RECOGNITION OF FOREIGN PARTICLES

BY HAEMOCYTES FROM THE

CRAYFISH, (Parachaeraps bicarinatus)

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ABSTRACT

An investigation has been carried out on the factors involved in the recognition and uptake of bacteria by crayfish haemocytes.

Initial studies indicated that $^{32}\text{P}$-labelled bacteria were eliminated from the circulation of crayfish at different rates, depending upon the species of bacteria studied. Further investigations revealed that this removal could be depressed temporarily by a large blockading dose of the same organism. Such blockade could be reversed however by opsonisation of the challenge dose of bacteria with serum which suggested that blockade involved a depletion in serum opsonins.

Further confirmation of these findings came from studies which showed that the circulating haemocytes from the crayfish when cultured in vitro phagocytosed a number of different strains of bacteria. The ability of these cells to take bacteria could be depressed by treatment with trypsin. This state of depression could be reversed however by either incubating the trypsin-treated haemocytes in crayfish serum or opsonising the bacteria with the same. Data presented suggests that the recognition factors associated with the membrane of the phagocyte are similar to those circulating in the haemolymph.
Purification of the recognition factors for bacteria and erythrocytes by affinity chromatography and gel filtration revealed that they were an antigenically related group of molecules. Further studies demonstrated that the opsonins for bacteria and sheep erythrocytes had a mol. wt. of 81,000 daltons and consisted of 6 sub-units of 13,500 mol. wt.

Investigations were carried out also on the cytotoxic action of crayfish haemocytes for Ehrlich and Krebs ascites tumour cells. Such cytotoxicity was found to be dependent on cell associated recognition factors which were labile to trypsin.

The significance of these findings in relation to the recognition of foreignness by phagocytic cells from invertebrates is discussed.
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