

www.bni-hamburg.de

Bernhard Nocht Institute



**Cooperative research and technology transfer activities**  
at the Bernhard Nocht Institute  
for Tropical Medicine  
Hamburg, Germany

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OIBC-MIHR workshop March 2007

Bernhard Nocht Institute

## MISSION STATEMENT

As the Center for Research in Tropical Medicine in Germany the Bernhard Nocht Institute is dedicated to **research, training and patient care** in the area of human infectious diseases which are of particular relevance in the tropics.

It is the primary mission of the BNI **to develop means to for the control of these diseases.**

Secondary missions are to **provide expertise** for regional and national authorities and to **directly and indirectly improve the health care** for national and regional citizens in regard to diseases of the tropics.

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Overview

Bernhard Nocht Institute

## BERNHARD NOCHT INSTITUTE FOR TROPICAL MEDICINE

Hamburg, Germany

<p><b>Parasitology Section</b></p> <p>Molecular characterization of tropical pathogens for the identification of drug targets</p> <ul style="list-style-type: none"> <li>-Malaria</li> <li>-Amoebiasis</li> <li>-Leishmaniasis</li> </ul>	<p><b>Medical Microbiology Section</b></p> <p>Interface pathogen - host, animal models of infection</p> <ul style="list-style-type: none"> <li>-Malaria</li> <li>-Tropical viruses</li> <li>-Leishmaniasis</li> </ul>	<p><b>Tropical Medicine Section</b></p> <p>Patient-oriented research, pathology, infection epidemiology</p> <ul style="list-style-type: none"> <li>-Malaria</li> <li>-Tuberculosis</li> <li>-HIV/AIDS</li> </ul>
National Reference Centre for Diagnostics of Tropical Infections		
Biosafety level 3+4 laboratories, BSL3 insectary		
Repository of pathogen strains, serum collections and animal models		
State-of-the-art facilities for scientific services		
Kumasi Centre for Collaborative Research in Tropical Medicine (Ghana)		
Cooperating Partner: Bernhard Nocht Clinic for Tropical Medicine University Medical Centre Hamburg Eppendorf		

INFRASTRUCTURE

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## SIZE & OUTPUT 2006

Staff	260
Staff scientists	50
from basic funding	30
Basic funding	9.5 Mio. €
Grants	3.1 Mio. €
Publications	99
Theses	33




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## TRANSFER OF RESULTS

- Licenses  
diagnostic tests, monoclonal antibodies
- Legal support: Ascension GmbH  
IP Asset Management Company  
Project funded by Federal Ministry of Science and Technology
- Interest in alternative TT models  
for neglected diseases




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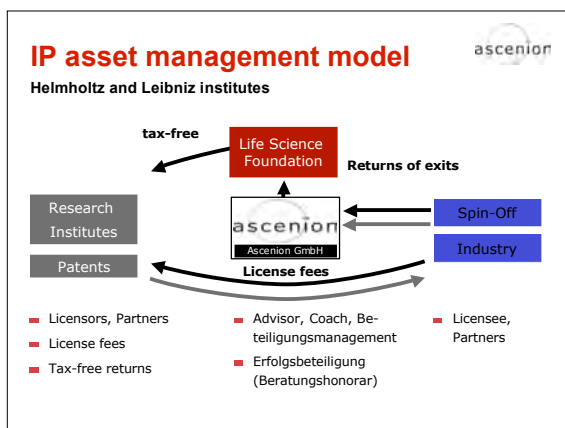
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**Ascenion:**  
Partner of 13 Helmholtz and Leibniz institutes

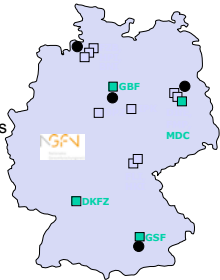
ascenion

in total:

- 5.250 staff
- €440 Mio. p.a. Budget
- 500 Patent families  
cancer research, heart diseases, infectious diseases
- Reservoir of know-how and materials (antibodies, mouse models)

Services:

- Assessment of inventions
- Patenting and TT strategy
- Training of staff
- ....etc




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OIBC-MIHR workshop March 2007      Drosten et al. N Engl J Med 348(20): 1967-76

**2003: SARS CoV Test**

news feature  
First past the post



- March 25th, virus identified at BNI
- March 28th, PCR protocol published on website
- Positive materials sent to 400 institutions worldwide
- April 16th, test kit available from BNI spin-off company artus (now Qiagen)

World Science: Christian Drosten became the midnight oil to be the first to produce a rapid test for SARS.

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OIBC workshop March 2007

**RESEARCH COOPERATIONS**

contractual partnerships<sup>en</sup>  
with 60 institutions in 29 countries




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OIBC-MIHR workshop March 2007    Blessmann J, Tannich E. N Engl J Med. 2002;347:1384

## VIETNAM

### Hué Medical College

**Institutional cooperation since 1998**

- permanent laboratory established
- Staff exchange

**Amoebiasis (*E. histolytica*)**

- 4-year study on epidemiology and treatment
- Paromomycin first-line agent for treatment of carriers
- ALA puncturing not necessary

**Dengue fever**

- Hospital-based diagnostic study




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OIBC-MIHR workshop March 2007    Drosten et al (2006), Clin Chem 52:7, 1258-66

## BRAZIL, South Africa, India, Germany

**HIV viral load monitoring**

- Evaluation of ultrasensitive low-cost HIV RT-PCR
- high specificity for tropical HIV strains
- 1186 samples from patients in national treatment programme of Brazil
- analyzed in a 4-week training session at BNI
- to be developed into kit by start-up company in Salvador, Brazil

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## Kumasi Centre for Collaborative Research in Tropical Medicine




A joint venture between the  
 Kwame Nkrumah University of Science and Technology, Kumasi, Ghana,  
 the Ministry of Health, Ghana, and BNI

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## KCCR Activities

Aims:

- to establish a sustainable research platform in West Africa for Tropical Medicine, open to the national and international scientific community
- to provide capacity building in biomedical research for African and European physicians, postdocs, postgraduates, students, and lab technicians

Features

- Long-term commitment in the frame of a State Agreement between Republic of Ghana and City State of Hamburg (20 years)
- established 1997 in rooms of the local university
- 2003: move into purpose-built premises on the university campus
- infrastructure for clinical trials, scientific workshops and seminars
- tandem project teams: Ghanaian co-principal investigators mandatory

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## Local partners (I)

### Kwame Nkrumah University of Science and Technology (KNUST)



**College of Agriculture and Natural Resources**  
 Faculties: Agriculture, Renewable Natural Resources, Forest Resource Technology  
 Research Centres: BIRD, CSUD, Dairy/Beef Research Station

**College of Architecture and Planning**  
 Faculties: Architecture and Building Technology, Planning and Land Economy  
 Research Centres: Centre for Human Studies, Centre for Land Studies

**College of Art and Social Sciences**  
 Faculties: Fine Art, Industrial Art, Law, Social Science, Business School  
 Research Centres: Centre for Cultural and African Studies

**College of Engineering**  
 Faculties: Civil and Geomatic, Chemical and Materials, Electrical and Computer, Mechanical and Agricultural  
 Research Centres: Centre for Energy Research and Development, Technology Consultancy Centre

**College of Health Sciences**  
 Faculties: Allied Health Sciences, School of Medical Sciences, Pharmacy and Pharmaceutical Sciences  
 Research Centre: Kumasi Centre for Collaborative Research into Tropical Medicine

**College of Science**  
 Faculties: Biosciences, Distance Learning, Physical Sciences  
 Research Centre: National Centre for Mathematical Sciences

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## Local partners (II)

- Komfo Anokye Teaching Hospital, Kumasi (KATH)
- Presbyterian Health Services, Agogo (PHS)
- Dunkwa District Hospital
- Korle-Bu Teaching Hospital, Accra
- International Water Management Institute, Kumasi (IWMI)
- Health Research Unit, Ministry of Health, Accra (HRU)

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## Infrastructure



Main building  
Cafeteria  
Workshop  
Guesthouse with eight appartements

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## Main building



Administration  
Conference room  
Computer room, internet

Laboratories  
Stores  
Scientists offices

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## Laboratories



Thermal cyclers  
Electrophoresis units  
Flow cytometry

ELISA reader  
Laminar flow hoods  
Incubators

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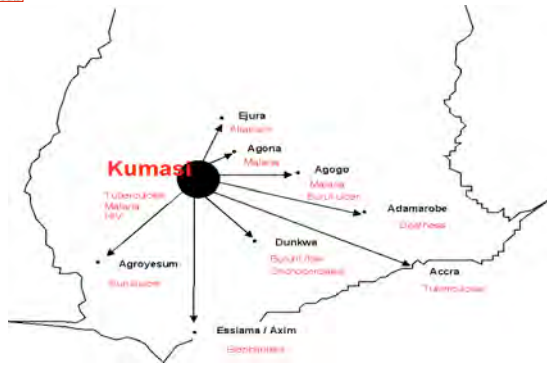
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## Projects and sites




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### Site lab in Agogo: Routine diagnostic procedures and methods

- ZN stain for TB and Buruli ulcer
- native stool diagnostics (intestinal parasites)
- malaria slide reading  
permanent training of staff
- Hepatitis B, C, Syphilis, HIV (Elisa)
- Hematology (Sysmex hematology analyzer)
- Biochemistry (smart lab biochemistry analyzer)
- PCR (div)
- CD 4 counts

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**Buruli ulcer:  
multidisciplinary research  
for improvement of control in Africa  
(BURULICO)**



"The overall objective is the improvement of BU control in Africa. This will be achieved by i) acquiring new knowledge about reservoirs, transmission, diagnostics, treatment and psycho-social attitudes and ii) application of this knowledge in order to optimize regional control programmes."

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**BURULICO**  
**Impact in terms of technology transfer**

- Local reference laboratory for diagnostics (KCCR)
- Quality assurance of diagnostic specimens  
logistics for collection and transport
- Training of community-based volunteers  
early case detection
- Development of standardized procedures  
treatment with both drugs and surgery  
in local treatment centres




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**Malaria vaccine study**



KCCR/KNUST: one of eight African study centres  
assessing the immunological impact and safety of the  
malaria vaccine candidate RTS,S.

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### Malaria vaccine study - Impact in terms of technology transfer

- Advanced medical training in pediatrics at PHS Agogo
- GCP procedures
- Construction of microbiology laboratory unit at PHS Agogo



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### “Advanced diagnosis of neglected diseases in African children”

Evans et al. (2004) Q J Med 97:591-597



Aim: To determine the cause of illness in children presenting with suspected severe malaria.

Background: Early recognition of children at highest risk of dying and the targeting of appropriate drug therapy are vital to the improvement of paediatric care in developing countries. This will rely upon the development of simple clinically based algorithms and treatment guidelines.

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### Project on neglected diseases impact in terms of technology transfer

- Real-time PCR protocols (GLP) bacteraemia, stool parasitology, viral respiratory infections
- Standard operation procedures for clinical diagnostics (IMCI)
- Training on the job technicians, nurses, doctors



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**EUTRICOD**

Upgrading of KCCR virology laboratory for BSL3 work



Operational goal:  
Establish a BSL 3 facility in West Africa

European Centre for Training and Research on Imported and Highly Contagious Diseases  
Construction of new infrastructure project funded in the 6th Framework programme of the EC

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**Training · Exchange**



Incorporation of scientists in PhD and Masters Programmes  
Sandwich PhD programmes with German institutions  
Training-on-the-job and courses for students, postgraduates and technicians at KCCR

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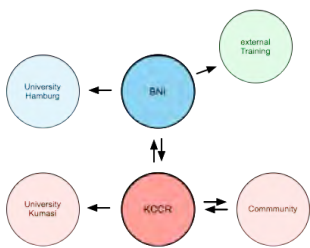
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**RELATIONS BETWEEN PARTNERS**



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    graph TD
      BNI((BNI)) --> UH((University Hamburg))
      BNI --> ET((external Training))
      BNI <--> KCCR((KCCR))
      KCCR --> UK((University Kumasi))
      KCCR <--> COM((Community))
  
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**Qualification**

**2004/2005**

- 9 Master students
- 3 doctoral students  
in German/Ghanaian sandwich programmes
- 19 peer-reviewed collaborative publications




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**Training**

- Molecular biology courses at KCCR for KNUST students and laboratory technicians laboratory manager supported by CIM
- Lectures and workshops of BNI scientists at KNUST
- Senior Expert support for students in Entomology




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**Financial sources · Funding**

- BNITM (Bernhard Nocht Institute for Tropical Medicine, Hamburg)
- BMBF (German Ministry for Research and Education)
- CIM (Centre for International Migration & Health)
- Nationales Genomforschungsnetz
- DAAD (German Academic Exchange Service)
- EC (European Community)
- SES (Senior Expert Service)
- Volkswagen-Foundation
- WHO (World Health Organization)
- IWMI (International Water Management Institute)
- Aktion Medeor




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