The cells of the monocyte-macrophage lineage have been identified as potential effectors of immune surveillance against neoplasms. The present investigation attempts elucidation and modulation of the antitumor activities of macrophages infiltrating a growing tumor in Swiss mice. Phagocytosis, direct cytolysis, antibody dependent cellular cytotoxicity (ADCC) and lectin dependent cellular cytotoxicity (LDCC) extended in vitro by the tumor associated macrophages (TAM) to the autologous tumor cells (ATC) were studied at different days of tumor growth. At the early stages of tumor growth all the tumor killing activities of TAM were found to be at a high level, but with progression of tumor the antitumor activities declined and except LDCC, all other functions were abrogated at a late period of tumor growth. The extent of Phagocytosis and ADCC to ATC by the TAM could be correlated with their augmented target binding. Using suitable doses of immunomodulators, Levamisole and Polyinosinic poly-cytidylic acid, Phagocytosis and ADCC to ATC by the functionally depressed cells of TAM could be significantly potentiated. In the latter cells the phagocytosis and ADCC could be potentiated without modulating target binding. The lectins, Con A and WGA, were also found to augment phagocytosis and ADCC mediated by TAM.
A probe on the mechanism of tumor killing by the TAM was made by investigating the effects of sugars on lysis, phagocytosis and target binding by the cells. D-Mannose, NAcGlc and NAcGal inhibited target binding by the TAM and abrogated ADCC, but had no inhibitory effect on phagocytosis. Glucose at 25mM augmented lysis of ATC extended by the TAM. The preincubation studies demonstrated that the effect of the sugars were predominantly on the effector cells. Pretreatment of the effectors with the sugars also abrogated LDCC mediated by the cells.

In order to enrich the subpopulation of TAM responsible for ADCC activity, the TAM were separated into four subsets on density gradient of Percoll. Although there was some overlapping of ADCC activity by the subsets, the maximum cytotoxicity to tumor cells were extended by the second subset, obtained at the interface of 20-40% Percoll and comprised of highly differentiated macrophages.

The results obtained in the present study may provide new insight into the in situ antitumor response of the infiltrating macrophages, as the work deals with the tumor killing activity of the TAM against ATC.