

1 Preamble

BNI is a government department and belongs to the Hamburg Ministry of Science and Health.

It was founded in 1900 to perform scientific and clinical tropical medicine and train physicians. BNI has developed into a national reference centre for tropical and other exotic infectious diseases.

The German federal government and the federal states fund the research activities of BNI jointly. BNI is a member of the Leibniz association, which unites 84 scientific institutes of national importance.

In 2004 a first programme budget was introduced using a provisional cost and activity accounting. The further development is dependent on the long planned establishment of the BNI as an independent institution in 2007 or 2008 and the subsequent switch from the cameralistic SAP/R3 accounting system to MACH1. During the transition period, then, required cost and activity accounting is not fully operational, due to requirements of cameralistic accounting. However in 2005, a more detailed accounting of programme costs was already achieved using SAP/R3.

The programme areas were defined as output-oriented cost centres:

- scientific activities of the Parasitology section,
- scientific activities of the medical microbiology section,
- scientific activities of the tropical medicine section,
- the cooperative research centre of BNI in Ghana
- scientific services
- infrastructure (construction activities)

2 Mission and aims of BNI

As the Centre for Research in Tropical Medicine in Germany the Bernhard Nocht Institute is dedicated to research, training and medical 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. Research at the BNI is devoted to the characterization of host-pathogen-interactions in tropical infectious diseases. The research activities of the BNI will concentrate in the mid term on three areas:

1. Cellular and molecular biology of infectious agents that cause tropical diseases (*programme area parasitology*),
2. Host response to such agents and its role in protection and pathology (*programme area medical microbiology*),
3. Disease oriented approach to pathogenesis and pathology (*programme area tropical medicine*)

In all these ventures special emphasis shall be put on two issues:

- Relevance for disease prevention and control
- Use of tropical infections as models for general issues in medicine and biology

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.

In 2005 BNI and the medical service of the German armed forces agreed on a cooperation. The aim is to train medical staff for humanitarian missions in tropical countries. A tropical medicine department of the medical service will be associated to the BNI. Also in 2005, a framework contract was agreed between BNI and the United Nations mission in Sierra Leone for diagnostic services, esp. Lassa fever.

BNI is the National Reference Centre for diagnostics of tropical pathogens, the national reference laboratory for SARS and a WHO collaborating centre for arbovirus and hemorrhagic fever reference and research. In 2004 the Greek government appointed BNI as a diagnostic reference laboratory for the Olympic Games in Athens. The Department of virology cooperates a diagnostic network of BSL 4 laboratories in Europe.

It is the aim of BNI to perform competitive and innovative research in its fields of expertise and to transfer results to the scientific community, industrial economy and public health.

Consequently BNI aims to

- Optimize the research infrastructure available at BNI and
- Create a working environment attractive for talented scientists and physicians
- Intensify activities in international and national networks.

An international scientific advisory board secures by annual peer assessment the scientific quality and up-to-dateness of the work.

3 Structure

Head of the BNI is a scientific director. The director and his two representatives are C4 professors for tropical medicine at the University of Hamburg. A managing director for financial matters, a head of administration and a scientific coordinator support the management. External panels are the board of trustees and the scientific advisory board.

An internal panel is the institute conference, where group leaders are represented to confer on scientific matters.

The 13 groups and departments are organised in three thematic sections according to the three main areas of research:

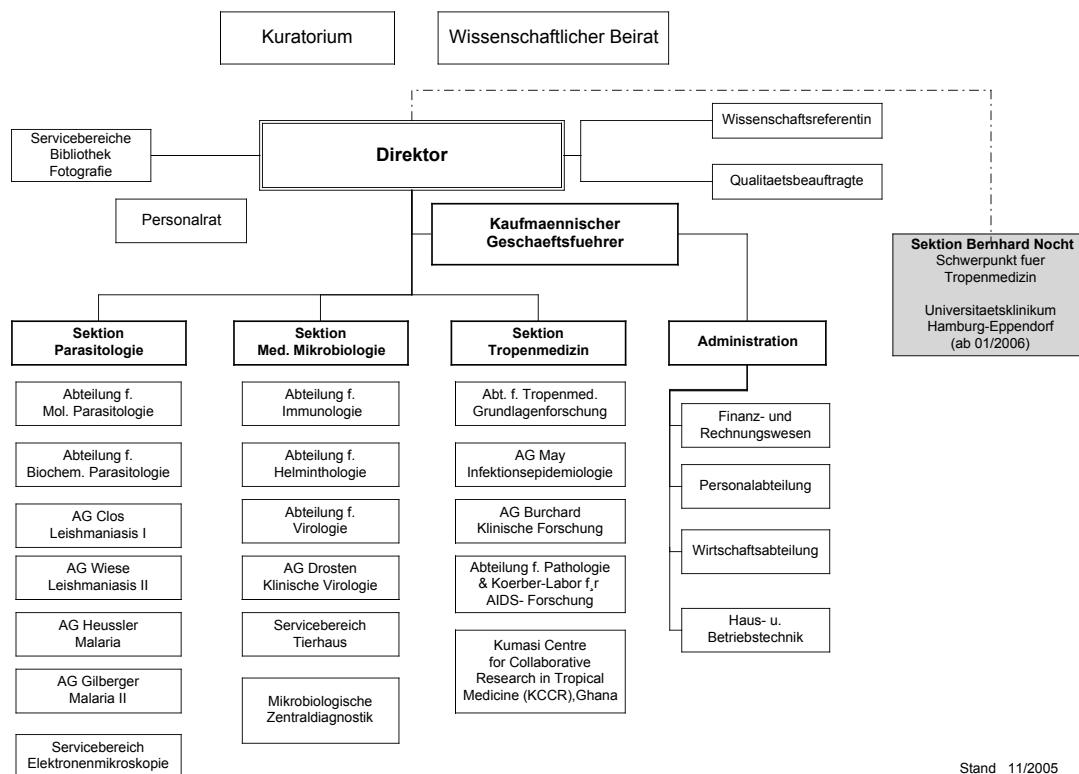
- Parasitology section
- Medical microbiology section
- Tropical medicine section

Departments and research groups are independent in their scientific work. Sections are represented by speakers. The speakers are the three C4 professors (directors). Scientific service units are integrated in the sections.

Departments perform diagnostics for specific tropical pathogens according to their field of research. Diagnostic activities are combined in a Central Diagnostic Unit.

Since 1997 BNI maintains a cooperative research centre in the tropics, the Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) in Kumasi, Ghana. Scientific partner is the Kwame Nkrumah University of Science and Technology (KNUST). The cooperation is established through a 20-year state contract between Hamburg and the Republic of Ghana.

BNI also maintains a biological safety laboratory level 4 for research on highly contagious tropical fever viruses



Stand 11/2005

Organizational chart BNI (November 2006)

4 Activities and aims of the programme areas

Activities and aims of the programme areas are deduced from the mission and aims of the institute. Research activities orientate on the two main issues “relevance for disease prevention and control” and “use of tropical infections as models for general issues in medicine and biology”.

○ **001 Parasitology research**

Activities in the programme area concentrate on cellular and molecular biology of infectious agents that cause tropical diseases.

Parasitic diseases play a major role in tropical countries. Many of them – like sleeping sickness and malaria- exclusively occur in tropical countries. Parasitology research focuses on human pathogens most relevant for morbidity and mortality in affected countries.

Research activities aim to improve control of tropical parasitic infections. Basic research aims to understand the molecular basis of interaction with the host. Targets are invasion, mechanisms of persistence and evasion strategies of the parasite. Information from parasite genome projects allows for identification of novel pathways containing targets for therapeutic intervention.

Applying modern tools in molecular biology, cell biology and biochemistry, the following activities are performed:

- Department of Molecular Parasitology: Research on variability and pathogenicity, vaccine development;
- research groups Malaria: Invasion of human cellular compartments and parasitic evasion strategies;
- research groups Leishmaniasis: drug resistance, stage conversion on transmission from insect to mammal, signal transduction pathways relevant for establishment of infection;
- Department of biochemistry: characterization of targets for drug development.

Research covers pathogens causing malaria, leishmaniasis and amoebiasis.

○ **002 Medical microbiology research**

Activities in the programme area concentrate on the host reaction to infection. Host reaction is analyzed on the organism, organ system and cellular levels. Pathogens investigated are parasites, bacteria and viruses of medical importance.

Research activities aim to understand specific reactions of the host in regard to infection with pathogen and to deduce measures to influence these reactions. Reactions are of importance for persistence and establishment of the pathogens, for immunity against subsequent infections and for the development of pathogenetic mechanisms.

In this context, the following activities are performed:

- Department of Immunology: studies on the role of innate and adaptive immunity and cellular components in infection with *Filaria*, *Plasmodia*, *Trypanosoma* and *Leishmania*. Animal models are used to study effects *in vivo*. Furthermore, studies on the role of the immune system in pathogenesis, local and systemic mechanisms of cellular control in the immune response; role of effector cells.
- Department of Virology: studies on immune response to viral infection and on interaction of virus with host cell. Identification of antigenic determinants to study their role in viral evasion, individual reactivity to virus determinants and epidemiological relevance. Development of reverse genetic systems to study the role of single viral proteins in the host cell. Studies focus on *Arena-*, *Corona-* and *Flaviviruses*.

○ **003 Tropical Medicine**

Activities in the programme area focus on patient-related analysis of resistance, susceptibility, pathogenesis and pathology of disease.

Starting points of studies are clinical patterns of disease and epidemiologic evidence of individuals with natural protection from infection. Studies aim to identify metabolic, regulative or cellular factors, which can protect individuals from infection or specific complications of the disease.

Central activities are investigations on human genetic variants linked to resistance or susceptibility, through linkage analyses and association studies of candidate genes. Included is clinical

characterisation of infections (attributes of pathogens, course of infection, pathogenesis and pathology). This work leads to accompanying intervention and prevention studies in endemic areas.

In this context, the following activities are performed:

- Department of Molecular Medicine: studies on clinical and immunological characterization of patients, genome-wide linkage analyses and genetic association studies
- Department of Pathology: studies on cellular immune protection
- Clinical Research Group: clinical characterization of patients and intervention studies
- Research Group Infection Epidemiology: epidemiological studies and intervention studies in endemic areas

Research covers malaria, tuberculosis, filarial infections and HIV/AIDS.

○ **004 Kumasi Centre for Collaborative Research (KCCR)**

KCCR is a research platform opening access to endemic areas for field studies, recruiting of patients and collection of clinical samples. The centre was established in 1996 to ensure long-term and stable conditions for patient-related studies in the tropics.

Activities of the programme area KCCR are administration and infrastructure supported by BNI. KCCR is run by a German-Ghanaian team. The German director is an employee of BNI. Running costs and project costs are mainly covered by third party funding and are not displayed in the budget.

○ **005 Scientific Services**

This programme area consists of internal and external services available at BNI:

- Library
- Scientific imaging
- Electron microscopy
- Animal husbandry
- Central Diagnostic Unit
- Teaching and Professional Training