

CODE: **CAM:01 2008**

INSTITUTE: Biotechnology Unit, Dept of Life Sciences, Univ of Buea
Box 63, BUEA, Cameroon

RESEARCH GROUP: **Applications of molecular biology techniques to tropical diseases**

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Staff			Students			
Academic PhD	Academic Other	Tech-nicians	Sandwich PhD	Local PhD	Sandwich MSc/MPhil	Local MSc/MPhil
9	9	1	3	7		6

Awarded degrees	87/02		2003		2004		2005		2006		2007		2008	
S=Sandwich; L=Local	S	L	S	L	S	L	S	L	S	L	S	L	S	L
PhD	1	3			2	3	1		1			2		1
MSc/MPhil/Licentiate	10	19	7					3		4		4		2

Publications	87/02	2003	2004	2005	2006	2007	2008
International journals	31	4	1	4	2	1	
National journals	11	4		2			
Conference reports	44	10	4				

Arrangement of work-shops/symposia/conf.	11	3	1	3	1	1	1
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Visits by IPICS staff/ Swedish scientists	7/10						/2
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No. of participants trained in IPICS prog.	Sweden or other country in Europe	Regional laboratory
Until December 2008	19	3

IPICS funding (total for the specified period)	Period of funding	Fellowship months (total no.)	Training costs (k-SEK)	Other Costs (k-SEK)	Total (k-SEK)
	1987-2008	151	2422	4395	6818

Cooperation initiated	1987
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SUMMARY OF THE RESEARCH GROUP CAM:01

The overall objective of the project is to investigate the molecular basis of host-parasite interplay in tropical parasitic infections with a view to developing new and more efficient control measures. Currently, *Onchocerca volvulus*, the causative agent of "river blindness", is the main focus of studies in our laboratory. A sub-group within our laboratory seeks to develop molecular probes for the diagnosis of drug-resistant malaria and tuberculosis both of which are endemic in our region.

Onchocerciasis, or river blindness, is caused by the parasitic nematode *Onchocerca volvulus*. It affects about 17 million people world-wide with a further 85 million at risk (W.H.O. 1988). Onchocerciasis is endemic in Cameroon where an estimated 10% of the population are affected. Manifesting itself as a severe skin disease, onchocerciasis may lead to the formation of disfiguring nodules, lymphangitis, kidney disease and blindness. In fact *O. volvulus* is one of leading causes of blindness.

To date adequate control measures are still lacking: there is no preventive vaccine to the disease. Chemotherapy with the drug ivermectin has improved the management of the disease considerably. However, since ivermectin apparently does not kill adult worms the latter are able to resume production once treatment has ended. Thus it would be necessary to administer ivermectin for periods corresponding to the life-span of adult *O. volvulus* which is about 10 years. This is bound to cause problems, both of compliance and perhaps drug resistance. It is therefore necessary to develop, in addition to ivermectin, safe vaccines and macrofilaricides that could prevent infections and eliminate adult worms as well. Clearly the wide application of any drug implies the availability of a sensitive diagnostic test to identify patients and monitor treatment. Current methods based on parasite detection in skin biopsies are insensitive and subject to sampling errors. The development of diagnostic methods and a preventive vaccine are priorities of onchocerciasis research.

The objectives of the present study are:

- to generate large quantities of recombinant antigens of *O. volvulus* for immunopathologic studies and vaccine development;
- to develop and evaluate tests for active onchocerciasis;
- to search for new drug targets in *O. volvulus*
- to investigate the epidemiology of drug resistant malaria, and immune responses to candidate malaria vaccines

To achieve these objectives we have established linkages for the training of our researchers at the Biomedical Centre, Uppsala, Sweden; The Universities of Lund and Stockholm, Sweden; The University of Salford, UK, and the Humboldt Berlin University, FRG.

Keywords: Onchocerciasis, *Onchocerca volvulus*, diagnosis, monoclonal antibodies, recombinant, antigens, vaccines, malaria, tuberculosis, gene probes

Training, research visits:

Year	Participant (months)	Research host	Research field
88/89	Vincent Titanji (1)	Ö Zetterqvist, BMC, UU	Parasite biochem
88/89	John Muluh Payne (8)	Ö Zetterqvist, BMC, UU	Parasite biochem
89/90	Barthelemy Nyasse (9)	U Ragnarsson, BMC, UU	Peptide syntheses
90/91	Marie S Evehe (5)	S Townson, Int Inst in Parasitology, UK	Screening/filari- cidal activity
90/91	Amos Sakwe (3)	L Rask, SLU	Sequencing
91/92	Amos Sakwe (3)	L Rask, SLU	Sequencing
91/92	Nwana Gwanjegana (5)	S Townson, Int Inst in Parasitology, UK	Screening/filari- cidal activity
93/94	John Muluh Payne (7)	Ö Zetterqvist, BMC, UU	Parasite biochem
93/94	Nde Pius Nche (6)	R Lucius, Hohenheim Univ, Stuttgart, Germany	Molecular biol/ parasites
94/95	John Muluh Payne (6)	Dan Larhammar/ Ö Zetterqvist, BMC, UU	Receptors/serotonin
95/96	Amos Sakwe (7)	L Rask, SLU	Sequencing
95/96	Marie S Evehe (5)	K-O Grönvik, SVA	Monoclonal antibodies
97	Jacob Soupgui (5)	R Lucius, Humboldt Univ., Berlin, Germany	Molecular biology/ onchoceerciasis
97	Stephen Ghogomo (3)	R Pelle, ILRI, Nairobi	Molecular biology/ onchoceerciasis
98	John Muluh Payne (3)	Dan Larhammar, BMC, UU	Molecular biology/ tropical diseases
98	Michael N. Fodje (8)	A Liljas, Molecular Biophys. Univ. of Lund	Structural biology/ tropical diseases
98	Jacob Soupgui (3)	R Lucius, Humboldt Univ., Berlin, Germany	Molecular biology/ tropical diseases
99/00	Alfred Ngwa (6)	J Bradley, Homboldt Univ. Berlin, Germany	Molecular biology/ tropical diseases
00/00	Babila Tachu (7)	R. Lucius, Homboldt Univ. Berlin, Germany	Molecular biology/ tropical diseases
00/01	Fidelis Ngwa (7)	K-O Grönvik, SVA	Monoclonal antibodies
00/01	Agnes Lyonga (5)	Ö. Zetterqvist, BMC, UU	Parasite biochem
00/01	Gawa Bidla (10)	K. Berzins, Dept of Immu- nology, Stockholm Univ	Immunology
01	Stephen Ghogomo (3)	A Liljas, Molecular Biophys. Univ. of Lund	Structural biology/ tropical diseases
02	Fidelis Ngwa (3)	K-O Grönvik, SVA	Molecular biology/ tropical diseases
02	Alfred Ngwa (6)	J Bradley, Nottingham Univ. UK	Molecular biology/ tropical diseases
03	Moses Ngemenya (2)	K Berzins, Dept of Immu-	Molecular Biology/

04	Moses Ngemenya (3)	nology, Stockholm Univ K Berzins, Dept of Immunology, Stockholm Univ	tropical diseases Molecular Biology/ tropical diseases
04	Michael Songmbe (2)	D Kwiatkowski Welcome Trust Centre for Human Genetics, Oxford, UK	Molecular Biology/ tropical diseases
04/05	Alfred Ngwa (2)	S Al-Kharadaghi LU. Sweden	Molecular biology/ tropical diseases
05	Verinique Penlap Beng (1)	T Victor Stellenbosch, SA	Molecular biology/ tropical diseases
05	Irene Anyangwe (1)	T Victor Stellenbosch, SA	Molecular biology/ tropical diseases
05/06	Alfred Ngwa (1)	S Al-Kharadaghi LU. Sweden	Molecular biology/ tropical diseases
06	Anong Nota (2)	K Berzins, Dept of Immunology, Stockholm Univ	Molecular Biology/ tropical diseases
07/08	Mbandi Stanley (2)	K Berzins, Dept of Immunology, Stockholm Univ	Molecular Biology/ tropical diseases

Other visits to Sweden:

V Titanji 1990, 1991, 1993, 1994, 1995, 1997, 1998, 2001, 2004, 2005, 2006

Visits by IPICS staff/reference group:

R-M Bålöv 1989
R Liminga 1990, 1995
M Åkerblom 1999, 2001, 2002
L Sjöblom 2001
L-I Elding 2002

Visits by Swedish scientists involved in the cooperation:

Ö Zetterqvist 1988, 1992 Lectures, Planning of coop.
S Townson 1992 External examiner
L Rask 1993 External examiner
A Liljas 1998 Lectures, Planning of cooperation
A Liljas 2001 Lectures, Workshop
Salam Al Karadashi 2001 Lectures, Workshop
A Liljas 2008 Lectures
P Blanchart 2008 *

Funding: (k-SEK)

Years	Training/ Exchange	Other project costs (equipment etc.)	Total
1988/89	100	61	161
1989/90	120	95	215
1990/91	124	87	211

1991/92	106	247	353
1992/93	53	174	227
1993/94	180	123	303
1994/95	103	89	192
1995/96 (18 months)	252	218	470
1997	161	131	292
1998	145	127	272
1999	152	95	246
2000	293	138	431
2001	202	285	488
2002	194	295	490
2003	49	236	285
2004	36	392	428
2005	37	841	878
2006	43	316	359
2007	17	134	151
2008	55	311	366
Total	2422	4395	6818

Financial support from other sources:

- 1) International Foundation for Science (IFS): Vincent Titanji; 1987/88 grant F/884-4 2) University of Yaoundé
- 3) USAID 1988/1991; 1992/94; 1995/97
- 4) EU project 1996-1998
- 5) Volkswagen Foundation, 1995
- 6) IAEA, 1995
- 7) Wennergren Foundation, 2001
- 8) TWAS, 2001
- 9) IFS, 2002