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An overview

The inclusion of a few papers on some of the infectious diseases in this number of the journal is intended to highlight some of the problems that have attracted the attention of the biochemists, microbiologists and immunologists in this important area.

The objective of this introductory note, is to highlight some of the areas that would need much great attention from scientists working in various disciplines in this country to answer several questions on infectious diseases, that are prevalent in our environment, and to focus on the information conveyed in the following articles.

In most bacterial., viral or parasitic infectious diseases, host-parasite interactions lead to total destruction of the host cell and multiplication of the pathogen. Alternatively tolerance of the pathogen in the host cell may permit the host cell to survive but be unable to eliminate the pathogen due to limitations in the biological/immunological potential of the host. It is also clear now that this host-parasite interaction—a manifestation.of the biochemical properties of the cells is of great importance.

There are two major events that are postulated to occur when a pathogen initiates a disease state. The first one is, obtaining a spatial and biochemical foot-hold by the pathogen in any of the host cells. In most infectious diseases, these host cells could be monocytes, macrophages, epithelial cells, or tissue derived macrophages of various types. The other important step for pathogen survival is to derange the host immune mechanism. Such steps involve modification of antigen presenting cells, prevention of activation of *B/T* cells, production of suppressor *T* cells/macrophages, which release immunomodulating factors and in some instances overcoming inactivation of *T* helper cells. In many infectious diseases, while humoral immunity is unaffected, the cell mediated immunity is compromised. It is also becoming clear that cell defects lead to poor levels of important lymphokines such as Interleukm-1, Interleukin-2 and Interferon. It is being demonstrated that some of the immune defects in infectious diseases could be rectified by addition of Interleukin-2 and Interferon.

Immunotolerance is one of the major reasons for a successful survival of pathogens in human and animal hosts. This phenomenon is dramatically highlighted in a small number of humans who suffer from lepromatous leprosy. The study of the immunological aspects of leprosy, provided an opportunity to unravel some basic concepts in the immunology of infectious diseases and general immune mechanisms.

One of the more important indications has been the elucidation of a suppressor mechanism operating through a microbial component with an affinity to a group of specialised *T* cells. This component was identified as a phenolic glycolipid which appears to interact with a receptor on *T* cells, initiating their action as suppressor cells, thus affecting both non-specific and specific antigen stimulated immune mechanisms. The suppressor mechanism has relevance to altered levels of important lymphokines, and is related to the immunotherapy by presently available "vaccines". Some of these aspects have been highlighted in the paper by Dr Bloom.

The article by Dr Brennen, highlights the role of glycolipids on the pathogenicity of leprosy bacillus, *Mycobacterium leprae.* A careful study of these compounds led to the identification, characterization and ultimately the synthesis of the phenolic glycolipid described in this article. This compound has the potential to be used as a reliable diagnostic tool for detecting leprosy and highlights the importance of biochemical investigations in this area.

The basic host–pathogen interaction during pathogenesis of the disease was demonstrated by research carried out at the Foundation for Medical Research, Bombay. One significant fact of this interaction was a change introduced in the macrophages of the host membrane by the pathogen (See Mankar *et al.* in this issue). In this study, such a basic change has been exploited to develop a screening procedure for compounds showing activity against *M. leprae.* This is another good example of practical utilisation of basic knowledge obtained from studies on this pathogenic organism.

Use of antigens and antibodies as diagnostic tools for detecting infectious diseases has been in vogue for some time and has greatly helped in the control of such diseases. A major advance in this area is the discovery of a method for immortalising antibody producing *B* cells, by hybridoma technique. This procedure enables the production of specific antibody with reactivity towards one antigenic epitope. Inspite of a few limitations these types of antibodies have found extensive application. The paper by Reddy *et al.* illustrate how such monoclonale can be developed for use in detecting microfilaria, a widely endemic disease in this country.

The availability of gene cloning techniques, intensive studies on host–parasite interactions, application of hybridoma techniques, understanding of immune modulating mechanism and development of immuno-diagnostic tools permit a confident prediction that major infectious diseases can be conqured in the near future.

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