TRANSVAAL SOCIETY OF PATHOLOGISTS

SUMMARIES OF SCIENTIFIC PAPERS*

1. FLUORESCENT ANTIBODY FOR THE DIAGNOSIS OF *BR. OVIGENITALIUM* INFECTION IN SHEEP SEMEN SMEARS

G. C. VAN DRIMMELEN, H. J. W. BOTES, N. CLAASSEN, W. F. ROSS and M. VILJOEN, *Onderstepoort Research Institute*

Genital brucellosis in rams is best diagnosed by microscopic examination of semen smears. When stained by conventional methods the smears from some known infected animals occasionally fail to show infection owing to the small number or the atypical appearance of *Brucella* organisms present.

Fluorescent antibody staining has shown an advantage over the fuchsin staining by aiding the detection of infrequent organisms and by providing additional proof of the identity of *Brucella* organisms discovered in the smears.

Indirect tests with fluorescent antiglobulin promise to yield even better results, although the elaborate facilities demanded may limit the wide application of this technique.

2. DEVELOPMENT OF PHAGE TYPING IN BRUCELLA INFECTION

G. C. VAN DRIMMELEN, *Onderstepoort Research Institute*

The phage typing method is useful in rapid characterization of the three modern 'species' of the genus *Brucella,* provided certain facts are borne in mind:

1. The phages thus far isolated appear to belong to a single type, all being neutralized by a single antiserum.

2. 'Rough' variant strains are resistant to phage lysis.

3. Only 'virulent' *Br. melitensis* are resistant in the smooth form. 'British' *Br. melitensis* of cattle origin, and similar strains from Uganda and Europe, are lysed like *Br. abortus.*

4. *Br. suis* strains are lysed only in high phage concentration without particle multiplication.

A graded variation of susceptibility of strains, types and species of *Brucella* is postulated for phage lysis, in general agreement with the degree variation between all other characteristics used for the conventional typing of *Brucella* cultures.

However, the oxidative metabolic pattern of all strains of *Brucella* organisms lysed by low concentrations of phage coincides with this characteristic of *Br. abortus* in the hands of workers in England. Thus far these two tests are the only tests known to give identical classification results.

3. THE FREQUENCY OF OESOPHAGUS CANCER AMONG THE BANTU ATTENDING HOSPITALS IN SOUTH AFRICA AND ELSEWHERE IN AFRICA

A. G. OETTLÉ, *Cancer Research Unit of the National Cancer Association of South Africa, South African Institute for Medical Research, Johannesburg*

In many parts of Africa oesophagus cancer has become very common among the Bantu, whereas elsewhere it remains rare. To identify these regions a questionnaire was sent to hospitals in South Africa during 1961 asking for records of cases in recent years. Replies were obtained from approximately 80% of those questioned. The results have been analysed in terms of cases diagnosed per year per 100 beds. Sex has not been distinguished in the figures, although the sex ratio varies considerably. This method proved reasonably accurate where it could be tested by local intensive investigations, and the differences are too great to explain on random or systematic errors.

A high frequency (over 4) of oesophagus cancer was evident in all the large urban centres. Some of this can be explained

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on transfer of cases from regions where diagnostic and therapeutic facilities are lacking. This is probably most marked in Cape Town which handles many cases from the Eastern Province: the Johannesburg and Pretoria cases include a much larger proportion of residents.

Some rural areas, e.g. Zululand, Lowveld, Northern Transvaal, Sekukuniland, Western Transvaal, Orange Free State, Western Cape, Basutoland, Swaziland and Bechuanaland Protectorate, show an incidence below 1 per 100 beds. Others reveal higher frequencies, viz. between 1 and 3 cases in the Eastern and North-Eastern Cape, Eastern Transvaal, rural Natal and Northern Transkei (Emboland and Pondoland). The frequency rises to between 4 and 5 in the Ciskei, and in the Southern Transkei to the extraordinary figure of over 20. The extremes differ from 0·2 to 40 per 100 beds per year — a 200-fold difference.

An increase among Bantu has been reported in Bulawayo, Salisbury, Blantyre, Nairobi, Kisumu and Mombasa. In other large cities, e.g. Lourenço Marques, Beira, Dar-es-Salaam and Kampala, the frequency of the disease remains low. Among South African Whites there is no evidence of an increase in mortality rates although White rates are high in Natal and low in the Orange Free State. Indian rates are low, although the female rates are somewhat higher than in Whites. Information on the Coloured population suggests that the increase in oesophagus cancer is occurring among them also.

4. INCLUSION BODIES AS AN AID TO THE DIAGNOSIS OF VIRUS DISEASES

J. D. SMIT, *Onderstepoort Research Institute*

In a number of important virus diseases intranuclear and/or intracytoplasmic inclusion bodies occur. These inclusions can be shown up by various stains, and special stains to illustrate the inner structure of these inclusions can help a great deal to differentiate true inclusions from other non-specific intracellular bodies. This is especially important in secreting epithelial cells. It is very important to ascertain the percentage of cases in which inclusions do occur, as well as how early in the course of the disease and for how long they may be demonstrated.

Research is being carried out along these lines, especially in diseases like infectious canine hepatitis, rabies and distemper.

5. SURFACE ACTIVATION AND THROMBOPLASTIN GENERATION

H. B. W. GREIG, *South African Institute for Medical Research, Johannesburg*

The occurrence of abnormal thromboplastin generation in patients with recent myocardial infarction, as demonstrated by the modifications of the thromboplastin generation test introduced by Owen *et al.* and by McDonald and Edgill, has been confirmed.

Rapid thromboplastin generation replaces the early 'lag' phase normally found. Experimental evidence was offered to suggest that this is due to the presence of 'pre-formed' activated contact factor ('activation product') in the blood of patients with recent infarction.

To obtain direct evidence for this suggestion, studies were made with 'activated' reagents and with isolated 'activation product' in the thromboplastin generation test. The pattern obtained after addition of these materials was similar to that observed in the tests on the patients.

6. FIMBRIAE AND HAEMAGGLUTINATING PROPERTIES IN PROTEUS STRAINS

J. N. COETZEE, *Department of Microbiology, Institute for Pathology, Pretoria*

Fimbriation and haemagglutinating properties of a large number of *P. hauseri*, *P. rettgeri* and *P. morgani* strains were described. While differing in the species of vertebrate red blood cells agglutinated, the various *Proteus* species proved to have haemagglutinins with similar physical characteristics, including the rare property of not being inhibited by mannose. Non-haemagglutinating variants could be selected from all strains by repeated sub-culture on solid media. Haemagglutinating strains were shown by electron microscopy to be peri-fimbriate, and non-haemagglutinating strains were afimbriate.

7. CHROMOSOMAL ANALYSIS IN A BANTU MALE WITH DOWN'S SYNDROME (MONGOLISM)

E. WILTON, *Cytogenetic Unit, South African Institute for Medical Research, Johannesburg*

A Bantu male patient aged 19 years exhibited features of Down's syndrome. He was born to elderly parents and was the last of seven children.

We anticipated a numerical anomaly of 47 chromosomes with trisomy for group G, either No. 21 or No. 22. Metaphase plates showed the presence of six small accrocentric chromosomes instead of the normal five (four in group G and the Y chromosomes of the male).

Of the 50 cells counted, 40 had a modal number of 47, 3 had a modal number of 46, and 7 had a modal number of less than 46.

A detailed analysis of ten cells showed a karyotype of 47 chromosomes with trisomy No. 21 (in group G).

Four European mongols, two of whom were siblings, who were investigated by this unit, were found to have the same karyotype. This agrees with the findings of other authors.

8. A HISTOCHEMICAL STUDY OF OXIDATIVE ENZYMES IN MALIGNANT LYMPHOMATA

R. E. DORFMAN, *Department of Pathology, South African Institute for Medical Research, Johannesburg*

A preliminary report is presented of a study of the activity of succinic dehydrogenase, cytochrome oxidase and lactic dehydrogenase in normal lymph nodes, as compared with their activity in two cases of Hodgkin's disease, one of lymphocytic lymphoma and a metastatic adenocarcinoma in a lymph node.

Incorporation of phenazine methosulphate, an electron carrier, was found necessary for the adequate demonstration of succinic dehydrogenase in normal lymph nodes. This contrasts with the reported findings of Braunstein[1] in various normal stromal and epithelial elements.

Under similar conditions comparison of activity of succinic dehydrogenase, cytochrome oxidase and lactic dehydrogenase showed no loss of these enzymes in a case of lymphocytic lymphoma.

There appeared, however, to be some overall diminution of activity of succinic dehydrogenase in two cases of Hodgkin's disease, although Reed-Sternberg cells retained their activity. Lactic dehydrogenase and cytochrome oxidase were not reduced in Hodgkin's disease.

The demonstration of lactic dehydrogenase in lymph-node imprints showed precise localization to mitochondria and possibly to nuclear membranes of atypical lymphocytes, histiocytes and Reed-Sternberg cells. Myeloid cells were well demonstrated by virtue of their strong activity of cytochrome oxidase.

Inclusion of phenazine methosulphate in the substrate did not effect any significant increase in activity of succinic dehydrogenase in a single case of metastatic adenocarcinoma. The negative reaction in the tumour contrasted with strong activity in lymphoid tissue and stromal fibroblasts. It is suggested therefore that an actual deficiency of succinic dehydrogenase has been demonstrated in the adenocarcinoma and not a lack or defective function of an electron carrier, as suggested by Braunstein.[1]

1. Braunstein, H. (1962): Cancer, **15**, 184.