute successfully allogeneic irradiated (900k) mice was investigated. Only the two step SBA-separation procedure yielded satisfying results: In comparison to the unseparated spleen cells, a three-fold increase in stem cells(CFU-c) and a 10-fold decrease of T cells(3 Thy1.2-pos.) was observed. Analysis by lectin and allo-38 Thy1.2-pos.) was observed. Analysis by lectin and allo-geneic stimulation showed significant diminuation of the cell function:The response (ratio) to PHA,Con A,and in the MLR dropped from 147,164,and 30 to 16,23,and 1.5. Transplantation of 10⁷ two-step separated spleen cells in allogeneic irradiated recipients (C57/B6 in BALB/c; C3H or BALB/c in C57/B6;C57/B6 in C3H) resulted in complete reconstitution in 18% to 58% of the grafted animals. In contrast,all the animals of two control groups (with and without transplantation of 10⁷ unseparated spleen cells) died either of GvHD or of wasting.- The results demons-trate that the SBA-separation procedure cannot completely trate that the SBA-separation procedure cannot completely eliminate the risk of GvHD in cell suspensions with an high amount of mature T lymphocytes.