

Name: Biotechnology Unit,

University of Buea

*Aspiring to become An African Millennium
Institute of Molecular Biosciences*

Location: SW Province, R. of Cameroon,
Central Africa

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Presented by Prof. Vincent P.K. Titanji
(Head of the Unit)



Objectives of the Biotechnology Unit:

- To develop new tools for the control of major tropical diseases in our milieu eg malaria, onchocerciasis, tuberculosis etc;
- To train M.Sc/PhD students in the Molecular Biosciences;
- To organize workshops and courses in Molecular Biology Techniques for African researchers;
- To provide diagnostic and consultancy services to the community.



Description of Institution:

- University of Buea: an English –Speaking institution
- founded in 1993 as one of six state universities in Cameroon.
- University of Buea has 5 faculties for: Arts, Education, Health Sciences, Science, Social&Management sciences and a School of Interpreters and Translators.




Description (continued)

- UB currently has 8900 students, 230 academic staff, & 300 support staff with an Annual budget of 5-6 million USD,
- The Biotechnology Unit is a common facility that serves the Faculties of Science and Health Sciences and other research institutes in the region.



Current Research themes pursued in the Biotechnology unit

- molecular diagnosis and epidemiology of malaria, onchocerciasis, rickettsia and tuberculosis;
 - identification and characterization of vaccine relevant antigens for malaria and onchocerciasis;
 - identification of drug leads against malaria, river blindness and bacterial diseases from Cameroonian medicinal plants
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- ***Current Research themes pursued in the Biotechnology unit***
- -Drug target identification and validation using reverse genetics with the C.elegans model.



Available Resources and Competencies

Human resources:

The current staff and students of the Unit include:

- 1 Professor (head of unit and current speaker)
- 2 Associate Professors
- 8 Ph.D.'s (lecturers or assistant lecturers)
- 6 Ph.D. Students
- 7 MSc Students
- 2 Technologists/Technicians



Competencies available

- Protein and Nucleic acid separation***
- Recombinant DNA techniques including PCR and protein expression in E .Coli and yeast;***
- Monoclonal antibody technology ;***



Competencies available

- immunochemistry including ELISPOT
 - a wide range of biochemical techniques
 - cell, bacterial and parasite cultures;
- Bioassays for anti filarial and anti malaria products
- Bioinformatics;
- ethno-botanical and field surveys.



Competencies available

***Good Laboratory Practices (GLP) training
capability***

Anti-malaria drug Clinical Trial capacity



Laboratory Facilities:

- Unit currently consists of one main and four affiliated research laboratories .
- One recently constructed animal house where mice and rabbits are bred
- The main lab large enough to accommodate 8-10 researchers at the same time.



Laboratory Facilities (continued):

- Established field research stations for malaria and onchocerciasis in Bolifamba and Fingui
- Links with the Public Hospitals of Buea, Tikp and Limbe
- Internet Connection through the University Computer Center.



Laboratory Facilities (continued):

- Plans to have permanent Internet connections
- At the University or out of campus, an hour of browsing costs approximately 50 cents (USD)



Major Pieces of Equipment include:

- 1 ELISPOT reader, AID Diagnostics, purchased 2005
- 2 CO₂ incubators, Heracell (Kendro, 2005) / LMS (1997)
- 1 Refrigerated incubator, Fisher, 2004
- 2 Incubator shakers, New Brunswick Scientific, one 1997 and the other in 2004
- 3 Bacteriologic incubators, Heraeus, 1997
- 1 Hybridisation incubator, Fisher, 2004



Major Pieces of Equipment (continued)

- 1 dissecting microscope, digital, Motic, 2004
- 1 Inverted microscope, Euromex, 1997
- 1 normal microscope, Olympus, 1997
- 1 Fluorescence microscope, Leitz, used, a donation (yet to be set-up)
- 2 pH /conductivity meters, Fisher, 2004
- 3 thermocyclers.....



Some results obtained by scientists in the Biotechnology Unit and their collaborators

- Development of a Mab based test for Bovine Onchocerciasis (Cho-Ngwa, V, Titanji & Gronvik)
- Development of hybrid recombinant antigen for serodiagnosis of Onchocerciasis (P.Nche, T.Pogonka, V, Titanji & R.Lucius)
- Molecular cloning characterization of four O,volvulus antigens for vaccine development ... (V. Titanji, A, Sakwe, S, Ghogomu, A.Nebu & AA Ngwa).....

Some results obtained by scientists in the Biotechnology Unit and their collaborators

- Description of new *M.tuberculosis* genotypes and a PCR for diagnosis of tuberculosis (V.Penlap, JP Tedom &V.Titanji)
- Identification of a hypothetical malaria protein UB5 as a potential marker of protective immunity
- Description of the allelopathic properties of *Nelsonia canensis* and its potential as cover crop for banana plantations (T, Fongod and Dfocho).
- Isolation of ethanol resistant yeast for wine production from local fruits and petroleum degrading bacteria for clean-up of oil spills(R.Ndip Akoachere, Nkwelang and Levai).....



Financial Resources

We gratefully acknowledge with thanks grants received from:

- The International Programme in the Chemical Sciences, Uppsala, Sweden
- The Volkswagen Foundation, Germany,
- The European Union
- The United States Agency for International development
- The International Atomic Energy Agency



Financial Resources

- The United Nations Environmental Programme

The World Health Organization through the
UNDP/UNESCO./World Bank/TDR Programme

- The University of Buea

- The University of Yaounde 1



Collaborating Laboratories

The Biomedical Center Uppsala, Sweden (Profs Zetterqvist, Lars Rask and KO Gronvik)

The Department of Immunology, Stockholm University (Profs Klavs Berzins and Marita Traoye –Blomberg)

The University of Lund Chemical center (Pr Anders Lilijas and Pr Salam Al-Karadaghu)

The Humboldt Berlin University (Prof Richard Lucius)

University of Nottingham(prof Jan Bradley)

University of Cape Town (Prof Iqbal Parker)

ILRI Nairobi (Dr.Pelle Roger)



Collaborating laboratories continued

- Georgetown University, Washington,USA (Prof DW Taylor)
- New England Biolabs, Beverly,USA (Dr Francine Perler)
- University of Texas Medical Center Prof DH Walker)
- Department of Organic Chemistry University of Dschang (prof Perre Tane)
- The Biotechnology Center Nkolbisson, Yaounde (Prof Rose Leke, Prof Wilfred Mbacham and Dr Veronique Penlap)



- **Perpectives of a Partnership with the Global Science Corps.**
 - **Recently a number of authoritative organizations such as the Inter Academy Council, the International Council for Science, The New Partnership for Africa's Development (NEPAD), The Science Initiative Group ,Tony Blair's Commission for Africa have argued forcefully in favour of a determining role for S&T the development of Africa.**
 - **The Global Science Corps as proposed by Prof Varmus has the possibility of being a leading vehicle in the achievement of this goal-namely to put S&T into the Service of the developing world for its own self-improvement.**
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- **We see collaboration with the Global science Corps first of all as a partnership that can be mutually beneficial to both parties. It is essential to base this partnerships on complementarities, rather than a vertical donor /recipient model.**



- **For this objective to succeed we need the collaboration of both the scientists of the developed and those in the developing countries, the support of political authorities, a careful definition of the specific objectives and above all the material resources**



The objectives must be such that if realized they could impact the lives of the African population for the better at least in the medium term.(I know that this is a tall order for for scientists who are engaged in basic research. They do not like deadlines and there is even a feeling that applied research is somewhat inferior to basic research.I personally feel the two are inseparable.) African authorities are becoming impatient with the unfulfilled promises ,



It is therefore suggested that the first flagship projects of the GSC be in those areas that Africans themselves have identified as priorities. NEPAD has made a list of such areas and the ICSU Regional Office for Africa has also done something in that area. Without being experts we know that disease, hunger, energy shortage, natural and man-made disasters are among some of the challenges facing Africa today. What can the Global Science Corps do about these these challenges?

-Building a culture of Science is necessarily a long complicated process because it involves a change attitudes and beliefs apart from the acquisition of skills. For this we need good African Scientists to stay and work in Africa, The brain-drain has to be countered and converted into a brain gain. The

The GSC fellow from the north would benefit from:

- The local expertise especially in field work
- Have access to unique resources: Samples and patients, medicinal plants and other natural products of tropical rain forest and savannah
- Research on tropical diseases;
- Experience a new cultural environment etc



*Thank you for your
kind attention*

