

## Paediatric Research Society

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**Immunological studies in chronic granulomatous candidiasis and the effect of treatment with dialysable transfer factor.** H. Valdimarsson, C. B. S. Wood, J. R. Hobbs, and R. J. L. Holt. (*Department of Child Health, Bristol Royal Hospital for Sick Children.*)

**Biological effects of ultrasound with reference to possible toxic effects on the fetus.** K. J. W. Taylor and Mary Dyson (*introduced by L. Stimmler*). (*Department of Anatomy, Guy's Hospital, London SE1 9RT.*) Ultrasound is widely used for diagnosis in obstetrics using the short-pulse echo technique (sonar). This may be used at a very early stage of gestation. Fetuses may also be irradiated with Doppler machines, either to detect fetal circulation or to monitor the fetal heart during labour.

With increased dosage, ultrasound can produce damage in many ways by nonthermal, noncavitational mechanisms. One dramatic effect of a simulated Doppler regimen is complete red cell stasis. Using longer pulses than in sonal regimen, severe damage may be shown to blood vessels, lysosomes, and to the cell membrane. At present, no thresholds can be established for these effects. With current diagnostic techniques, local intensities may be greatly increased by technical malfunction, focusing effects from the bony pelvic concavity, reflection by air in the intestine, and standing wave formation. The neonatal paediatrician is in a unique position to observe the results of antenatal irradiation.

Experiments are in progress on the effects of irradiation with simulated sonar and Doppler machines on chick embryonic development. This should yield information about the effects of ultrasonically-induced streaming during differentiation of the embryo.

**Paediatric onset of degenerative disease.** Jocelyn Germain (*introduced by Colin L. Berry*). (*Department of Pathology, Guy's Hospital Medical School, London SE1 9RT.*) Intrauterine growth retardation is associated with an increased incidence of phenotypic anomaly, and with reduction in size of cells and organs. Many organ systems in man develop late in pregnancy and continue their growth after birth, and are vulnerable during the period in which disturbances of fetal nutrition are manifest—the aorta is a good example. Changes in chemical composition of

this vessel may affect its physiological performance in later life—leading to the early onset of degenerative disease.

We have developed an experimental system in which 'old' arteries can be produced in growing rats. Evidence is presented to show that the method produces inhibition of DNA synthesis without affecting transcription phenomena, and reduces the size of organ blastemata. Recent studies on osteoporosis suggest that the onset of this change in later life is the result of events occurring before 17 years of age. Varying susceptibility to degenerative disease may be determined in early life.

**Nutrition and cellular growth.** C. G. D. Brook. (*Institute of Child Health, 30 Guilford Street, London WC1N 1EH.*)

**Functional development in adipose tissue.** M. J. Hardman (*introduced by G. Hambleton*). (*Department of Paediatrics, St. Thomas's Hospital, London.*) In most newborn mammals including man, brown adipose tissue is both a store of fat and the principle site of extra heat production in response to cold exposure. However, little is known about the factors which influence the tissue's growth and metabolism after birth. The metabolism of brown adipose tissue was studied in rabbits in two ways, firstly by measuring the animals' oxygen consumption during cold exposure and secondly by measuring the net exchange of fatty acids and glycerol by the tissue *in vivo*.

It was found that at birth brown adipose tissue can generate heat but does not release fat into the circulation. During the first week of life the weight of the brown adipose tissue in well-fed rabbits increased by 50%. However, thermogenic capacity fell but it had gained the ability to release fatty acids for metabolism elsewhere. In rabbits kept warm (36 °C) but underfed during the first week of life, brown adipose tissue did not grow. The tissue's thermogenic capacity was poor but its turnover of fat had greatly increased. In rabbits reared to 1 week of age in a cool environment (20 °C) but kept well-fed, brown adipose tissue's growth was also retarded. The tissue's thermogenic capacity had increased and it did not release fatty acids. These findings show that age, nutrition, and environmental temperature have profound effects on the function of adipose tissue in the newborn period.

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