found in tissues, and a very resistant and infectious oocyst found in the stools of cats. Each can play a different rôle in the spread of infection. It is a unique protozoan parasite in that it is not host-specific and affects virtually all species of mammal and birds. The prevalence of toxoplasma antibody varies not only between town and country but also in different regions of the world. In town dwellers in Lincolnshire the incidence is about 22%, whereas it is about 36% in the rural areas. In urban Hong Kong, it is 6% whereas in urban Paris it is 90%. In rural Sudan it is 22% whereas in rural Tristan Da Cunha it is 80%.

There are still many unsolved problems on how man and animals become infected. Man is surrounded by animals which may transfer infection to him. In towns they will be mainly cats and dogs but in the country man is in contact with a much wider variety of animals. Another factor is raw meat which may contain the toxoplasma parasite but little is known to what extent this can cause infection. In France it has been shown that the ingestion of raw meat can cause infection, and the high incidence of toxoplasma antibodies in Parisians could be due to their eating habits.

In Birmingham owners of either a cat or dog have been shown to be associated with a higher incidence of toxoplasma antibody, and these animals probably play a significant part in the transfer of infection.

Much more research is needed into the epidemiology of toxoplasmosis.

Mycoplasma, Doxycycline, and Human Infertility

M. BLADES, J. DE LOUVOIS, R. F. HARRISON, AND ROSALINDE HURLEY (*Queen Charlotte's Hospital for Women, London*) *Mycoplasma hominis* was isolated from the genital tracts of 13.2% of 38 fertile and 14.7% of 109 infertile couples and *T. mycoplasmas* from 52.6% of fertile and 57.2% of infertile couples.

Minimum inhibitory concentrations of doxycycline for *T. mycoplasmas* (0.16–0.32 µg/ml) and *M. hominis* (<0.08 µg/ml) were determined.

A double-blind controlled trial of doxycycline was carried out on 88 fertile couples. Levels in seminal fluid (0.22–0.95 µg/ml), cervical mucus (0.06–3.02 µg/ml), and serum (0.43–3.98 µg/ml) were measured. Twenty-eight days' treatment with doxycycline (100 mg/day) eradicated

mycoplasmas from the genital tract but there was no difference in the rates of conception of the treated or control groups.

We are unable to confirm the suggestion of Gnärpe and Friberg (1972) that doxycycline is of benefit in the treatment of primary infertility.

Reference

- Gnärpe, H. and Friberg, J. (1972). Mycoplasma and human reproductive failure. I. The occurrence of different mycoplasmas in couples with reproductive failure. *Amer. J. Obstet. Gynaec.*, **114**, 727–731.
II. Concentrations of doxycycline in serum and seminal fluid and the effect on the growth of *T. mycoplasmas*. *Amer. J. Obstet. Gynaec.*, **114**, 963–966.

Micrococcal Urinary Infections in Young Women

MARGARET A. SELLIN, W. A. GILLESPIE, AND J. D. ANDERSON (*Department of Bacteriology, University of Bristol and Department of Pathology, County Hospital, York*) Prospective surveys of acute urinary infections in females aged 17 to 25 showed that most, perhaps the great majority, of the infections followed sexual intercourse. Nearly all were caused by either *Escherichia coli* or micrococci. The micrococcal infections were about half as common as the coliform ones. Micrococcal infection often produced more pyuria than coliform infection, and symptoms were at least as severe.

All the infecting micrococci belonged to Baird-Parker type 3 and all were novobiocin-resistant. Most were sensitive to sulphonamide. Sulphonamide treatment was usually satisfactory.

The *Micrococcaceae* present in the urethra and introitus of healthy young women were investigated in forestream urine specimens and peri-urethral swabs. Forestream urine from healthy young men was also investigated. Staphylococci (all of which were coagulase-negative) outnumbered micrococci in the urethra of both sexes. Most micrococci belonged to types 1, 2 or 3, but very few of the type 3 strains were novobiocin-resistant. Thus the novobiocin-resistant type 3 strains responsible for urinary infection were rarely found in the normal urethra. These findings point to an exceptional virulence of the micrococcal biotype responsible for urinary infection. So far there has been little evidence to suggest that the infecting micrococci were transmitted from males to females.

Aspects of Rubella Immunity in Wales

JULIA A. MUNRO (*Public Health Laboratory, University Hospital of Wales, Cardiff*) Although rubella is usually a mild illness of childhood, virological confirmation of rubella is most frequently required when pregnancy is involved. The relationship between rubella infection in pregnancy and fetal damage is widely known, and because of the need to prevent pregnant women contracting the disease, immunization programmes have been introduced. Live attenuated vaccine is offered to girls between their 11th and 12th birthdays, also to any woman found to be serologically negative antenatally when it is given early in the post-partum period. To try to assess the extent of the problem, results of rubella haemagglutination inhibition titres at various ages and of different populations were studied. It was found that prior to the introduction of the immunization programme, 30% of children aged 10 to 15 years were still susceptible to rubella and 12% of the antenatal population. Rubella vaccination has had little effect upon the antenatal population results. This means that there is still a need for rapid serological diagnosis of suspected rubella in early pregnancy. One year's results of haemagglutination inhibition and complement fixation titres supplemented by sucrose density gradient centrifugation and 2 mercapto-ethanol reduction for the detection of rubella IgM antibodies are presented.

Measurement of Plasma Volume using Human Serum Albumin labelled with Technetium

A. M. HOLROYD, A. C. LAWRENCE, J. PARKER, AND M. DAVIES (*Haematology Department, Northern General Hospital and Medical Physics Department, Western Park Hospital, Sheffield*) A standard technique for measurement of plasma volume using radio-iodine-labelled human serum albumin (^{125}I HSA) has been compared with the same method using human serum albumin labelled with technetium ($^{99\text{m}}\text{Tc}$ HSA) Beazley *et al.* (1968).

The plasma volume has been measured simultaneously using two isotopes and differential counting in five normal subjects and eight patients with polycythaemia, myelofibrosis with splenomegaly, chronic granulocytic leukaemia with splenomegaly, or chronic renal

failure. The average discrepancy between the two methods in 12 cases was 50 ml. A low value of 27.5 ml/kg was obtained in one normal subject using ^{125}I HSA compared with a value of 50 ml/kg using $^{99\text{m}}\text{Tc}$ HSA.

The 30 μCi dose of $^{99\text{m}}\text{Tc}$ HSA used produces a smaller radiation dose to the whole body including the blood and to the thyroid and would be suitable for sequential plasma volume measurements and measurements in pregnant women.

Reference

Beazley, J. M., Matthews, J. C., Leaver, E. P., and Smith, G. M. (1968). Placental localisation using $^{99\text{m}}\text{Tc}$ labelled serum albumin. *J. Obstet. Gynaec. Brit. Cwlth*, 75, 470.

Effects of Natural Oestrogens on Blood Clotting—a Double-Blind Cross-over Trial

L. POLLER, J. M. THOMSON, AND J. COOPE (Department of Haematology, Withington Hospital, Manchester) A double-blind cross-over study on the effect of natural oestrogen on blood clotting and platelet aggregation has been performed on a group of 30 women. It had been claimed that natural oestrogen did not have the harmful effect of synthetic oestrogen on blood coagulation.

The women were randomly divided into two groups, the first group received natural oestrogen (Premarin) for three months and then for a further three months received a placebo, whereas the second group received the placebo first.

Significant acceleration of the prothrombin time and factor VII and X assays occurred with natural oestrogen administration but the intrinsic tests were not accelerated at the three-month stage. The changes are similar to those which occur after three months' synthetic oestrogen/progestogen oral contraceptive administration.

Endocrine Assessment of Threatened Abortion

R. E. REWELL (Department of Pathology, The United Liverpool Hospitals, Liverpool) At the end of pregnancy human chorionic gonadotrophin (HCG) and human per centile lactogen (HPL) in the blood fall sharply. Since the half-life in the circulation of HPL is much shorter than that of HCG, it is the former that would be expected to be more useful in assessing whether or not a threatened abortion will in fact take place. Several small series have confirmed this, eg, Genazani *et al* (1969), though their

patients threatened to abort for much longer than happens in Liverpool before this became inevitable.

Blood levels of HPL and HCG were measured on admission to hospital for threatened abortion. Women admitted for therapeutic abortion were used as controls. A highly significant difference was found between the mean levels of both hormones for women who in fact aborted and for those whose pregnancy continued: the differences between those whose pregnancy continued and the controls were not significant. Further, it is possible to calculate the changes of abortion taking place from the level of either hormone, but unexpectedly HCG gives a more accurate figure (analysis of results by Mr M. C. K. Tweedie). Using both levels a still more accurate assessment emerges.

This work was partly supported by a Research Grant from the former United Liverpool Hospitals.

Reference

Genazani, A. R., Aubert, M. L., Casolif M., Fioretti, P., and Felber, J.-P. (1969). *Lancet*, 2, 1385-1387.

An EM Study of Human Thymus

W. JONES WILLIAMS, D. L. JONES, AND K. THOMAS (Pathology Department, Welsh National School of Medicine, Cardiff) In a fine structure study of human, normal, hyperplastic, and tumour thymus, we demonstrate similar cell types though they are present in varying proportions. The mixed thymoma differed only in showing increased numbers of mitosis and predominance of large lymphocytes.

We describe, for the first time, in postnatal human thymus, the presence of nuclear pockets in lymphocyte nuclei. We also found that both lymphocytes and epithelial cell nuclei contain nuclear bodies. It is likely that both are features of actively metabolic cells.

Three varieties of lymphocytes are present—small, large, and 'activated'. In addition, occasional plasma cells suggest the presence of B type lymphocytes.

We consider that epithelial cells have a functional as well as a structural rôle. There appears to be a continuity between mucoprotein-containing epithelial cell cytoplasm and extracellular material, which is taken up by macrophages, all in close contact with lymphocytes.

Some mucoprotein-containing macrophages are converted into foam cells. These features are most prominent in the

thymoma. The possible significance of these features in relation to humoral epithelial/lymphocyte interaction will be discussed.

Gaucher's Disease with Biclinal Gammopathy

MORVEN MACDONALD, MARGARET MCCATHIE, M. J. W. FAED, R. PRINGLE, H. B. GOODALL, J. S. BECK, G. R. TUDHOPE, P. E. G. MITCHELL, A. J. J. WOOD, W. GUTHRIE, AND D. SHAW (Pathology Department, Ninewells Hospital, Dundee) The association between Gaucher's disease and monoclonal gammopathy is well documented (Pratt *et al*, 1968). The present case appears to be the first in which Gaucher's disease is associated with biclinal gammopathy. A woman aged 48 complained mainly of tiredness and was found to have pinguiculae, splenomegaly, raised serum acid phosphatase, and low β -glucosidase activity in cultured skin fibroblasts. The blood showed pancytopenia with dimorphic red cells. The marrow showed typical Gaucher cells and atypical degenerate foamy forms; excess of two types of plasma cells, large and small; transitional megaloblasts and giant metamyelocytes. Serum proteins (9 g per 100 ml) included two abnormal bands on electrophoresis, one IgC and one IgA.

Anaemia was partly corrected by oral iron and folic acid, but hypersplenism persisted, and thrombocytopenia and leucopenia necessitated splenectomy. Two weeks after operation the serum IgG was at the preoperative level but IgA was halved.

With fluorescent anti-IgG and anti-IgA sera two populations of plasma cells were identified—one predominantly in marrow, producing IgG; the other in marrow and spleen, producing IgA.

Galactocerebroside, one of the lipids in reticulo-endothelial cells in Gaucher's disease, is known to be strongly antigenic because of its ability to produce plasma cell proliferation when injected into mice. Could leakage of this or other lipids from the foamy, degenerate Gaucher cells have stimulated the production of the two clones of plasma cells in this patient?

Reference

Pratt, P. W., *et al* (1968). *Blood*, 31, 633.

Dissociation of Carboxyhaemoglobin in the Cadaver

H. M. RICE (Department of Pathology, General Hospital, Nottingham) Many