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DEVELOPMENT OF IMMUNOLOGY IN SOUTH-EAST ASIA

1. GENERAL

Even though tropical diseases affect a large part of humanity and are associated with the immunological phenomena of antibody formation and cellular hypersensitivity, a rather small number of research workers is engaged in attempts to measure and interpret these immunological responses. Recognition of the fact that the discipline of immunology offers new prospects for combating the communicable diseases, which have always formed a substantial part of WHO's programme in developing countries, was one of the factors prompting the establishment of a specialized unit for immunology in WHO in 1963.

Immunological tests make earlier diagnosis of many communicable diseases possible, and immunological research offers the means of finding ways of immunizing against malaria and other parasitic diseases. Further, the auto-immune and other immunopathological disorders and cancer pose a serious problem to developed and developing countries alike. Here again, immunological research holds the promise of progress. In these subjects there is a special need to bring to the attention of practising physicians the new knowledge coming from basic research in immunology, and also to incorporate adequate training in immunology into the medical curriculum.

Several mechanisms have been used by WHO to help to train immunologists for research and for teaching. The main method has been the establishment of research and training centres - in Ibadan, Nigeria (for Africa), in Sao Paulo, Brazil, and Mexico City, Mexico (for Latin America), and in Singapore (for the Western Pacific Region, this centre also available to South-East Asia), with a co-ordinating base centre in Lausanne, Switzerland. These centres organize courses in immunological concepts and in immunological techniques, and conduct research. The research projects are carried out in collaboration with the host institution and with teaching and research institutions in the area. Experienced consultant immunologists visit the centres to lecture and to collaborate with local medical personnel who are interested in immunology, with the aim of breaking through possible scientific isolation and creating contacts between such personnel and those in places where immunology is well developed.

Training in highly-specialized fields of immunology is also again through the network of WHO reference centres for the different fields and through a series of collaborating laboratories. These centres give advice in their respective fields by organizing short courses and accepting

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visitors for orientation, as well as by discussions and correspondence. Eleven such immunological reference centres have been established, in order to improve and encourage immunological services for clinical medicine and public health. They make available information on serological and immunochemical techniques as well as some reagents.

The principles behind the establishment of the WHO programme for Immunology Research and Training Centres are best illustrated by the following excerpts from the Report of the Expert Committee on the WHO Immunology Research and Training Programme (see references at end):

"An understanding of immunology is crucial for a rational approach to a large variety of problems in clinical and preventive medicine. These include the prophylaxis, diagnosis and treatment of all diseases that have a viral, bacterial or parasitic etiology; the medical approach to allergic and hypersensitive states; the procedures aiming at avoiding rejection of tissue and organ transplants, and all present problems that are mainly immunological in nature. An impressive list can also be made of diseases and degenerative disorders in which there is a major involvement of the immune system, and evidence is increasing that the growth of tumours may be subject to immunological control. None of these problems can be understood without knowledge of the mechanisms involved."

"Immunology is a rapidly developing science. There can be no doubt that post-doctoral personnel competent in basic immunology and in modern immunological techniques are now indispensable to any major health centre."

"The Committee agreed that immunology will be successfully applied to health problems and to medical research only if it is continuously nourished by ideas, techniques and findings derived from basic immunological research. It would therefore be shortsighted, in any region of the world, not to devote a reasonable part of the available resources to such research, particularly as it is often only a short step from basic observations in immunology to the application of these observations in therapy and prophylaxis. Consequently, the rather rare individuals who have the talent and inclination for basic immunology should be given the administrative support they need, not only for their training, but also with regard to career opportunities and a stable background. A laboratory for research and training in immunology can be established and maintained at relatively low cost, and can prove an invaluable asset as a continuing supply of qualified personnel and as a source of inspiration and intellectual support for those who face immunological problems in their public health work.

"In any university setting, moreover, a research and training laboratory in immunology can serve as a centre of experience and knowledge that will uphold standards of scientific excellence and maintain direct contacts with other research workers all over the world. In this way the laboratory can bring modern knowledge and experience to bear on the immunological aspects of the health problems of the region in which it is located."

2. DEVELOPMENTS IN IMMUNOLOGY IN SOUTH-EAST ASIA

Following visits by the Chief of the Immunology Unit at WHO Headquarters and a consultant (Dr Elvin Kabat, Professor of Immunochemistry at the Columbia-Presbyterian Medical Centre in New York) in 1966 to India and Thailand and another visit by the Chief of the Immunology Unit in 1967, it was decided to hold two seminar-workshops on modern concepts and techniques in (a) the cellular and (b) the molecular basis of the immune response. The workshops were organized by the WHO Regional Office for South-East Asia and the Department of Biochemistry of the All-India Institute of Medical Sciences, New Delhi, in collaboration with the Immunology Unit at Headquarters. The successful impact of these workshops is well illustrated in the report of two consultants who made a follow-up visit (in December 1969) to see all but three of the persons who had participated. They found that in several laboratories, in particular, a good beginning had been made in developing research programmes in immunology. In one, where such programmes had already been under way before the workshops were held, it was clear that the information gained on techniques and reagents had speeded up research. In a second centre, a major turn toward a programme in immunology was developing. In other laboratories serological techniques formerly avoided as being "too difficult" were starting to be used.

The consultants concluded that the workshops had definitely helped in the development of medical education, clinical immunopathology and research. They regretted only that, in the centres visited, information about the courses had not reached all the research workers who would be expected to benefit most from it. They listed the following lines of research which had subsequently been improved or taken up:

- (1) Human immunoglobulin (Ig) and anti-Ig reagents
- (2) Immunoglobulins in leprosy
- (3) Lymphocytes in leprosy
- (4) Lymphocyte typing for histo-compatibility antigens
- (5) Hormones and the immune response
- (6) Biochemical studies on human lymphocytes
- (7) Electrophoresis of cells from lymphnodes of mice immunized or treated with antilymphocyte serum
- (8) Action of radiation on antibodies
- (9) Screening of sera for myeloma proteins
- (10) Measurement of the serum levels of Ig in normal individuals
- (11) Immunoglobulin patterns in various diseases
- (12) Analysis of the enzyme citrase
- (13) Role of histones in mammalian cell regulation
- (14) Purification of brain hexokinase
- (15) Analysis of proteins of E. coli ribosomes
- (16) Analysis of action and timing of protein hormones responsible in the rat for the reproductive cycle, through antihormone antibodies.

The consultants recommended that a training centre on immunology be established in South-East Asia, that the "Immunology Newsletter" containing information from participants (one issue of which, prepared by the Regional Office, in collaboration with the All-India Institute of Medical Sciences, had appeared) should be continued, and that closer contact between research workers be stimulated and assisted.

### 3. FUTURE DEVELOPMENTS

Two consultants will visit the Region in November 1970 to help to organize a continuous programme for research and training in immunology in the Region to be operated in close collaboration with the research and training programme in other WHO regions.

Experience in developing the immunology research and training centres in the past few years has shown that WHO can successfully stimulate interest in the development of effective methods in this field by taking an active lead. The Organization can appoint experienced immunologists and send them to these centres, to train workers who are faced with particular disease situations but who lack knowledge of the techniques that may be applicable. Also WHO can assemble well known specialists to discuss various aspects of disease problems. In the past few years expert committees on Parasitic Diseases, on the Immunology of Malaria, and on the Immunology of Cholera, as well as Meetings of Investigators on Leprosy and on Schistosomiasis, have outlined many of the approaches and techniques which need to be followed.

The following principles were outlined in the report of the Expert Committee on the Immunology Research and Training Programme (see references at end):

"The primary aim of a centre, therefore, is to develop a nucleus of first-rate immunologists in those regions of the world where immunological research is sorely needed and difficult to organize. This implies finding individuals with an exceptional talent for this type of work, and developing their capacities so that they are able as soon as possible to act as independent creative teachers and research workers in immunology and immunochemistry and to add significantly to the total body of scientific knowledge. It is hoped that ultimately the most outstanding of these immunologists will be able to take over the programme of the centre and extend it throughout the area in which the centre operates.

"Experience has shown that the initial training of such persons should be carried out so far as possible in their own countries or regions, since their inclination for research aimed at the solution of local problems is liable to be weakened by prolonged training abroad. In order to provide a suitable environment for training it is necessary to set up continuing programmes of research at the centres, so that the students can become exposed to a research atmosphere and learn by example how research of high quality is conducted.

"A second aim of the WHO programme is to attract experienced immunologists from other regions to help both in the training of the students and in collaborative research on diseases of special local significance. Because of the availability of unique resources or unusual genetic materials, such research may not only provide insight into local problems but also contribute to the solution of problems in other areas.

"A third aim is to create, with initial WHO support, an immunological centre of excellence that can become a continuing feature of the host institution. A centre is not intended to supplant or to replace the general teaching of immunology to undergraduate students by the host institution, although it will be able to co-operate with the host institution in such teaching. In this connexion, the capacity to attract expert immunologists from other countries will be of mutual benefit."

It is of interest to note the following resolution, adopted by the Executive Board at its forty-fifth session in January of this year:

"Having examined the report of the Director-General and reviewed the programme of the Organization in the field of immunology,

1. NOTES with appreciation the development of the activities of the Organization set out in the report, and in particular the high scientific level of the research programme;
2. BELIEVES that much knowledge derived from the study of immunological factors in diseases prevalent in tropical countries is of great assistance to progress in other areas in the world;
3. RECOGNIZES that the rapid development of the field of immunology requires appropriate emphasis in medical education and provision for the use of modern immunological techniques in health services;
4. CONSIDERS that the development of the Immunology Research and Training Centres has helped to meet these requirements; and
5. REQUESTS the Director-General to continue to develop the Organization's programme in immunology, within the resources available, on the lines set out in the report. (EB45.R15)

#### CONCLUSION

In South-East Asia, WHO has tried to stimulate developments in both research in and the teaching of immunology. A lot remains to be done so as to have this new and very promising discipline incorporated in the undergraduate medical education curriculum. If this is to be achieved in future, post-graduate training facilities must now be established. The findings of the consultants mentioned above who are scheduled to visit the Region in November 1970 will be submitted to governments in due course.

A second issue of the Immunology Newsletter is being prepared, and a meeting to review progress in research in immunology is foreseen in 1972. Co-operation from Member Governments to depute selected research workers for this meeting will be most essential.

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