AFRICAN MALARIA NETWORK TRUST

Afro-immunoassay (AIA) Network

Phase 1 Members

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1. Coordinator

Noguchi Memorial Institute for Medical Research (NMIMR), University of Ghana.

Accra, Ghana

Senior Scientists of Immunology: Dr. Daniel Dodoo, Dr. Ben Gyan, Mr. Michael Ofori

Additional personnel: Anastasia Ocran, Asamoah Kusi, Helena Nartey

The Noguchi Memorial Institute for Medical Research (NMIMR) was established by the University Council as a semi-autonomous institute of the University of Ghana in 1979. The physical facilities of NMIMR were built with a grant aid by the Government of Japan as a gift to the Government and people of Ghana, and in memory of the Japanese medical scientist, Dr. Hideyo Noguchi who, working for the Rockefeller Institute, died in Ghana, the then Gold Coast in 1928 whilst researching into yellow fever.

The broad objectives and mandate of NMIMR is to conduct research into infectious and communicable diseases prevalent in Ghana and into nutritional problems; to provide training opportunities for postgraduate students in medical research; to provide specialized laboratory diagnostic and monitoring services in support of public health programmes. The strides the Institute has made in health research and its contribution to national development have enjoyed financial support from many sources particularly the Government of Japan through Grant Aid and Technical Co-operation Agreements executed through the Japan International Co-operation Agency; and the government of Ghana. The Ministry of Health of Ghana remains the primary beneficiary of research findings of the Institute

NMIMR through its research and extension activities has acquired international visibility resulting in research collaboration with several institutions both nationally and internationally. NMIMR has made considerable contribution to the training of graduate and polytechnic students in science, from all tertiary institutions in the country, by making its facilities available for their field work and supervising degree students project work. Students from collaborating universities and institutes abroad have also benefited from the materials and facilities available to the Institute.

NMIMR is managed by a Director appointed by the University Council who is answerable to the Vice Chancellor of the University of Ghana. The following Committees and Boards assist him: The Management Committee, which formulates policies and guides management. The Advisory Board, which provides liaison with other governmental and private agencies. The Co-ordinating Committee, which supervises the Ghana-Japan Medical Co-operation Programme. The Finance Board, which supervises the financial administration of the Institute. Appointments Committee, which deals with appointment of Staff. Scientific and Technical Committee, which examines and approves all research proposals through external peer review and reviews progress of research execution. It also serves as a conference committee when necessary. Bio-safety Committee, which deals with safety issues and does scheduled inspection of research facilities and procedures; and finally, Institutional Review Board (IRB), which is an independent body tasked to deal with ethical issues regarding research proposals, ensuring that every study proposal is ethically approved before implementation. The IRB is constituted such that an approval obtained from it is acceptable to the Ghana Ministry of Health (MOH), and therefore may not require further approval from the Ghana MOH.

NMIMR employs a total of 120 personnel including Scientific and Technical staff (62), of which there are 21 Research fellows, 21 Research assistants 18 Technicians and 2 nurses and the rest being administrative, accounting and support personnel. There are presently 9 research units operational at the institute - Epidemiology, Virology, Parasitology/Molecular Biology, Microbiology, Nutrition, Immunology, Clinical Pathology/Haematology, Electron Microscopy/Histopathology and Laboratory Animals. Each units has 2-3 Research Fellows, 2-3 Research Assistants, 2-3 technicians/technologists and 1 Laboratory Assistant, in addition to technical, scientific and administrative temporarily employed under study grants.

NMIMR is financially autonomous and is run by government subvention. The accounting section provides for internal and external auditing. NMIMR is involved in a number of research activities predominantly in tropical disease research. Current activities include the following: Immuno-

epidemiological studies on correlates of immunity to malaria; the role of maternally derived antibodies and parasite strain specificity in the protection of infants in malaria; Variation of malarial antigens and malarial attack rates in northern Ghana; Immunopathology of severe malaria; Development of a malaria vaccine/drug trial site in Northern Ghana in collaboration with the Navrongo Health Research Centre of northern Ghana; Development of new immuno-diagnostic techniques for urinary schistosomiasis; Identification of Onchocerciasis vectors, *Simulium damnosum* sibling species complex using molecular methods; Deforestation and Onchocerciasis in West Africa; Filariasis intervention studies in Ghana; Screening of new formulations of Baccilus thuringenesis serotype (Bt H14) against *S. damnosum s.l.* vectors of onchocerciasis; Urban food security and nutrition in the Greater Accra region; Factors affecting food intake and nutritional status of infants in selected communities in Greater Accra; Isolation and molecular characterization of HIV strains from Ghana; In vitro screening of Ghanaian medicinal plants for antiviral and anti-malaria activity. Over the past 10 years we have conducted an extensive, collaborative research program in malaria immunology and have developed the capability to carry out a wide variety of immunological assays relevant to the evaluation of both humoral and cellular immune responses to candidate malaria vaccines. In recognition of its expertise in immunology, NMIMR was awarded a grant by the African Malaria Network Trust to coordinate the Afro-immuno assays network, a multi-site effort among African and European laboratories to standardize immune assays to be used in immunogenicity studies of malaria vaccine candidates. Under the leadership of Dr. Daniel Dodoo (NMIMR), partners from Burkina Faso, Gabon, Ghana, Senegal, Tanzania, and Zimbabwe, and facilitators from Ghana, France, The Netherlands and Denmark standardizes protocols for IgG isotype specific EIA assays to detect antibodies to four candidate vaccine antigens, AMA1, MSP1, MSP3, and GLURP. NMIMR maintains an active research program in malaria immunology addressing immune correlates of naturally acquired immunity, the role of maternal antibodies in protection of infants, the effect of pro-inflammatory versus anti-inflammatory cytokine responses on clinical outcome, the pathogenesis of severe malaria, and the measurement of baseline humoral and cellular immune responses to candidate malaria vaccine antigens in semi-immune Ghanaians.

NMIMR has a consortium of well-trained and experienced personnel constituting a clinical trials team, able to design and implement clinical trials of potential malaria vaccines and other anti malaria interventions in compliance with international ethical and regulatory standards. They have undergone training in human subjects research ethics, Good Clinical Practices, and Good Laboratory Practices including those organized by AMANET. A Clinical laboratory capable of conducting basic clinical safety laboratory studies including complete blood count, serum electrolytes, serum creatinine, serum aminotransferases, and plasma glucose have been established at NMIMR. The laboratory is a member of

the (U.S.) National Committee for Clinical Laboratory Standards (NCCLS) and participates in regular proficiency testing administered by the College of American Pathologists (CAP). A Quality Assurance Team has been set up in NMIMR with a mandate to ensure GLP according international standard. Scientists and physicians regularly design clinical research protocols and consent forms, which are implemented after passing review by local Institutional Review Boards registered.

A facility for clinical research adjacent to the current NMIMR building has been completed. The new multi purpose facility provides more rooms for the increasing activities of the Institute, including data management, sample storage and archiving, volunteer recruitment, screening, phlebotomy, and counselling and vaccine testing centre.

A liquid nitrogen producing plant and dry ice making facility have recently been installed at NMIMR, which will ensure continual and adequate supply of liquid nitrogen and dry ice for the storage and shipment of samples. NMIMR has developed an internationally acceptable system of sample storage and transport. It is certified in shipment of samples to the three global polio laboratories at CDC, Atlanta, USA, the Netherlands and South Africa. Staffs are adequately trained to ensure that packaging of sample materials meets WHO and CDC standards with regards to appropriate packaging boxes.

NMIMR maintains a 24 / 7 internet-based electronic mail connectivity to enhance all aspects of its collaboration. The availability of internet facilitates all aspects of collaboration, including registration and abstract submission for international meetings, registration of Institutional Review Boards, manuscript submission and publication, reporting of adverse events during the conduct of clinical trials, coordination of specimen shipments, training opportunities, and many other resources, such as those provided by websites such as HINARI.

NMIMR has a Scientific and Technical Committee (STC), which examines and approves all research proposals through a peer review mechanism and also carries out periodic reviews of the progress of research being executed. It also serves as a conference committee for planning and carrying out scientific meetings and workshops, when necessary.

The NMIMR Institutional Review Board (IRB) is an independent body tasked to ensure that research proposals meet internationally accepted ethical standards. NMIMR IRB has FWA certification (FWA00001824). The IRB is constituted such that an approval obtained from it is acceptable to the Ghana Ministry of Health (MOH), and therefore may not require further approval from the Ghana MOH. However in certain instances, particularly drug and vaccine trials require approval from the Ghana MOH. In addition, importation of vaccine and drug products requires certification of the Ghana Food and Drugs Board. Volunteers in a vaccine or drug trial will not be allowed to participate until Ministry of Health

approval is granted. The MOH will receive a timely copy of all reports related to the protection of participants, including annual reviews, reports of any unanticipated problems or risks, any serious or continuing non-compliance with requirements for protection of research volunteers, or any suspension or termination of IRB recommendation for approval of research. The STC assesses scientific merits of study proposals every other month, followed by IRB meetings that assesses the ethics of proposed studies as well as monitor the ethical conduct of approved studies. However, in certain instances these 2 bodies conduct expedited review.

2. Centre National de Lutte contre le Paludisme
Ouagadougou, Burkina Faso
Senior Scientists: Dr. Issa Nebbie, Mr. Diarra Amidou, Dr. S. Sirima

The Centre National de Recherche et de Formation sur le Paludisme (CNRFP) formerly known as the Centre National de Lutte Contre le Paludisme (CNLP), is part of the Secretariat General of the Burkina Faso Ministry of Health and was founded in 1983. The centre has close research collaboration links with many institutions worldwide. It is one of the leading malaria research institutions in the country.

The centre was founded to guide the development of the national malaria control programme, and to support its implementation. The mandate of CNRFP are therefore i) to participate in the formulation, implementation, supervision and evaluation of the national malaria control program; ii) carry out operational and basic research to identify new malaria control tools and adapting existing ones to the local conditions; and iii) provide training on malaria to health staff and scientists from Burkina Faso and other African countries.

As a specialized malaria research centre and having the missions to provide technical support for the implementation of the National Malaria Control Program, the current activities of CNRFP are focused on:

- Community based interventions (Home management of malaria, prevention of malaria during pregnancy, insecticide treated materials)
- Training of local and regional health staffs on malaria control strategies
- Training of local and abroad scientists and students
- Clinical trials (drugs and vaccines)
- Monitoring of drug and insecticides resistance.
- Epidemiological and basic research on malaria.

During the last ten years, CNRFP staff have been trained in various fields: 5 PhD (epidemiology, immunology, entomology, molecular biology and social science), 1 medical doctor (Clinical development of malaria candidate vaccines), 3 medical doctors (MD), 2 Pharm D, 1 Master in biology, 3 project managers, 2 accountants, 5 nurses, 5 lab technicians and many part-time workers.

At present, the group consists of a multi-disciplinary scientists, several post-doctoral fellows and graduate students. Group members have also been trained for GCP, GLP and ethics during the workshops organised by AMANET, WHO and others funding agencies. MSP3 phase Ib trial was entirely conducted by CNRFP team in compliance with GCP standards and international regulatory requirements. The lessons learned during previous programs ran by the CNRFP (large scale insecticide treated materials study, home management, drug trial, site preparation for malaria vaccine phase Ib trials, ongoing MSP3 phase Ib trial …) greatly contributed to the long experience of the team in project management.

Present facilities of the CNRFP include a well-equipped laboratories with parasitological, molecular biology, entomological and immunological sections allowing routine examination of a large number of samples. The lab equipment includes: laminar air flow cabinets, automatic CO2 incubator, centrifuges, optical microscopes out of which some are equipped with phase contrast optics or with fluorescence, PCR machines, cell harvester, ELISA plate readers, beta-counter for cellular and humoral immune response studies as well as malaria diagnosis. freezers out of which, liquid nitrogen container and reservoir for cells conservation and -80ºC freezer. The power is supplied by the national provider; however a back up generator has been purchased and installed to take over in case of power failure.

The lab is implementing a quality assurance/quality control (QA/QC) plan to ensure the reliability and reproducibility of all the lab data generated.

3. National Institute of Health Research (former Blair Research Institute)
Harare, Zimbabwe
Senior Scientists: Dr. S.L. Mutambu, Dr. Taka Mduluza

The National Institute of Health Research (NIHR) is the national institute for research, training and service in the fields of disease control, biomedicine and health. The institute comprises the Blair Research Laboratory (established 1939), Health Research Unit (established 1981) in Harare and De Beers Research Laboratory (established 1965) in Chiredzi. These research departments form the Research Department of the Ministry of health and Child Welfare. NIHR is affiliated to the University of

Zimbabwe, run by a Director who is appointed by the Public Service Commission and answerable to the Secretary of Health and Child Welfare.

The Director also serves as Secretary to the Medical Research Council of Zimbabwe (MRCZ), a statutory body established by Act of Parliament in 1974 in terms of the Research Act of 1959, Chapter 336, Sub-section 18, to promote and co-ordinate all aspects of health and medical research in Zimbabwe.

The overall objective of NIHR is to conduct research in priority areas such as malaria, schistosomiasis, diarrhoeal and other related diseases, AIDS and STIs, provision of safe water and sanitation as well as health systems research. The aim of this research is to improve the health of the people of Zimbabwe through more effective control of disease and solving problems associated with the implementation of national health programmes.

Dr. S.L. Mutambu has worked as a researcher at NIHR for the past 24 years and has research experience in malaria drug resistance and immnoepidemiology of malaria. Her research work has contributed to policy formulation on malaria chemoprophylaxis and case management in Zimbabwe. She has coordinated various programmes that include Essential National Health Research and Malaria Research Training Programmes in Zimbabwe. This aspect of her job has helped to strengthen capacity, links and research collaboration between this institute, the provinces and the various research institutions in and out of Zimbabwe. Dr T Mduluza is one of her major collaborators at the University of Zimbabwe.
She is a member of:

1. Medical Laboratory and Clinical Scientists Council of Zimbabwe
2. Malaria Case Management Subcommittee of the Zimbabwe National Malaria Control Task Force
3. Zimbabwe National Malaria Technical Committee
4. Zimbabwe National Epidemic Prone Diseases Task Force
5. Member of the Afro-Immuno Assays
6. PABIN

4. Medical Research Unit at the Albert Schweitzer Hospital in Lambaréné, Gabon (MRUAS)

Senior scientist: Dr. Francine Ntoumi

Albert Schweitzer himself in Lambaréné founded the Albert Schweitzer Hospital in 1913. The hospital is administrated by the International Foundation for the Albert Schweitzer Hospital in accordance with the

local Ministry of Health. It consists of the departments; Internal Medicine, Surgery, Paediatrics, Obstetrics, Dentistry and a Research Unit. Presently, Prof. Peter G. Kremsner (Head of Department of Parasitology at the Medical Faculty, University of Tübingen) is the Head of the Research Unit in March 1992 and the focus of research is malaria.

Lambaréné is situated on the equator in a typical Central African rain forest area on the river Ogooué in Gabon. Average temperature is 27°C, and rains occur throughout the year with considerably less rain in July and August. The prevalence of *Plasmodial* infection shows a hyperendemic pattern in Lambaréné and surrounding areas. The predominant species is *Plasmodium falciparum*, responsible for more than 90% of all infections, together with some *P. malariae* and *P. ovale* infections, and the entomological inoculation rate averages 50 infectious bites per person per year. In the Research Unit every patient coming to the hospital with a clinical diagnosis of malaria (mostly fever) is seen totalling 12,000 patients a year, of which 5000 have confirmed malaria, and the vast majority being children. Out of these, about 150 have severe malaria, mostly severe malarial anaemia and hyperparasitemia. These patients are between 0.5 and 6 years old. The chemotherapy of choice for severe malaria is intravenous quinine plus clindamycin for four days, which was shown to be superior to seven days of treatment with quinine. There are three main topics of malaria research: Chemotherapy/chemoprophylaxis, pathophysiology and molecular epidemiology.

In chemotherapy, the combination chemotherapy was investigated in a series of clinical trials in different patient groups of adults and school children having uncomplicated malaria, and young children having severe malaria.

In pathophysiology, the impact of cytokine regulation on the development of the disease was investigated drawing special emphasis on the dual role of tumour necrosis factor and nitric oxide; both molecules seem to play pivotal roles in the initial anti-parasitic response and possibly also later in severe malaria. In an ongoing large prospective longitudinal trial, factors influencing the development of severe disease particularly severe anaemia and the re-infection rate are studied in more than 100 children with severe malaria and matched with mild controls. In this study a mutation in the promoter of the nitric oxide synthase 2 was first described and associated with protection against malaria. Additionally, the liver stage parasite antigen induced interferon-gamma production in cells of children also correlated with protection. Currently, the characterization of the innate immune response to P. falciparum *blood-stages in women (pregnant and non pregnant) living in endemic areas is being carried out. The*

involvement of Natural killer (NK) cells in the increase of susceptibility of women during pregnancy is being evaluated in addition to hormonal factors influencing the innate immunity in clinical malaria.

In Molecular epidemiology, the analysis of *P.falciparum* genes (DHFR, DHPS, PfCRT, PfMDR1) involved in the resistance to some anti-malarial drugs and also the analysis of the extent of MSP1 and MSP2 polymorphisms in field isolates have been investigated. The prevalence of these specific mutations on field isolates are being done by frequent screenings. The parasite genotypes of isolates from children presenting different clinical status (asymptomatic and symptomatic infections, severe cases) and haemoglobin phenotype (AA and AS) are also compared in a vast programme on the sickle cell trait carriage and malaria, which started in 1995.

Additional scientific staff

- Dr. Elie Mavoungou, senior scientist , PhD
- Dr. Saadou Issifou, MD, PhD
- Dr. Matsiegui Pierre Blaise, MD
- Dr. Bouyou-Akotet Marielle, MD
- Dr. Lekana-Douki Jean-Bernard, Post-doc, PhD
- Dr. Impouma Benido, MD, PhD student
- Miss Pembe Issamou Mayengue, PhD student
- Technician, hospitak staff

5. Institut Pasteur, Dakar (IPD)

Dakar, Senegal

Senior Scientists: Dr. Toure Balde Aissatou, Dr. Mohammed Ndiaye

IPD has for many years been involved in seroepidemiology studies, and has produced some of the most outstanding contributions in this field. The year long close follow up of the cohorts in the villages of Dielmo and Ndiop has enabled the institute to cast light on the various aspects of humoral immune response to malaria infection.

Dr. Toure Balde Aissatou is already involved in the immunological aspect of field studies carried out in Senegal (Dielmo, Ndiop), and is supervising the studies of 4 other scientists and technicians. Dr. Toure Balde has relevant experience in the techniques used in malaria research, having carried out a number of key experiments with parasite-derived antigens. She has described the induction of apoptosis by *P.*

falciparum in malaria patients and/or asymptomatic individuals and she demonstrated that this process of cell death could interfere with proliferative results.

6. State Serum Institute (SSI)
Copenhagen, Denmark
Senior Scientist: Dr. Michael Theisen

Statens Serum Institut is the Danish National Public Health Institute. The institute is by law charged with three areas of responsibility:

1. To serve as a national and international research and reference center for infectious diseases. SSI hosts ten WHO research and reference laboratories. The institute is a national and international postgraduate training center for specialization in all areas of microbiology and biotechnology.

2. To serve as a national and international center for survey of infectious diseases and congenital disorders. A research center for epidemiological studies, headed by two professors and employing 25 epidemiological scientists is hosted by the Institute.

3. To produce or purchase all vaccines needed for the population in Denmark, Greenland and the Faroe Islands, and to make available vaccines for export to the extent possible.

The institute has more than 250 academics employed and the total number of employees is around 1100 persons.

SSI produces all the antibacterial vaccines needed for national immunization programmes, and is a supplier to WHO/UNICEF's EPI programmes for approximately EURO 15 million annually. SSI produces some, but not all of the antiviral vaccines needed for the national immunization programme. The institute's production facilities have, besides national approval, obtained FDA/US approval.

Dr. Theisen has for the past ten years been involved in research on vaccines for human use against the following diseases: Tuberculosis, Lyme borreliosis, pneumonia and malaria. Malaria vaccine research has been carried out at SSI for the last 20 years. The sustained effort has led to an institutional capacity in malariology and more specifically in malaria vaccine research and development. The co-ordinator heads the Biotechnology and Infection Immunity Laboratory, which is GLP certified, and is the co-ordinator of an INCO-DC contract with partners from Asia, Africa, South America and Europe. The co-ordinator and his staff are well placed at an institute with an international scientific staff, top professional vaccine

production equipment and staff, and with access to advice from the institute's independent quality control unit. The co-ordinator can at all time draw at the institute's expertise. Currently working with the Department of Infectious Disease Immunology at Statens Serum Institut, (SSI) with staff of 47 including immunologists, molecular biologists and protein chemists, who conduct research in the following broad areas: TB, Malaria, Chlamydia, and novel adjuvant. The Department of Infectious Disease Immunology and the Institute in general has extensive experience in all aspects of vaccine research and development. Advanced molecular biology, genetic, and immunology techniques have been employed in comprehensive antigen discovery and validation programs within TB, malaria. This has resulted in the identification of key components of novel vaccines against these diseases. SSI has state of the art animal and laboratory facilities. The Institute has a regular vaccine production plant and a pilot plant for cGMP production of experimental vaccines as well as a full clinical trials and development department. As a result of many of these research activities, members of The Department of Infectious Disease Immunology have generated more than 200 scientific publications over the last 10 years. New vaccines and diagnostic kits based on these studies are now in human trials or already entering the clinic.

Dr. Michael Theisen, Ph.D, D.M.Sc has 20 years of experience in molecular and immunological research on bacterial and parasitic diseases, including malaria (over 40 publications). He is co-ordinator of a number of International Research Grants and he has had extensive experience in assembling and directing multi-disciplinary research teams. With the help of immune epidemiological studies, population genetic studies, animal model studies and in vitro assays he has identified a number of malaria vaccine candidate antigens from the erythrocytic stages of *Plasmodium falciparum*, the only stage of the parasite that is pathogenic in humans. Two of these antigens are now in Clinical trials (Phase I trials successfully completed in 2003). Further safety and efficacy studies will take place in Africa in 2006.

7. Muhimbili University College of Health Sciences Dar es Salaam Tanzania.
Institute of Public Health (MUCHS)
Senior Scientist: Dr. Gasarasi

The institute of public health of Muhimbili University College of Health Sciences will be the principal institution involved in the trial of the malaria vaccine in Tanzania. The institute of public health has a special link with the Bagamoyo district, through the BAGAMOYO TEACHING UNIT which was established to cater for Medical students community health rotations.

The Institute of Public Health was established on 1st July 1991 when the Muhimbili University College of Health Sciences (MUCHS) of the University of Dar es Salaam was formed. The Muhimbili University College of Health Sciences is made up of four faculties (i.e.Medicine, Dentistry, Pharmacy and Nursing) and three Institutes (Public Health, Development Studies and Traditional Medicine). The Institute of Public Health has four academic departments: Behavioural Sciences, Community Health, Epidemiology/Biostatistics and Parasitology/Medical Entomology.

The mission of the institute is to promote and maintain the health of the Tanzanian people, with the resources available through organized actions by the society. It intends to achieve this through an integrated spectrum of activities focussed on education of public health professionals, essential health research aimed at strengthening decision making and management of health systems; provision of technical services relevant to these educational and research functions and advocacy through information, education and communication with a view to empower communities to take care of their own health.

The institute works in full partnership with the Ministry of Health and collaborates with other national and international research and educational institutions and with NGOs as well as health-related agencies and foundations. Based on the Institutes mission the main functions of the Institute are teaching, research and service.

Teaching: The Institute runs post-graduate (MPH and M Med) as well as undergraduate programmes for other faculties. This academic year (2001/2002) the Institute started a BSc. Degree in Environmental Health Sciences.

The aim of the post-graduate training is to train public health specialists capable of providing leadership to District/Regional Health Management Teams in the management of public health services, and competent in working with communities in planning implementing and evaluating health intervention programmes. The undergraduate program aims to complement the training of physicians, dentists and nurses by equipping them with skills for conceptualizing sickness more adequately and for providing care to patients more successfully. In addition it is also to equip the health personnel who graduate from the undergraduate programmes of MUCHS with skills for organizing health promotion and disease prevention services in communities and for managing district health services.

Research: The aim is to carry out multi-disciplinary research on priority public health issues, to evaluate health interventions and health programmes and to disseminate the research findings and health information widely so as to influence policies.

Service: This component aims to provide professional advice and technical services on public health issues and to provide prompt advice and support in handling disasters and epidemics.

Resources Of The Institute:

The most important form of resource the Institute has is the scientific, technical and auxillary personnel. The distribution of the personnel in the constituent departments of the Institute is as follows.

Category of personnel	Beh/ science	Epi/ Biostat	Com. Hlth	Para/ Ento.	Off.Dir.	Total
Professor	-	-	-	2	-	2
Associate Prof.	3	1	1	1	-	5
Sen.Lecturer	1	2	-	-	-	4
Lecturer	-	3	5	1	-	9
Asst. Lecturer	-	2	2	2	-	6
Tutorial Assit.	-	-	-	-	-	-
Sub total						**26**
Technical/Adm	-	3	3	18	-	24
Secretary	1	1	-	-	1	3
Typist	1	1	3	1	1	7
Off. Attendant	1	2	4	2	1	10
Total	**7**	**15**	**18**	**27**	**3**	**70**

8. The Department of Parasitology, Biomedical Primate Research Centre (BPRC), Rijswijk, Netherlands

Senior Scientists: Alan W. Thomas, Ph.D, Chairman of the Section of Parasitology; Edmond J. Remarque, Ph.D, Immunologist/Epidemiologist

The Biomedical Primate Research Centre (BPRC) is an independent non-profit research foundation dedicated to the breeding and use of non-human primates as models to study, prevent and/or treat human diseases. The primary mission of the BPRC is to engage in basic and applied research in association with academia and industry, both on a national and international level.

The BPRC is structured in 4 sections, viz. Parasitology, Immunobiology, Virology and Animal Science. The main research lines within the department of Parasitology are:

- Vaccine research:
- Pre-clinical malaria and tuberculosis vaccine testing
- The development of vaccines against AMA-1, both *P. falciparum and P. vivax* according to cGMP standards.
- Genomic and Genetic research in malaria:
- Sequencing and transforming towards vaccines and drugs
- Pre-clinical drug evaluation

The parasitology department has developed a method to produce cGMP-grade AMA-1 (both *P. falciparum and P. vivax*) in a yeast expression system. Currently ,trials are underway to evaluate safety and immunogenicity of the cGMP-produced AMA-1 vacccine.

9. National Institute for Medical Research, Amani Centre, Tanzania

Senior scientists: Dr. Martha Lemnge, Dr. John Lusungu

Amani Medical Research Centre is one of the 2 large Centres of the National Institute for Medical Research (NIMR), which was founded in 1949, at Ubwari in Muheza, under the name East African Malaria Unit (EAMU). Following the collapse of the East African Community in 1977, the EAIMVBD was renamed Amani Medical Research Centre under NIMR. NIMR was established by an Act of Parliament in October 1979 and became operational in October 1980. NIMR is charged with the responsibility for carrying out, controlling, coordinating, registering, monitoring, evaluating and

promoting health research in Tanzania. The Centre is in the process of relocating most of its activities to Tanga town next to the new Amani Biomedical Research Laboratory (AMBRELA) next to Bombo regional hospital. The overall in charge of the Centre is the Director assisted by heads of stations and departments. The main laboratory units earmarked for strengthening in the next 3 years will be: Clinical pharmacology, Molecular biology, Immunology, Haematology, Clinical chemistry and Microbiology.The Centre has 18 scientific staff, 10 technical staff, 10 administrative personnel and over 100 other staff. Most of the scientists are at postgraduate level.

Most of the research is on malaria but the Centre deals with filariasis and HIV/AIDS and TB research also. Major ongoing research activities on malaria include: 1) monitoring antimalarial drug efficacy at sentinel sites and at community level funded by DANIDA and the NMCP; (2) Epidemiology of malaria at different altitudes (MoH/DANIDA); (3) Intermittent preventive malaria treatment in infants (BMGF); (4) Immuno-epidemiology involving community cohorts (DANIDA); (5) Biomedical backgrounds to drug failures in 2 villages with high level SP resistance in Muheza (DANIDA-ENRECA); (6) Hospital admissions for malaria. The Centre is preparing to implement a project aimed at preparing sites for malaria vaccine testing with AMANET support.

10. The Tropical Diseases Research Center, Lusaka, Zambia

Senior scientist: Violet Siachinji (Ms)

Historical Background:

The World Health Organization established the Tropical Diseases Research Center (fondly called the Centre) in 1975. In January 1981, the Centre became a national institute under the Zambian Government. The first stage of this transformation was a shift in emphasis from a WHO Regional Centre towards a national institution aiming at strengthening capacity for epidemiological research. The second phase of this transformation was to operationalise TDRC as a viable national and regional research and training Centre.

Management Structure:

The Centre operates under the provisions of the TDRC Act of 1982. There is a Board of Directors appointed by the Minister of Health which is the policy making body for the institution. The Director who is assisted by a Deputy Director and Board Secretary heads the management team, which is responsible for the day-to-day running of the Centre.

Research Activities:

In the period 1975 to 1981, the research activities of the Centre were tailored to the UNDP/World Bank/WHO Special Programme for Research and Training in Tropical Diseases. The major thrust was on epidemiology of malaria, trypanosomiasis and schistosomiasis. Since the Centre became a national institution, the research agenda has expanded to include research in micronutrient deficiency disorders, tuberculosis, HIV/AIDS and other sexually transmitted infections. The types of studies carried out in TDRC include epidemiology, entomology, and clinical trials of anti-malarial drugs, social science and the search for herbal remedies for malaria.

Staffing

The total staffing level at the institution, at the moment, stands at 74. Out of these, 34 are scientific and technical staff while the rest are administrative and auxiliary staff. There are three PhD scientists while three others are on Doctoral programs.

The TDRC Location and Infrastructure:

The Centre is housed on the topmost two floors of the Ndola Central Hospital, a tertiary care facility in the Copperbelt Province of Zambia. The 6th floor has Administrative Offices, the Public Health Department, the Fee Paying Clinic and a mosquito proof Clinical Trials Ward with 20 beds and 6 paediatric cots. The laboratories are situated on the 7th floor and are demarcated into eight units namely: Biochemistry, Haematology, Microbiology, Parasitology, Immunology, Nutrition and Vector Biology. The most recent addition is the cross cutting Molecular Biology unit which deals with the confirmation of mosquitoes species and their infectivity and the determination of drug resistant micro-organisms such as Plasmodium falciparum, Tuberculosis and the human immune virus using the state of the art equipment. The Center has telephone, facsimile, and Internet connections through local area network and a fleet of automobiles is available for research operations acquired mostly through project funding.

Mission:

To contribute to socio-economic development through targeted research leading to prevention and control of diseases

The Vision:

- The vision of TDRC is to be a center of excellence in the promotion of health through research and training in the Region.
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11. Malaria Research And Training Centre (MRTC), University Bamako, Mali

Brief description of the Unit.

The immunology lab has been set up in January 2001 with two different sections:

- Flow cytometry section with a Beckmann Coulter Epics XL four fluorescence sensor Flow activated cells sorter. With this cytometer moreover cells sorting we can make HLA serotyping, Cytometric Beads array (CBA) for cytokine measurement, proliferation assay using carboxyfluorescein diacetate succinimidyl ester (CSFE)
- Functional assays section with equipment to perform cell culture, ELISA, ELISPOT and proliferation assay using (CFSE).

The lab is equipped to maintain cold chain (Cold room at 2-8ºC, -20 & -70ºC freezer, liquid nitrogen storage tank and dry shippers) to preserve specimen from the field and in the lab. Others equipment include two incubators (Forma Scientific CO_2) for cells culture, Elisa Reader Versamax (340-850 nm) connected to computer with a software (Softmax Pro v 4) for reading ELISA plate and a plate washer (Ultrawash Plus Dynex)

The aim of the Unit is to describe humoral and cellular immunity level in different study population (sites) under natural condition; and to follow the level of theses population after malaria vaccine administration.

We are collaborating mainly with:

- Center for Vaccine Development (CVD), University of Maryland (Pr Marcelo Sztein / Christopher Plowe);
- Malaria vaccine development unity (MVDU/NIAID/NIH): Carole Long/ Louis Miller
- University of Stockholm: Marita Troye Blomberg

II. **Main Projects** (specific aims & project site)

1. **Co-infection malaria and schistosomiasis** (University of Maryland)

Specific aims: This study is comparing the immune responses in subjects with both malaria and schistosoma to subjects with only malaria. Cytokine profile and antibodies production will be determined.

Project site: Bandiagara.

2. **Severe Malaria Case-Control study** (University of Maryland)

Specific aims: **This study is focused on the immune responses in volunteers with mild or severe forms of malaria, as well as healthy controls, with the specific goal of identifying the immune responses to HLA-restricted peptides that correlate with protection from infection and/or disease. . Those techniques will also be use to measure immunogenicity in our future vaccine trials**

Project site: Bandiagara.

3. **Chloroquino-resistant parasite clearance study**:

Specific aims: This study is comparing the immune response in subjects who clear Chloroquino-resistant *P. falciparum* parasite to those who doesn't. CBA will be used to determine the cytokine production profile in each group.

Project site: Bandiagara (Sahelian area) and Kollé (Sudan Savannah area)

4. **Assessment of Biologic Parameters in Preparation for Future Malaria Vaccine Trials in Donéguébougou, Mali** (grant from NIH)

Specific aims: The overall goal of this study is to characterize the population of this site in terms of common hematologic and biochemistry parameters that may be used to determine eligibility for participation in vaccine trials, as well as in terms of preexisting medical conditions and immunity to potential malaria vaccine antigens, both of which might impact on the assessment of vaccine safety and efficacy.

Project site: Doneguebougou.

5. **Double blind randomized controlled Phase I trial to evaluate the safety and immunogenicity of WRAIR's MSP1 candidate malaria vaccine (FMP1) adjuvanted in GlaxoSmithKline Biological's AS02A vs. Rabies vaccine in semi-immune adults in Bandiagara, Mali** (University of Maryland / WRAIR / NIH)

Specific aims:

- To evaluate the safety and reactogenicity of WRAIR's MSP1 malaria vaccine (FMP1) adjuvanted in GlaxoSmithKline Biologicals' AS02A in malaria-experienced Malian adults aged 18-55 years inclusive

- To evaluate the humoral immune response of WRAIR's MSP1 malaria vaccine (FMP1) adjuvanted in GlaxoSmithKline Biologicals' AS02A in malaria-experienced Malian adults.

Project site: Bandiagara

6. **Susceptibility of malaria in different ethnic groups living in sympatry in Mali** (University of Roma , University of Stockholm)

Specific aims: Identify immunogenetic factors implicated in malaria

Project site: Manteourou, Koro.

III. Personnel/category

The personnel is composed of pharmacists (5), and resident (1)

- Dr Amagana Dolo, PharmD, PhD, Associate Professor of Parasitology, Faculty of Medicine and Pharmacy, Bamako.
- Dr Modibo Daou, PharmD
- Dr Issa Diarra, PharmD
- Dr Charles Arama, PharmD
- Dr Modibo Coulibaly, PharmD.
- Mlle Agnes Guindo, candidate PharmD