



TOGETHER
for a sustainable future

OCCASION

This publication has been made available to the public on the occasion of the 50th anniversary of the United Nations Industrial Development Organisation.



TOGETHER
for a sustainable future

DISCLAIMER

This document has been produced without formal United Nations editing. The designations employed and the presentation of the material in this document do not imply the expression of any opinion whatsoever on the part of the Secretariat of the United Nations Industrial Development Organization (UNIDO) concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries, or its economic system or degree of development. Designations such as “developed”, “industrialized” and “developing” are intended for statistical convenience and do not necessarily express a judgment about the stage reached by a particular country or area in the development process. Mention of firm names or commercial products does not constitute an endorsement by UNIDO.

FAIR USE POLICY

Any part of this publication may be quoted and referenced for educational and research purposes without additional permission from UNIDO. However, those who make use of quoting and referencing this publication are requested to follow the Fair Use Policy of giving due credit to UNIDO.

CONTACT

Please contact publications@unido.org for further information concerning UNIDO publications.

For more information about UNIDO, please visit us at www.unido.org

19084

**NEW TOOLS IN THE STUDY AND DIAGNOSIS OF PARASITIC DISEASES
THEORETICAL AND PRACTICAL TRAINING COURSE**

November 24 - December 14, 1990

Host Institution: Instituto Venezolano de Investigaciones Cientificas, IVIC, Centro de Microbiologia y Biologia Celular, Caracas, Venezuela.

Organizers: Dra. Hilda A Perez, IVIC, Caracas, Venezuela Dr. Lucio Benedetti, Paris University, Paris, France, Dr. Angel Hernandez, Facultad de ciencias, UCV, Caracas.

Sponsors: International Centre for Genetic Engineering and Biotechnology, Centro Latinoamericano de Ciencias Biologicas/UNESCO, Corporacion Andina de Fomento, Pan American Health Organization, IVIC.

SUMMARY OF COURSE ACTIVITIES

The course "New Tools for the Study and Diagnosis of Parasitic Diseases" was held at the Center for Microbiology and Cellular Biology at the Venezuelan Institute for Scientific Research (IVIC), Caracas Venezuela, from November 24 through December 14 1990. 19 students from 10 Latin American countries attended the course run by researchers from European, North American and Latin American institutions. The theoretical and practical aspects of the course covered the technological applications of DNA, synthetic oligonucleotides, PCR, monoclonal antibodies and synthetic peptides used in the study, diagnosis and epidemiological prevention of tropical parasitic diseases especially malaria, leishmaniasis and onchocercosis. The intensive course included laboratory work, round-table discussions and seminars.

ACKNOWLEDGEMENTS

It goes without saying that the success of any international event at such a high academic level depends upon the dedication and cooperation of many institutions and all the people involved in all stages of preparation. To all these we own our sincere appreciation.

During the year-long preparation, we counted on the unquestioning support of many colleagues at IVIC and from the UCV. Discussions held with Dr. Jose Luis Ramirez, Fulvio Esposito, Michael Parkhouse, Jose Vicente Scorza and Jan Conn proved to be extremely valuable in the course design.

The International Center for Genetic Engineering and Biotechnology (CIIGB), the Latin American Center for the Biological Sciences (CLAB) and the Andean Development Agency (CAF) generously provided the financial backing essential for any course of this nature. Laboratorios Heiga and the Fundacion Polar also contributed by donating reagents.

VIASA generously helped the participants to and from their destinations and also delivered promptly materials for the course.

We owe special thanks for all the expertise and good-will shown to help at a moment's notice to the scientific and technical personnel at the laboratories of Immunoparasitology at IVIC, of Molecular Biology at the Center of Experimental Biology and the Institute of Biomedicine at UCV and the laboratory of Parasitological Research "Jose Witremundo Torrealba" at ULA.

Thanks also to the staff at the Marcel Roche Library and the Printing and Copying Service at IVIC for undertaking the task of reproducing the documents.

The MSAS (Health Ministry) offices in Bolivar State and the Amazonas Federal Territory were especially helpful in the collection of samples used in the laboratory.

The Center for Advanced Studies at IVIC arranged the lodgings on campus.

Thanks go to Monica de la Cerda (CMBC) and Gema Merida (IVIC) for expertly organizing the purchase of all the materials needed.

Everybody appreciated the extraordinarily punctual transport service at IVIC - arriving on time at any time!

Thanks also to Dr. Miguel Laufer (President of CLAB) and Dr. Horacio Vanegas (Director at IVIC) who were always willing to lend their support.

Special thanks go to Mrs. Miriam Ramos (secretary at CLAB) with whom we shared our joys and worries before, during and after the course.

Finally we must thank all the participants, students and professors for their dedication, interest and enthusiasm which made the course such an extraordinary experience for all of us.

INTRODUCTION

The study of parasitic organisms have not escaped the impact of state-of-the-art biotechnology. Indeed few would disagree that the application of new technology, especially in the field of genetic engineering, will be extremely beneficial for the diagnosis, control and research into the biology of parasites. Nevertheless, we should understand that much of this technology is still beyond the reach of developing countries, and hence far from contributing to practical solutions in the areas where these diseases are endemic. As an essential step towards development we need to train scientists and technicians in the use of the latest technology. This can only be done through the cooperation of scientists from the developed countries. As a small part of this initiative, and after the successful course held in 1988 ("Applied Immunocytochemistry in the Cellular and Molecular Biology of Parasites" at IVIC under the auspices of CLAB/UNESCO/ICRO/CONICIT) the organizers, Dr. Lucio Bendetti, Angel Hernandez and Hilda Perez, decided to undertake the organization of a regional course for specialists throughout Latin America.

The course broadly aimed to present the theoretical and practical applications of genetic engineering in the study, diagnosis and epidemiological control of parasitic diseases. Although DNA technology formed a central aspect of the course, other methods were considered. malaria, leishmaniasis and onchocercosis were chosen for two reasons: firstly, the molecular biology of their etiological agents have been intensely researched (especially in the case of malaria); and secondly,

these three diseases present a severe health threat in many regions of Latin America.

The participants performed at an excellent professional level and were well-prepared to take full advantage of the theoretical and laboratory aspects of the course. The enriching discussions of the topics being analysed and the high-level of seminar presentations of each individual's work area reflected the general enthusiasm and competence of each of the participants.

The general consensus of opinion at the end of the course was one of having shared a fascinating experience. The stimulating scientific program, the keen interest of the students, the dedication of the teaching team, the success of the laboratory workshops and the excellent level of discussion in a informal atmosphere all contributed to this experience. Informal social moments helped all the participants to form friendships and relax, so easing the pressure of the extremely intensive nature of the course. On the last day each of the participants were given the opportunity to make an initial analysis of the feasibility of application of what they had learnt in the context of their own countries: this proved an excellent way to conclude the course.

THE PARTICIPANTS

The course was promoted through CLAB, CIIGB and OPS newsletters as well as through direct correspondence to the directors of postgraduate programs in Latin American Universities and research institutions offering tropical medicine. Collaboration of the OPS proved to be particularly important to circulate the course program throughout the

region. The promotion was directed at postgraduate students in Parasitology or Microbiology, and at young scientists working in research, teaching or health services in the area of parasitic diseases.

Due to the overwhelming response (37 applicants for the 12 places) we decided to increase the number of participants to 19. The selection committee (Dr. Angel Hernandez, Jose Vicente Scorza, Jose Luis Ramirez and Hilda Perez) evaluated the candidates on the basis of their academic qualifications, their current activities within the context of their institution's interest in the parasitic diseases of the region as well as their institutional recommendation.

TEACHING STAFF

All the lecturers invited are well-known experts in their field of research and have had extensive teaching experience on high-level courses. The international flavor of the course was guaranteed by the presence of lecturers from Italy, Switzerland, the UK, the USA, Colombia and Venezuela (see Appendix 1,2, for a complete list - only Dr. Fulvio Esposito was unable to attend for health reasons, but fortunately two of his very capable laboratory assistants were able to take his place).

Not only did the teaching staff feel strongly motivated to transmit their knowledge to the students on the course, but they actively participated in its organization and final planning by making pertinent and useful suggestions. In the preliminary planning phase all the invited professors helped enormously by promptly replying to our circulars for all the necessary information so we were able to compile two excellent laboratory books which were ready before the course began

(one edited in Paris by Dr. Lucio Benedetti and the other in Venezuela by Dr. Hilda Perez - see Appendices 3 and 4). We were able to prepare an excellent bibliography, as well as to carefully assemble all the necessary materials and reagents with the help of the information supplied by the guest speakers. Indeed credit for the success of the course must go to the dedication and efforts of the teaching staff.

STRUCTURE AND ORGANIZATION OF THE COURSE

Since the selection of the technology used on the course strictly obeyed the criteria of its applicability to third world countries, especially in Latin America. Mostly, we worked with non-radioactive probes.

In order to ensure the smooth operation of the laboratory sessions we took a number of precautions. Several weeks prior to the initiation of the course laboratory assistants were allocated to the preparation of each of the practical sessions. The assistants were selected from responsible members of the scientific and technical staff of the Laboratory of Immunoparasitology at IVIC, the Laboratories of Molecular Biology at the UCV (Center for Experimental Biology and Institute of Biomedicine) and the Laboratory of Parasitological Research at the ULA. (Any minor equipment or accessories required were made in the workshops at IVIC). Furthermore, to be doubly sure, prior to each laboratory practical the profesor in charge carefully inspected and checked every piece of equipment, the reactants and the biological specimens. The result was a 100% success rate in the laboratory sessions.

The first week was dedicated to the biology of malaria parasites and their vectors. This included the analysis of the current world

distribution of malaria, the cytogenetics and molecular genetics of the anophelids and a demonstration of the usefulness of DNA techniques in the study of the molecular taxonomy of the anophelids as well as their impact on vector identification. Lecturers on this first section were: Dr. Jose Vicente Scorza, Dr. Jan Conn, Dr. Sharon Mitchell and Dr. Robert Zimmerman.

In the second week we undertook an in-depth analysis of the biology and diagnosis of the erythrocytic phase of the malarial parasites. The conventional microscopic method of diagnosis was compared to the use of nucleic acid probes and the fluorescent coloration of capillaries using Acridine Orange (QBC). The application of monoclonal antibodies and synthetic peptides in the control of vectors and malaria transmission, and the use of new techniques for the detection of the presence of anti-malarial drugs in body fluids were also studied. Professors were: Dr. J.V. Scorza, Dr. Moises Wasserman, Corinna La Rosa and Roberta Gambella (for Dr. Fulvio Esposito), Dr. Bruno Bestchar and Dr. Joseph Perrone.

The third week emphasized the great potential of genetic engineering in the study of specific aspects of the biology of etiological agents of Leishmaniasis and Oncocercosis as well as in the diagnosis of these diseases using hybridization tests with synthetic oligonucleotides; polymerase chain reaction (PCR) and monoclonal antibodies. This section of the course was taught by Dr. Michael Parkhouse, Dr. Jose Luis Ramirez and Dr. Felix Tapia.

In most of the laboratory practicals fresh specimens and biological samples were used. This was made possible thanks to a combination of

field collection trips and by drawing on the stock of parasitic organisms and infected tissues of experimental animals kept in the laboratory.

The basic daily routine was classroom-laboratory-classroom. Thus theoretical input in the classroom was followed by lab sessions related to the theory, and finally we returned to the classroom to discuss the results and theoretical implications of the practicals. Discussions were always very productive thanks to the intellectually stimulating and humorous contributions of Professor Lucio Benedetti.

COURSE LOGISTICS

Mrs. Miriam Ramos, secretary of CLAB, was in charge of all the logistics and the myriad of details necessary for the smooth running of the course. This included: the coordination of visas through the Venezuelan Chancellory, the mailing of the prepaid airline tickets, the confirmation of return flights, transport from and to the airport, lodgings at IVIC, the meals, entertainment activities and the resolution of any other problems our guests had.

CERTIFICATES

All participants were awarded a certificate for assisting and successfully completing the course from the Center for Advanced Studies, IVIC.

FINANCE

The course was sponsored by the following institutions:

Centro Internacional de Ingenieria Genetica y Biotecnologia (CIIGB, International Center for Genetic Engineering and Biotechnology);

Centro Latinoamericano de Ciencias Biologicas (CLAB, Latin American Center for the Biological Sciences);

Oficina Panamericana de Salud (OPS, Panamerican Health Agency);

Corporacion Andina de Fomento (CAF, Andean Development Agency);

Fundacion Polar (Private foundation);

Laboratorios HEIGA (Pharmaceutical company).

Finance was as follows:

CIIGB.....	25.000	\$US
CLAB.....	8.000	"
CAF.....	2.000	"
Fundacion Polar.....	1.000	"
Laboratorios HEIGA.....	200	"
<hr/>		
TOTAL.....	36.200	"

The OPS office in Washington kindly paid the return tickets (Miami-Caracas-Miami) for Dr. Jan Conn and Dr. Sharon Mitchell. The CAF office in Colombia likewise sponsored Dr. Moises Wasserman's trip from Bogota.

RECOMMENDATIONS

On the last day of the course we invited all participants to make constructive criticisms of the course for future reference. Nevertheless, the students took the opportunity to express their concern about the difficulties facing young scientists in Latin America in keeping their knowledge up to date. (This is not to say that we believe the course to have been totally without hitches!). This genuine concern was a common underlying theme in all the seminars given by the students about their area of work in their own countries: this all goes to reaffirm the importance of establishing contacts for cooperation (see Appendix 5). Indeed, we believe that more courses of this nature should be sponsored in the region and they should be given greater diffusion to ensure that all those interested are informed. Furthermore, some follow-up mechanisms should be designed to reveal the long-term benefits of this type of courses.