

in retrospect judged to be syphilitic, was unnoticed until treatment for gonorrhoea had been given; all six lesions were darkground-negative and healed within the following 5 to 15 days. The remaining three patients developed lesions 26 to 33 days after treatment; two of these lesions were darkground-positive.

Magnuson and Eagle also investigated the effect of small doses of penicillin on incubating syphilis in rabbits. In less than $\frac{1}{2}$ of the amount necessary to cure an established infection, penicillin either aborted the infection entirely or significantly prolonged the incubation period. In general, the smaller the inoculum and the earlier penicillin was given, the more likely was it that the infection would be aborted; the suppressive effect was greatest when penicillin was given before the seventh day. It is important to notice that many of the lesions were very small and consisted merely of papules which could easily have been missed had they occurred in a human subject.

It is worth reiterating that, in the case reported here, the lesion was in fact very small and had not been noticed by the patient. It is perhaps reassuring that a frank chancre, containing motile treponemes, did develop. However, the case does demonstrate that routine penicillin treatment of gonorrhoea cannot be regarded as wholly adequate insurance against coincidental syphilis, and this is disturbing. Magnuson and Eagle recommended a

minimum of 4 months' follow-up of gonorrhoea, but experience in clinics to-day suggests that few patients are likely to complete such a long period of surveillance. Moreover, those who fail to attend for follow-up are precisely those who may be expected to be most at risk through promiscuity and carelessness about their health; by the same token, they would also constitute a reservoir of potential infection.

This case strengthens the argument for separate reporting of dual infections, first proposed by Leeming as long ago as 1947 and endorsed by Woodcock (1971).

Yours faithfully,

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Ultrastructure of *T. vaginalis*

TO THE EDITOR *British Journal of Venereal Diseases*

SIR—The paper by Ovčinnikov, Delektorskij, and Kosmacheva (1974) requires some comment in the light of recent advances in the study of the ultrastructure and biochemistry of *Trichomonas vaginalis* and other trichomonad species, including the urogenital parasite of cattle *Trichomonas foetus*.

My work in this laboratory on the ultrastructure of *T. vaginalis* confirms that reported by Nielsen, Ludvik, and Nielsen (1966) with regard to the association of the flagellar apparatus and the axostyle. The axostyle is a single sheet of microtubules running parallel to the longitudinal axis of the cell. The sheet is coiled like a cone at the posterior end where it projects from the cell for a distance of several microns; at the anterior end of the cell the sheet flattens out and terminates at the side of the kinetosomes of the five flagella. Lying next to, but apparently not attached to, the anterior end of the axostyle is a smaller sheet of microtubules running at right-angles to the axostyle and curving around the kinetosomes; this is known as the pelta. The organelle identified by Ovčinnikov and others (1974) as the 'parabasal apparatus'

is, I believe, the anterior end of the axostyle and the pelta and not, as they suggest, a separate structure.

The identification as lysosomes of the numerous electron dense granules with their single membrane and granular matrix, a characteristic component of the cytoplasm of trichomonads, lacks corroboration by other workers. Lysosomes have the common property of containing acid hydrolases encompassed in a semi-permeable limiting membrane. Their role in the cell is thought to involve the intracellular digestion of both endogenous and exogenous material (Cohn and Fedorko, 1969). Müller (1973) investigated the enzyme content of the different subcellular components of *T. foetus* and found that the electron dense granules contained no acid phosphatase, an enzyme marker of lysosomes, but that the enzyme was found in a larger population of granules more heterogeneous in size with pleomorphic contents, probably phagocytosed material. Subsequently, Lindmark and Müller (1973) named the electron dense granules of *T. foetus* as hydrogenosomes due to their involvement in the anaerobic trichomonads in the production of hydrogen. Brugerolle and Metenier (1973)

were able to demonstrate malate dehydrogenase activity in the electron dense granules of *T. vaginalis* and Brugerolle (1972) excludes the possibility that they are lysosomes. Müller (1973) demonstrated malate dehydrogenase and α -glycerophosphate dehydrogenase in the electron dense granules of *T. foetus*. I have not seen in any of my electron micrographs of *T. vaginalis* any evidence of fusion of the electron dense granules with vacuoles containing phagocytosed material, a process primary lysosomes undergo in the formation of secondary lysosomes (De Duve and Wattiaux, 1966).

Thus the evidence suggests that the electron dense granules of trichomonads are involved in the energy producing mechanisms of the cell and they should not be labelled as lysosomes. It is likely that the numerous small vesicles, and the Golgi apparatus from which they are thought to have originated, participate in the digestion of phagocytosed material in *T. vaginalis*.

Further research is needed on the cytoplasmic contents of *Trichomonas vaginalis* to elucidate their role in the

metabolism of the parasite and in the pathogenicity of trichomoniasis.

Yours faithfully,

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Liver involvement in congenital syphilis

TO THE EDITOR *British Journal of Venereal Diseases*

SIR—Liver involvement in infants affected with congenital syphilis may range from cirrhosis, first described by Gubler (1849), to simple enlargement. Nabarro (1954) recorded *post-mortem* histological evidence of intercellular fibrosis in nineteen out of 41 infants of under 1 year old who died of congenital syphilis.

Thanks to the kindness of Prof. A. E. Claireaux of the Institute of Child Health, London, we were able to examine a collection of liver sections taken from 59 infants, under 1 year old, who died of congenital syphilis. The serial sections were stained with haematoxylin and eosin and with silver stain (Levaditi method). We were able to confirm the diagnosis of congenital syphilis by reference to the clinical notes incorporated in the *post-mortem* reports. No antisyphilitic treatment had been given to any of the infants.

These sections are from the period 1917–1956, and it is difficult at this distance in time to know precisely how much of this material was included in the late Dr. D. Nabarro's series referred to above, especially as his original series may have contained sections from other centres not available for us to study, and the Department of Pathology may have accumulated further material since completion of his work.

We found that, of the 59 sections stained with haematoxylin and eosin, fifty were histologically normal. Five showed intercellular fibrosis, two fatty degeneration, one a localized area of necrosis, and one biliary stasis. In 41 sections stained with silver stain, we found the tissue to be heavily infiltrated with treponemes, so much so that it appeared that there were more treponemes than liver.

We therefore conclude that intercellular fibrosis appears to be an uncommon finding in congenital syphilis and that a histologically normal liver does not exclude the possibility of heavy infiltration by treponemes.

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