IMMUNITY TO TUMOURS IN MICE

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ABSTRACT

This project was undertaken to investigate the increased resistance to tumour growth induced by bacterial infection.

The resistance to Ehrlich ascites tumour (EAT) transplants in mice immunised with a live vaccine of the rough, avirulent strain Salmonella enteritidis 11RX (11RX) was the experimental system used. The principal findings are:-

(i) The degree and duration of resistance to tumour growth are strongly dependent on the routes of injection of the bacteria and of the tumour cells, the highest tumour resistance being obtained when the same route is used for both.

(ii) Resistance to intraperitoneal tumour challenge in 11RX immunised mice can be correlated with the ability of the mice to destroy radioisotope-labelled EAT cells rapidly.

(iii) Immunisation induces cytotoxic activity in the peritoneal exudate cells, which lyse ^{51}Cr-labelled EAT cells *in vitro*. The cytotoxic cells adhere to glass and plastic surfaces.

(iv) Resistance to tumour growth and cytotoxicity toward tumour cells, detected *in vivo* or *in vitro*, are related to the distribution and persistence of the immunising bacteria.

(v) When the resistance to intraperitoneal tumour growth induced by intraperitoneal immunisation with 11RX has waned, it can be recalled by injection of an antigenic extract of 11RX which, in itself, is not protective in normal mice. The same extract, if injected at the site of tumour challenge, can elicit resistance to intraperitoneal tumour challenge in intravenously immunised mice and resistance to subcutaneous challenge in intraperitoneally and intravenously immunised mice.

(vi) The ability of the bacterial extract to elicit tumour resistance and in vivo cytotoxic activity in the peritoneal cavity can be transferred to unimmunised recipients with spleen cells from 11RX immunised mice. The elicitation of resistance in this transfer system requires the presence of the 11RX extract, T lymphocytes from the immune donor and radiation-sensitive cells from the unimmunised recipient.

It is concluded that infection with 11RX induces a state of tumour resistance which is expressed by cytotoxic cells whose activation is initiated by persisting bacterial antigens in a reaction mediated by T cells sensitised against these antigens. The results are discussed in relation to the literature concerning immunity to tumour growth and to intracellular microbial infection and possible effector mechanisms common to both.