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T Cell Hybridomas

A Workshop at the Basel Institute for Immunology

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Preface

For more than ten years cell fusion techniques have been applied in studies on various lymphocyte functions. Ig expression was first studied in hybrids obtained by fusing myeloma cells with fibroblasts (1) or lymphomas (2), both of which do not produce Ig, and with Ig-producing myelomas (3) or human blood lymphocytes (4). Köhler and Milstein (5) fused a myeloma with spleen cells from immunized mice. Up to 10% of the hybrids obtained secreted antibodies specific for the immunizing antigen. This suggested that plasma cells preferentially fused with the myeloma cells, a finding which was of enormous practical value. It was found that both B and T lymphocytes could be fused with the T cell tumor BW5147, which is however not permissive for Ig synthesis (6). A very large number of T cell hybridomas were generated by fusing BW5147 with cell populations containing in vivo or in vitro activated cells (7). The hybrids showed no specific T cell functions and binding assays for T cell receptors were not available. In particular, no hybrids were obtained which expressed specific cytolytic activity that could be tested in short-term ^{51}Cr-release assays (8). However, the frustrations expressed about these failures, published in January, 1978 (9), were relieved by Taniguchi and Miller's publication a few months later of T cell hybridomas producing antigen-specific suppressor factors (10). Unfortunately, their hybrids rapidly lost factor production. Subsequently, many laboratories generated murine and human T cell hybridomas which produced antigen-specific molecules that suppressed or induced various lymphocyte functions (this volume; 8,11). Many T cell hybridomas could be induced to produce various lymphokines (this volume; 12). Some T cell hybrids expressed antigen receptors which could be identified by binding antigen or antiidiotypic antibodies or antigen-induced lymphokine production (this volume; 13). Indeed, T cell hybridomas expressing specific lytic activity could also be generated (this volume; 14). It is remarkable that BW5147 is permissive for expression of all these T cell functions. Many more fusion experiments will be required - including interspecies fusions - to determine the optimal conditions for fusion and expression of particular T cell functions in hybrid cells. Although the problem of stable expression of particular T cell functions in hybridomas has not yet been completely solved, several laboratories have generated sufficient numbers of hybrid cells to allow purification and biochemical analysis of antigen-specific T cell factors. Most advanced is the analysis of suppressor factors (this volume).

T cell hybridomas are not the only source of monoclonal T cell products. First, several murine and human T cell tumors can be induced to express normal T cell functions such as lymphokine production (15). Second, transformed T cell lines expressing specific functions can be obtained by infection of mice or cells in vitro with radiation leukemia virus (16). Third, clones of all major T cell classes can

now be grown continuously in tissue culture (17).

To help evaluate the potential of T cell hybridomas for understanding the functioning of the immune system as well as for practical purposes, the workshop on "T Cell Hybridomas: Sources of Specific Mediators in the Immune System" was held January 27-29, 1982, at the Basel Institute for Immunology. The techniques used, the difficulties encountered and the present state of art were discussed, and most of this is presented in the following papers.

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