

vaccinia or ectromelia had taken place. The transformed virus was purified twice by limiting dilution passages. The purified viruses had the same pathogenicity for rabbits and mice as each original virus strain.

Preliminary work using fibroma virus showed that fibroma also could be transformed into vaccinia by the similar procedure.

With heat-killed vaccinia, poliomyelitis (Type 1, Brunhilde strain) and measles (Edmonston strain) could not lead to transformation when used as active virus. Recently it was shown in our laboratory that myxoma was closely related serologically to vaccinia and ectromelia⁷. These results may suggest that there is a correlation between transformation and cross-immunity.

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Protein Synthesis in Macrophages containing *Eimeria tenella*

RECENT studies on bacteriophage have shown that the virus may stimulate anabolic protein metabolism in the parasitized bacterial cell and, furthermore, deflect metabolic processes towards the production of bacteriophage nucleoprotein.

This is a preliminary report of a similar phenomenon in intestinal macrophages of the chick which have become invaded by the sporozoan *Eimeria tenella*. Briefly, the process of infection consists of swallowing the oocyst which breaks down in the small intestine, liberating sporozoites. These invade the cells in the

cæcal wall and undergo schizogony within the cells, liberating merozoites which re-invade the gut wall.

This process was studied by standard histological methods and by histochemical methods in the cæca taken from a chick seven days after oral infection. The parasite can be seen in large macrophages which often entirely replace the lamina propria mucosæ; adjacent to this there is a conspicuous exudate composed mainly of red cells with a moderate number of eosinophil leucocytes. The adjacent epithelial cells of the gut show numerous mitotic figures and many contain globules of secretion.

The parasitized macrophages are considerably enlarged (Fig. 1) and filled with protein, most of which appears to be ribonucleic acid as judged by the 'tetrazo' method and by pyronin staining using ribonuclease as a control measure. In the early stages the ribonucleoprotein collects at the centre of the cell surrounded by a palisade of developing schizonts. Later the cell fills with schizonts and the ribonucleoprotein is presumably incorporated within them.

The nuclei of the macrophages are greatly enlarged, displaced to the side of the cell and show two or three big nucleoli. This is an index of intense protein synthetic activity by the cell. The fate of the macrophages is, at present, uncertain since it is unusual to find evidence of damage to these cells. They may liberate the merozoites and serve as a breeding ground for even more.

The histological appearances suggest an enhanced ribonucleoprotein production within chick macrophages parasitized by *Eimeria tenella*, and furthermore that this new protein is incorporated into the newly formed merozoites.

Further confirmation of this view will be attempted by the use of fluorescent conjugates of chick and *Eimeria* protein and the results will be reported in due course.

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HISTOLOGY

Histochemical Use of the Cyanocarbon Organic Compounds

MEMBERS of the new group of organic compounds called 'cyanocarbons'¹ appear worthy of investigation as histochemical localization reagents on the basis of preliminary studies made with one of the series, tetracyanoethylene. These compounds are chemically quite active and will take part in a large number of organic reactions.¹⁻⁴ For example, tetracyanoethylene may, in proper circumstances, react through additions to its double bonding with such radicals as dienes, ketones and hydrogen, and through replacement of cyano groups, it will react with the alkoxy, hydroxy, and aminoaryl radicals. The products of many such reactions are coloured. Tetracyanoethylene produces an intense yellow colour with benzene, orange with toluene, and red with xylene. Reactions with certain amines will produce 4-tricyanovinylamines, a class of brilliant orange to blue dyes.

Experiments utilizing animal and human necropsy tissues, 10 per cent buffered formalin and Bouin's

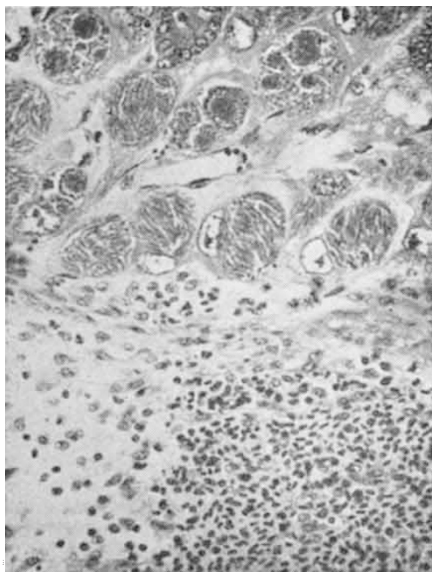


Fig. 1. T.S. of chick cæcal wall seven days after oral *E. tenella*. Parasites in macrophages (upper part of picture). Hemorrhagic exudate in submucosa (lower part of picture). (H and E. $\times 440$)