

incidence of adenocarcinomas may be influenced by the staining methods used. Some standardization of technique is desirable and the alcian blue-PAS combination appears to be the most satisfactory.

The Nuclear Channel System of the Human Endometrial Glandular Cell

I. A. R. MORE AND E. M. ARMSTRONG (*Western Infirmary, Glasgow, introduced by R. N. M. MACSWEEN*) Endometrial curettings from 56 healthy women at all stages of the menstrual cycle were surveyed for the occurrence of nucleolar channel systems. Typical nucleolar specializations were noted in 14 of 26 women biopsied between day 13 and day 26 of the menstrual cycle and were observed most commonly and in greatest numbers between day 17 and day 20.

The nucleolar channel system occurs as an ordered, angular mass of interdigitating membrane-bound tubules of 60-100 nm diameter embedded in a dense granular matrix surrounding a core of lightly granular material. It arises in association with an invagination of both inner and outer nuclear membrane.

Towards the end of the cycle the nucleolar channel system appears more commonly as a dense disordered mass of tubules lacking a central core, often occurring as a protrusion of the nucleus. Although such masses have not yet been positively identified free in the cytoplasm, micrographs suggesting extrusion of the channel system and possible incorporation into giant lysosomes are presented.

The function of the structure is discussed. In particular its appearance is linked with the presence of 17 B progestational steroids and it is suggested that the tubular system itself may be a manifestation of a specific hormone-induced gene derepression. The structure may therefore provide a pathway for the rapid transport of newly formed mRNA molecules into the cytoplasm where they could act as a template for new protein synthesis.

Pyogenic Granuloma of the Urinary Bladder

C. K. ANDERSON (*University of Leeds*) Pyogenic granuloma of the urinary bladder is a condition found in a small group of patients presenting with severe lower urinary tract symptoms, usually pain, frequency, and haematuria. Seven cases

have been seen in a provincial urological clinic over a period of 12 years.

Clinically, the patients are usually in the fifth and sixth decades, although the conditions may be seen in younger patients. There is a preponderance of females to males (5:2 in this series). The urine does not contain malignant cells and there is no consistent pattern of urinary tract infection, most patients having a sterile urine on presentation or during the course of the condition. Intravenous pyelography is usually normal, but may show a dilated upper tract (2/7) or a filling defect in the bladder (1/7). On cystoscopy the lesion appears red and angry with irregular elevation of the bladder mucosa resembling an infiltrating neoplasm. The lesion usually appears single.

Histologically the lesion is always covered by intact mucosa in the early stages. The epithelium is usually regular. The submucosa contains congeries of vascular spaces with areas of vasoformative tissue infiltrated by inflammatory cells, including many pus cells. No organisms are seen in the fixed tissue preparations. Electron microscopy shows no inclusion bodies and no visible virus particles.

The lesion may regress spontaneously leaving an area of scar tissue under the bladder mucosa; in one case progression to leukoplakia occurred. Generally the lesion persists with continuing symptoms unless resected endoscopically or excised by segmental cystectomy. In two patients additional lesions have arisen. Immunological studies have been made on one patient and show an apparent deviation of complement into the lesion.

Fibrin and Complement in Glomerulonephritis

A. M. DAVISON, D. THOMSON, AND MARY K. MACDONALD (*University of Edinburgh, Edinburgh*) Glomerulonephritis may be induced in experimental animals by immunological means and it is thought that some forms of human glomerulonephritis are due to such mechanisms. Immunological reactions may be associated with activation of the coagulation and complement systems with subsequent deposition of complement and fibrin.

Histologically it is possible to classify glomerulonephritis on the basis of morphological appearance. However it is now recognized that identical histological appearances may be produced by a wide

variety of aetiological factors and conversely a single precipitating factor may induce differing histological patterns. Electron microscopy is of further value in characterizing the ultrastructural features of glomerulonephritis, but it is not possible to determine the nature of deposited material by this method. Immunofluorescence microscopy is of considerable help in elucidating the composition of the material deposited within the glomerulus in a patient with glomerulonephritis. There is a good relationship in the site of abnormal material as observed by immunofluorescence and electron microscopy. In addition examination of the urine from patients with glomerulonephritis for the degradation products of fibrin and complement reveals a good relationship between their excretion and the presence of such material within the glomerulus.

It has been possible to demonstrate that the mesangial cell is responsible for removing material deposited within the glomerular capillary walls, and indeed for the ability to recover from a given insult. It may also be the case that the histological pattern is determined by the ability of the mesangial cell to remove adequately the products of immunological injury than by the nature of the primary aetiological factor.

Serratia marcescens Infection in a General Hospital

W. A. BLACK, L. A. HATCH, P. BINNIE, AND JEAN NEWBERRY (*St Joseph's Hospital, London, Ontario, introduced by H. A. SISSONS*) In recent years increasing attention has been given to the role of *Serratia marcescens* as an organism causing severe and even fatal opportunistic infections in hospitalized patients, particularly in individuals whose host resistance has been compromised by disease or therapeutic measures such as antibiotic or antimetabolite therapy. The fact that the majority of reports of this type of infection have come from the USA is interesting, and whether this reflects a higher incidence in the occurrence of *Serratia marcescens* in that country or better methods of identification of the organism has been the subject of a previous communication. In the present study in a 600-bed Canadian teaching hospital, 114 strains of *Serratia marcescens* were isolated from 105 patients over the course of 10 months, 80 of the strains being isolated in the first five months of the

survey. Seventy-three of the organisms were urinary-tract isolates, 14 respiratory tract isolates, and 27 were isolated from other sites. Two-thirds of the 97 patients studied in detail had been in hospital for more than seven days and three-quarters had been on antibiotic therapy before *Serratia marcescens* was first isolated. Details of antibiotics used before the first isolation of *Serratia marcescens*, and of the *in vitro* antibiotic susceptibility of the *Serratia marcescens* isolates would be presented.

Factors Affecting Transfer of Antibiotic Resistance between Gram-negative Bacteria in the Human Intestine

J. D. ANDERSON (*University of Bristol*) In the absence of chemotherapy, no transfer of bacterial antibiotic resistance transfer (R) factors could be detected in the faeces of four subjects who swallowed potential donor and recipient organisms even though the plasmids concerned could be freely transferred in broth, both to the ingested potential recipients and to a variety of faecal coliforms. The faeces of these subjects contained such large populations of the relevant organisms that one would have expected transfer to occur if the bacteria had been in a broth medium (Anderson, Gillespie, and Richmond, 1973). Reasons for the discrepancy between results obtained *in vivo* and *in vitro* were therefore investigated.

R factor transfer between donor and recipient strains of *Escherichia coli* was found to be completely inhibited in nutrient broth by dense suspensions of *Bacteroides fragilis*. Comparable amounts of inert bacterial matter (formolized suspensions of *E. coli* or *B. fragilis*), populations of *Streptococcus faecalis*, or bile salts were only moderately inhibitory. Strict anaerobiosis had no effect upon R factor transfer. Population densities of organisms used in these studies were similar to those found in faeces.

The presence of *Bacteroides fragilis* thus provides a satisfactory explanation for the almost total inhibition of conjugation in the human gastrointestinal tract in the absence of antibiotics. Other factors inhibiting conjugation to a lesser degree may reinforce the effect of *B. fragilis*.

Reference

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Serum Amylase and Related Enzymes in Diabetic Ketoacidosis

D. M. GOLDBERG, R. J. SPOONER, AND A. H. KNIGHT (*Royal Hospital, Sheffield*) In previous studies we have confirmed the high incidence of hyperamylasaemia in diabetic ketoacidosis and have shown that this is not related to acute pancreatitis, renal failure, macroamylasaemia, or hepato-biliary disease (Knight, Williams, Ellis, and Goldberg, 1973; Knight, Williams, Spooner, and Goldberg, 1973) nor does it appear to influence the prognosis in individual cases.

It has recently been proposed that the source of the amylase in such subjects is the hepatocyte, and that amylase is released from its endoplasmic reticulum as a consequence of attack by lysosomal enzymes (Belfiore, Napoli, and Lo Vecchio, 1972; Belfiore and Napoli, 1973). This proposal rested on the demonstration that raised levels of lysosomal enzymes were found in the serum of subjects with diabetic ketoacidosis and hyperamylasaemia and followed a similar time-course to the latter.

The following lines of evidence exclude the hepatocyte as the source of hyperamylasaemia in diabetic ketoacidosis and cast doubt on the role of lysosomes in its release from other tissues.

1 Sequential determinations of serum enzyme activities in 10 consecutive patients revealed that whereas beta-glucuronidase was elevated at some time in all patients, amylase was raised in only eight and acid phosphatase in only four.

2 A low correlation was found between amylase and beta-glucuronidase, and between amylase and acid phosphatase in the above, whether peak activities or activities of all samples were considered.

3 Measurement of the same enzymes in 24 cases of acute viral hepatitis showed that whereas raised beta-glucuronidase activities were found in 20, amylase was raised in only three, and acid phosphatase in but a single case. Again, correlation between amylase and beta-glucuronidase was poor.

4 Analysis of six samples of normal postmortem human liver revealed that, in contrast to acid phosphatase and beta-glucuronidase, its amylase content was negligible, especially when care was taken to remove all pooled blood. In fact the concentration of amylase in

human liver is far below that of human serum, even when steps are taken to ensure solubilization of lysosomal and microsomal enzymes whereas the hepatic content of acid phosphatase and beta-glucuronidase are respectively approximately 30-fold and 6000-fold, the upper normal limit for serum.

References

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Aspects of EB Virus Infection

R. N. P. SUTTON (*King's College Hospital Medical School, London*, introduced by H. A. SISSONS) The association of the EB virus with Burkitt's lymphoma, infectious mononucleosis, nasopharyngeal carcinoma, and possibly with some other conditions (notably Hodgkin's disease) is now well recognized. Asymptomatic infection with this virus is also frequent and most of the population have acquired antibodies by early adult life.

Although the isolation of EB virus from nasopharyngeal secretions is possible in acute infectious mononucleosis, this procedure is not practicable at the moment as a routine measure and evidence of infection depends upon the demonstration of rising antibody titres. A variety of such antibodies may be demonstrated, including antibodies to virus capsid antigen, membrane, and complement-fixing antibodies. We have observed that antibodies to EB virus capsid antigen develop more rapidly than those to EB soluble complement-fixing antigen and this discrepancy could form the basis for a relatively simple diagnostic test for the presence of recent infection.

Infections with EB virus also result in the development of autoimmune antibodies and in the impairment of cell-mediated immunity. In our report, we describe some of these phenomena in active infectious mononucleosis and also in asymptomatic infections.

SYMPOSIUM IN POLYCYTHAEMIA

The Assay of Erythropoietin

J. S. MALPAS (*Department of Medical Oncology, St Bartholomew's Hospital, London*) Investigation of erythro-