ULTRASOUND

Clinical Applications

from a Correspondent

THE multidisciplinary nature of ultrasonic techniques in medicine was well illustrated at a conference held at the Welsh National School of Medicine, Cardiff, on December 15. The value of diagnostic ultrasound in obstetrics has now been established, and the precision possible with current methods in detecting and recording the foetal heart from the seventh week of pregnancy was described by Dr H. P. Robinson (University of Glasgow). Considerable accuracy has been claimed for the measurement of the biparietal diameter of the foetal skull *in utero*, which provides important information on foetal gestation and growth. It was, however, pointed out by Dr D. Watmough (University of Aberdeen) that there are certain pitfalls for the unwary. He demonstrated that it is possible to obtain a variety of midlines corresponding to differing diameters of the foetal head. He emphasized the dangers of relying on a simple reading and concluded that both maturity and growth should be assessed by serial measurements over an extended period.

The significance of antenatal bleeding in various stages of pregnancy can be difficult to assess clinically. Dr Margaret Jones (Welsh National School of Medicine, Cardiff) showed that ultrasonic techniques have a valuable part to play in the management of patients who are bleeding in the first trimester to confirm the presence of a continuing normal pregnancy, or to detect a missed abortion or a hydatidiform mole. In the second and third trimesters accurate localization of the placental site is possible. It was pointed out that it is not sufficient to localize the inferior pole of the placenta accurately in early pregnancy as the placenta rises in late pregnancy.

Dr D. A. Carpenter (Commonwealth Acoustic Laboratories, Sydney) provided an exciting glimpse into the future of the art by describing a series of developments aimed at improving the information content without the use of computers. The resolution has been improved by the technique of film echography using a non-storage display tube. A substantial improvement was obtained in the grey scale and the amount of low level echoes displayed on the echogram. Further improvement in the resolution was achieved by the use of medium focused transducers. Further developments are envisaged, which will involve increasing scanning speed and electronic steering and focusing of the ultrasonic beam.

There is, of course, considerable interest in the use of computers in ultrasonic examinations, and a report by Drs R. A. Mountford and M. Halliwell (University of Bristol) of ultrasonic liver and kidney scanning with the aid of off-line computation was of particular value. They have constructed an automated system of data acquisition with direct computer-compatible output and have been able to confirm that the mean echo amplitude was considerably increased in liver cirrhosis. By using off-line computational techniques in an array scanning system, information from the focus can be digitized and stored. Subsequent analysis yields a contour type C-scan display.

Dr R. B. Pridie (London) described how the ultrasound cardiogram could measure the rate of closure of the mitral valve during diastole. The rate of closure is slow in mitral stenosis and in hypertrophic cardiomyopathy. The diastole closure rate is increased in mitral incompetence and in congestive cardiomyopathy. He concluded that if the pulmonary vein pressure is known, a measure of the left ventricular compliance could be obtained using the diastolic closure rate of the mitral valve as the only other parameter.

The manner in which a tissue returns ultrasonic echoes may reflect features of its structure. Drs R. C. Chivers and C. R. Hill (Institute of Cancer Research, Sutton) described an experimental study involving a new approach in which the spectral distribution of the returning echoes from various tissues was analysed.

Japanese workers have for some time described the use of ultrasonic techniques in the detection of gall stones. These results have been confirmed by Dr I. H. Gravelle (Welsh National School of Medicine, Cardiff). He described how gall stones could be diagnosed, but pointed out that small stones could not at present be detected unless grouped together. The method can be used to treat

Origins of Malignant Lymphoid Cells

THE discovery of distinctive cell surface antigens on thymus-dependent lymphocytes (T lymphocytes) and thymus-independent lymphocytes (B lymphocytes) has provided methods for investigating the organization and function of normal lymphoid tissues. Distinctive cell surface antigens on T and B lymphocytes are detected with specific allo or hetero-antisera and have been identified in several species including chicken, mouse, rat, guinea-pig, and man. Recently such antisera have been used to identify the possible origins of malignant lymphoid cells.

One such study of lymphomas induced in chickens by Marek's disease herpes virus is reported by Hudson and Payne in *Nature New Biology* next week (January 10) and indicates that most lymphoid cells within the lymphomas carry T lymphocyte antigens. This, and their previous observation that chickens having only T lymphocytes (achieved by neonatal bursectomy and X-irradiation) failed to develop lymphomas after infection with Marek's disease virus, suggests that the target cell for the virus is a T lymphocyte. Further support for this hypothesis must await an answer to the question whether or not the T cells in the lymphomas are transformed and carry virus-induced tumour-specific antigens. The RNA leukosis viruses also induce lymphomas in chickens, but the target cell in these lymphomas is probably a B lymphocyte, for early bursectomy prevents lymphoma induction (Cooper *et al., J. Nat. Cancer Inst.*, **41**, 373 ; 1968).

Murine leukaemias have been examined for T lymphocyte alloantigens (θ, TL, LyA, LyB, LyC, LyD) and for B lymphocyte hetero-antigens (MBLA) and surface immunoglobulins (Ig). Many of the murine leukaemias induced by the oncogenic RNA viruses have θ, TL, LyA and so on, and are thus likely to be of T origin. But very few murine leukaemias have been identified which lack T markers yet have B markers. The murine myelomas do not have T markers but do have B markers such as the alloantigen PC, the heteroantigens MSPCA and MBLA, and surface Ig (Shevach *et al., J. Immunol.*, **108**, 1146; 1972).

Markers for human T and B lymphocytes are only now becoming available. The best characterized marker is surface Ig, which is detected on B lymphocytes with anti-Ig serum (20 to 30% of normal blood lymphocytes have surface Ig). Most of the blood lymphocytes of patients with chronic lymphatic leukaemia (CLL) have surface Ig of the IgM class and lack T antigens (as detected with hetero-antisera) (Wilson ond Nossal, *Lancet*, ii, 788 ; 1971). It seems likely that CLL is a disease of the B lymphocyte series. Because T lymphocyte markers are not yet readily available or standardized, the origins of lymphoid malignancies lacking surface Ig have not been determined.

The data so far available suggest that lymphoid malignancies may arise at several stages during lymphocyte differentiation. Antigenic characterization of malignant lymphoid cells will provide an additional means of classifying these diseases, and may provide a basis for studies of interactions between carcinogen and target cell.