

SY-12 DIAGNOSIS OF PARASITIC DISEASES

Fausto G. Araujo, DVM, Ph.D.
Department of Immunology and Infectious Diseases
Palo Alto Medical Foundation Research Institute
Palo Alto CA 94301

Since the introduction several years ago of indirect immunofluorescent antibody test the field of diagnosis of parasitic diseases has been in a rapid and constant evolution, specially because of the realization of the amount of money that could be made in patenting new technologies and marketing kits for the rapid and specific diagnosis of viral, bacterial, fungal and parasitic infections. A giant advance was made with the development of radioisotopic assays followed almost immediately by the development of the enzyme immunoassays and by the development of monoclonal antibodies. This latter development revolutionized the field of immunodiagnosis by opening new ways to the development and commercialization of a wide variety of very effective diagnostic tests (1). There was, however, almost no time to really understand the exquisite sensitivity and specificity of assays based on monoclonal antibodies and to completely realize their potential since the exploding field of molecular biology burst into the scene with technologies and possibilities beyond the imagination. Molecular biology has provided spectacular advances in developing new methods for the identification of infectious agents and vectors. These methods explore the genomic core of the organism and often supplant traditional technologies because of their rapidity, ease of use, accuracy and, sometimes, extremely exquisite sensitivity. DNA probes are now all over. More importantly, they are moving out of the diagnostic laboratory and becoming available to epidemiologists for use in the field (2). The sensitivity of the DNA probes may be impaired by the quantity of parasite DNA in the samples. However, a new technology, the polymerase chain reaction (PCR) (3), has been developed to permit the use of extremely small quantities of DNA. In PCR, sequences of DNA are amplified over a million of times in a short period of time. This technique allows the use of non-radioisotopic detection systems and has already been employed to demonstrate human immunodeficiency virus and human papilloma virus (4).

One of the problems with all the new technology for diagnosis of parasitic diseases, particularly those based on expensive molecular biology procedures is cost to the patient and to the institution providing the technique. Parasitic diseases are unfortunately much more prevalent in poor third world countries where patients are unable to pay for any health care. The main health care provider is usually the government which is almost always with very limited economic resources. Thus, a careful analysis of cost effectiveness and impact on health care is essential before any significant technological change is made in the diagnosis laboratory. In this time of economic restraint for most if not all third world countries it is impossible to introduce new techniques and assays because they are fancy and nifty. Most often, technology which provides cost savings is accepted without question, but new tests which require substantial expenses for equipment and reagents require exhaustive analysis of cost effectiveness and health care benefit.

It is fortunate that this symposium is being realized here in Caxambu during the Chagas' disease and Protozoology meetings. We will hear presentations describing research being

conducted at the forefront of the field of diagnosis of parasitic diseases usually in laboratories with exceptional resources. Most of the listeners, however, work under more limited conditions and may better evaluate the impact of the new technologies described in this symposium in terms of cost and usefulness for improvement of the health care of the general population. The input of these listeners will be extremely useful.

References:

1. Rapid Detection and Identification of Infectious Agents. D.T. Kingsbury and S. Falkow, eds., Academic Press, Inc., New York, 1985.
2. DNA Probes in the field. Series of articles. *Parasitology Today* 3: 371, 1987.
3. Erlich, HA et al. *Nature* 331: 461, 1988.
4. *Lancet*, June 18, 1988, page 1372.