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The African Network for Drugs and Diagnostics Innovation
The African Network for Drugs and Diagnostics Innovation (ANDI) was launched as a concept in Abuja (Nigeria) in 2008, and incubated at the World Health Organization through the Special Programme for Research and Training in Tropical Diseases (TDR). ANDI is now headquartered in Addis Ababa (Ethiopia) and hosted by the United Nations Office for Project Services.

ANDI acknowledges the financial support of the European Union, WHO/TDR, the African Development Bank, and Nigeria. Special thanks to the African Union Commission for its support.
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INTRODUCTION

The mission of the African Network for Drugs and Diagnostics Innovation (ANDI) is to promote and sustain African-led health innovation to address the continent’s public health needs through the assembly of collaborative networks and capacity building to support development. Its vision is to create a sustainable platform for health innovation in Africa to address the continent’s health needs.

ANDI works mainly on the development of essential and high impact technologies for diseases that disproportionately affect developing countries. The focus is on easy to use, affordable, and quality technologies that meet the needs of populations in Africa. A cross-cutting element of the work of ANDI involves capacity and leadership development linked to projects.

Achieving this mission requires closer collaboration among African research institutions and investigators in a manner that leverages existing capacities to implement projects and support sustained capacity development in Africa. It also involves equitable South-South and North-South collaboration, and technology transfer.

An initial mapping of the landscape for health R&D in Africa demonstrated that the capacity for innovation exists on the continent. This capacity is not, however, effectively utilized to address Africa’s health problems due to a variety of factors, including (i) lack of collaboration within Africa, (ii) lack of funding, and (iii) lack of coordination of existing research efforts. This rationale led to the establishment of ANDI and to its pioneering work in the competitive identification and selection of the 1st set of pan-African Centres of Excellence in health innovation (CoEs).

The process of the identification and selection of the CoEs as well as the profile and expertise of the CoEs are presented in this document.

On behalf of the co-Chairs and Board of ANDI, I would like to congratulate the institutions that were successful in the competitive and rigorous process that led to the selection of this initial group of ANDI Centres of Excellence in health innovation (CoEs). The Board sees the CoEs as the pillar of the work of ANDI, and we are very pleased to see the interest that this initiative has generated in the past few years.

As reflected in this document, the capacity and expertise of the CoEs span the various health technology domains including drugs, vaccines, medical devices/diagnostics as well as the various parts of the innovation cycle. We hope that the successful centres will continue to remain competitive in their field. The Board is aware that many more institutions in Africa are requesting ANDI to initiate a new call for CoEs, which will happen shortly.

The Board has requested the ANDI Secretariat to work very closely with the CoEs in its quest to advance health innovation on the continent. The current Ebola crisis has reinforced the critical need of ANDI and strong R&D institutions on the continent.

Finally, I would like to acknowledge the superb work that the ANDI Secretariat has done in the past few years with limited resources, and despite the initial transitional challenges it faced. The release of this document as well as the significant progress being made by ANDI funded projects are a testimony to this. We encourage African countries and the international community to support the work of ANDI financially.

Tshinko Ilunga
Vice Chair of ANDI Board
MESSAGE FROM THE EXECUTIVE DIRECTOR

In October 2011, 38 African centres drawn from leading universities, research institutes, NGOs, private sector and manufacturers from across the continent were recognized as ANDI Centres of Excellence in health innovation (CoEs). This is the first time a criteria-based process has been used to identify and recognise institutions across Africa. We are pleased to release the detailed profile of these CoEs as well as the process that led to their selection after some delay caused by the transitional challenges ANDI faced in 2012.

We see the CoEs as the framework to establish a consortium or alliance of African institutions with a critical mass of expertise and resources to support health-related projects, capacity building, entrepreneurship, and development activities. Indeed, some of the CoEs have started to trigger a new wave of intra-African, South-South and North-South networking and collaboration. We hope that the CoEs can be the mechanism for the establishment of technology incubators in Africa.

We encourage countries where these centres are located to utilize their expertise in addressing local problems. We hope that everyone interested in global health will find this information useful. ANDI is available to help in brokering partnerships and technology transfer involving these CoEs and other African institutions.

We would like to thank the numerous African institutions and partners that have made this work possible. Special thanks are accorded to ANDI’s Scientific and Technical Advisory Committee (STAC) for the work in reviewing and selecting the CoEs. We acknowledge the financial support from the European Union as well as support from Nigeria, AfDB, and WHO/TDR.

Solomon Nwaka
Executive Director of ANDI
The ANDI task force emerged from the launch of the ANDI concept in Abuja, Nigeria in 2008. The body was tasked with overseeing the further establishment of ANDI and in particular, the development of its Strategic Business Plan.

Once established, the task force adopted a two-stage approach for identifying ANDI projects (Figure 1): the first stage was through a call to identify Centres of Excellence in health innovation, and the second was a call for specific projects.

The objective of the first call was to identify existing Centres of Excellence with capacity and expertise in the various areas of health product R&D across Africa which could become technical partners of ANDI in support of its mission and vision.

Figure 1: Two-stage approach for identification of ANDI projects
DEFINITION

Centres of Excellence are virtual or physical centres of sustained distinction in research in key areas of national and global knowledge that simultaneously generate highly qualified human resource capacity. They concentrate and build on existing capacity and resources to enable researchers to collaborate across disciplines on long-term projects that are locally relevant and internationally competitive.

OBJECTIVES OF THE FIRST CALL

• To identify centres that will form the basis for an integrated network of competency and convergence in health innovation in Africa
• To identify institutions with promising technology platforms to support the above objective
• To establish a network of Centres of Excellence that could support local training, technology transfer and diffusion in Africa
• To map existing centres with specific capacity, capability and infrastructure in the various product R&D areas
• To identify Centres of Excellence that could form the backbone for concerted and coordinated collaboration, and support pan-African institutional technology transfer and diffusion as well as broader South-South collaboration
SCOPE OF THE CALL

Health innovation as used here covers the entire product R&D value chain, including basic research and genome sciences, discovery and development of new drugs, vaccines, diagnostics, insecticides and those based on traditional medicines and natural products, as well as medical devices, relevant technology platforms in health product R&D and techniques in process engineering/manufacturing and any other relevant areas of expertise, as described by the core capacities listed in Figure 1.

Centres of Excellence with competency in communicable and non-communicable diseases that disproportionately affect the African continent were encouraged to apply.
ELIGIBILITY CRITERIA

- Be based in Africa (core)
- Be a public, private or non-governmental research and/or development institution or university (core)
- Track record of achievement in a specific or multiple areas of the product value chain as measured by international peer-reviewed publications, patents, technologies developed, products discovered, developed, manufactured or commercialized, evidence of previous or ongoing activities and a reasonable level of funding (core)
- Have staff with a track record in the specific area(s) of competency within product value chain R&D (core)
- Willingness to partner with ANDI (core)
- Willingness to partner with other institutions in Africa on specific projects, training and capacity-building activities (core)
- Have functional research infrastructure including telephone, fax, e-mail and internet (core)
- Track record of achievements in one or more diseases that disproportionately affect Africa
- Willingness to engage in South-South and North-South collaborations as well as technology transfer activities
- Demonstrated track record in intra-African and international collaboration is an advantage
- Sustainability of the institution as evidenced by budget allocation over the past 3 years

3 Only institutions that meet the core criteria (1-7) were encouraged to apply.
INCENTIVES FOR CENTRES TO APPLY

• Potential for designation of the centre as an ANDI Centre of Excellence in a specific area.
• It is foreseen that selected centres will play an active role in ANDI-funded projects and capacity building in their specific areas of competency.
• The centre will be linked with specific projects in other institutions in order to support capacity and innovation development in Africa.
ANDI launched its 1st call for Centres of Excellence in health innovation on 15 June 2010. This call was disseminated through a variety of communication media, websites as well as international journals in order to attain maximum coverage throughout the continent.

By the call deadline, a total of 117 applications, spanning the various areas of R&D value chain, were received from institutions that were spread across the five regions of Africa. These applications were subjected to the various phases of the review process to determine how they meet the stipulated criteria. The review process was implemented as follows:
Phase 1: Initial peer assessment

Applications were assessed and scored by heads of competing applicant institutions following a defined set of guidelines and criteria. This review was performed electronically, confidentially, and with the assurance that no heads of institutions reviewed their own applications and possibly also no applications from their home countries.

All applications were assessed and scored by at least 2 independent heads of institutions, to guarantee a reasonable level of objectivity in the grouping. In cases where there was significant divergence between the scores of the two reviewers, the opinion of a third peer reviewer was obtained. ANDI Secretariat collated the reviews and separated applications that scored at least 70% from those that scored below this cut off mark and presented the former for review by members of the Scientific and Technical Advisory Committee (STAC). 76 applications passed this first phase of peer assessment (Fig 5).
Phase 2: STAC review

The 76 applications that scored at least 70% from the peer review process were distributed electronically among members of the ANDI Scientific and Technical Advisory Committee (STAC) for review and scoring in a manner that matched the area of expertise of the STAC member with the competency area selected by the institutions in their application. The remaining 47 applications that scored below 70% were also made available to STAC on a password-protected FTP site for further review. Each STAC member reviewed up to 8 applications, and preliminary scores were returned to the ANDI Secretariat.

Scores from the STAC review were aligned with those recorded from the peer assessment in preparation for final review by STAC during a face to face meeting on 26–27 May 2011. At this meeting STAC recommended a short list of 20 applications that met most of the criteria for ANDI Centres of Excellence based on information provided in the applications and the scores obtained in the review processes. From the remaining applications, 20 applicants were requested to provide further clarification and information in a revised application that would assist STAC in making a final decision on their applications. Thirteen of these institutions submitted a revised application in a timely manner and were re-assessed by STAC (Fig 5).

Figure 3: Phase 2 of CoE review process
Phase 3: Validation of CoEs

STAC’s recommendation of institutions that met most criteria was subject to a validation or verification mechanism that consisted in soliciting additional information from referees or site visits. The result of this validation process would be submitted to STAC to inform its final decision on the CoE applications.

On 13 July 2011, the short-listed forty applicant institutions were notified of these preliminary results and were requested to elect 4 referees for the purpose of the validation process. At the same time, the institutions whose applications did not meet the established criteria to qualify as ANDI Centres of Excellence were notified of the outcome of their applications. By 30 September 2011, thirty-two of the short-listed institutions had submitted at least two strong and positive recommendations from the referees and site visits had been concluded, if deemed necessary. These thirty-two institutions were thus designated ANDI Centres of Excellence in health innovation. On 3 October 2011 the Secretariat officially notified designated ANDI Centres of Excellence of the final outcome of their applications. The official announcement of these results as well as the Awards Ceremony was featured during the 4th ANDI Stakeholders Meeting and Donors’ Conference, 24–27 October 2011, at the United Nations Conference Centre, Addis Ababa, Ethiopia.
During the STAC meeting in May 2011, a sub-committee of STAC constituted to further assess all the manufacturing applications recommended that pharmaceutical manufacturing institutions applying to be recognized as ANDI Centres of Excellence should submit evidence of national or international certifications by relevant authorities to determine their manufacturing and GMP status. Submitted certificates would aid STAC members in the further assessment of these CoE applications in view of the nature and complexity of pharmaceutical manufacturing.

The certificates received from these pharmaceutical manufacturing institutions were transmitted to STAC, after which, six institutions were designated as ANDI Centres of Excellence in manufacturing/pharmaceutical production and added to the 32 institutions already approved. These manufacturing institutions were notified of their designation as ANDI Centres of Excellence in their category. The process for the selection of ANDI Centres of Excellence in health innovation is shown graphically in Figure 5.
Figure 5: Timeline of CoE review and selection process

- **CoE call launch**: Jun 2010
- **CoE call closure**: Dec 2010
- **1st STAC meeting**: May 2011
- **2nd STAC meeting**: Jul 2011
- **3rd STAC meeting**: Aug 2011
- **Additional review of manufacturers**: Sep 2011
- **Site Visits and Referee Review**: Oct 2011
- **Revision**: Nov 2011
- **STAC Short Listing**: Dec 2011
- **Peer Short Listing**: Jan 2012
- **Revision**: Feb 2012
- **STAC Review**: Mar 2012
- **Peer Review**: Apr 2012
- **Revision**: May 2012
- **2nd STAC meeting**: Jun 2012
- **3rd STAC meeting**: Jul 2012
- **3rd STAC meeting (final)**: Aug 2012

**Selections:**
- **32 CoEs Selected**
- **6 CoEs From Manufacturing Sector Selected**

**Additional Information:**
- **CoE call closure**: Additional review of manufacturers
- **Site Visits and Referee Review**: Oct 2011
- **Revision**: Nov 2011

**Timeline:**
- **Jun 2010**: CoE call launch
- **Dec 2010**: CoE call closure
- **May 2011**: 1st STAC meeting
- **Jul 2011**: 2nd STAC meeting
- **Aug 2011**: 3rd STAC meeting
- **Sep 2011**: Additional review of manufacturers
- **Oct 2011**: Site Visits and Referee Review
- **Nov 2011**: Revision
- **Dec 2011**: STAC Short Listing
- **Jan 2012**: Peer Short Listing
- **Feb 2012**: Revision
- **Mar 2012**: STAC Review
- **Apr 2012**: Peer Review
- **May 2012**: Revision
- **Jun 2012**: 2nd STAC meeting
- **Jul 2012**: 3rd STAC meeting
- **Aug 2012**: 3rd STAC meeting (final)

**Selections:**
- **32 CoEs Selected**
- **6 CoEs From Manufacturing Sector Selected**
ANDI sees CoEs as an integrated network or consortium of African institutions with a critical mass of expertise and resources able to support projects, enable individual and institutional capacity-building and scientific exchange activities. At the 1st meeting of the heads of the CoEs in December 2011 in Cape Town, South Africa, the Centres networked and agreed upon the network modus operandi and framework project to be implemented.
The activities foreseen under this framework project include:

- Hosting and training of young graduate and postdoctoral fellows from other African institutions for a period of 1 to 12 months.
- Hosting or exchange of scientists, including those on sabbaticals from other Africa institutions.
- Hosting of foreign experts from developed and emerging economies who wish to spend time at an ANDI CoE to support capacity-building in a specific area of the innovation value chain and/ to gain more experience in Africa. This will include placement of experts from industry, leading academic institutions and laboratories abroad to work on specific R&D and innovation topics, including project management, regulatory, IP management training and other areas.
- Hosting and maintenance of R&D equipment donated by local or foreign institutions/agencies and supporting training associated with the use of such equipment.
- Implementation of targeted workshops or training in specific areas of the innovation value chain as deemed essential.
- Utilizing the same mechanism, fellows or scientists from the CoE network will also participate in specialized training at other CoEs or overseas through focused North-South and South-South exchanges as appropriate.
This approach has several unique features:

- It will align capacity building around projects at the CoE or at the institution receiving the training. Such projects could also be specific ANDI-supported R&D projects. Oftentimes, capacity building and training in Africa — including efforts focussed on IP, regulatory affairs and quality assurance — are not undertaken around concrete projects.
- It will bring African scientific and technical resources together to develop and diffuse technology in order to address African health challenges in a significant way.

Figure 6 summarises the structure of the project in relation to other areas of ANDI activities and how this will eventually support attainment of ANDI vision.
Figure 6: How CoE activities link to ANDI mission and vision
OPPORTUNITIES: VALUE PROPOSITION OF THE COE NETWORK

The collective strength of this network presents a significant opportunity, in facilitating the implementation of ANDI activities, as well as constituting a resource for a variety of stakeholders, including donors. This is a novel approach to capacity building and institutional development on the continent.

In general the CoEs are uniquely positioned to serve the following functions:

- Provide a critical mass of capacity to tackle translational research problems in Africa
- Scale up existing research/evaluation programmes across Africa
- Tap into specific capacities/infrastructure or expertise offered by CoEs
- Carry out training workshops and other capacity building activities, including support for grant writing, project management, IP management etc.
- Offer exchange programmes, placements and sabbaticals to researchers and institutions within Africa and internationally
- Share knowledge, technology transfer
- Provide co-funding or in-kind support for projects, training and fellowships
- Disseminate information, knowledge/resources across the continent
- Promote public-private partnerships, and serve as incubator hubs for new companies
- Host experts from developed countries and emerging economies in support of capacity building in various areas of the innovation value chain
- Support North-South and South-South collaboration and exchange
- Host specialized R&D equipment, including those secured through donations that can support other institutions in Africa
- Support other African institutions aspiring to become Centres of Excellence
- Support training for product regulation, quality assurance and local production projects
# Profiles
## ANDI Centres of Excellence

<table>
<thead>
<tr>
<th>Institution</th>
<th>Name of ANDI Center of Excellence</th>
<th>Country</th>
</tr>
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<tbody>
<tr>
<td>African Institute of Biomedical Science &amp; Technologies</td>
<td>ANDI Centre of Excellence in in-silico Drug Metabolism &amp; Pharmacokinetics and Toxicology Studies</td>
<td>Zimbabwe</td>
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<tr>
<td>Council for Scientific and Industrial Research</td>
<td>ANDI Centre of Excellence in Nanomedicine Research</td>
<td>South Africa</td>
</tr>
<tr>
<td>Infectious Diseases Institute</td>
<td>ANDI Centre of Excellence in Epidemiology of Infectious Diseases</td>
<td>Uganda</td>
</tr>
<tr>
<td>Institute of Medical Research and Medicinal Plants Studies</td>
<td>ANDI Centre of Excellence in Traditional Medicine Research</td>
<td>Cameroon</td>
</tr>
<tr>
<td>Institute of Primate Research</td>
<td>ANDI Centre of Excellence in Pre-clinical Research</td>
<td>Kenya</td>
</tr>
<tr>
<td>Institut Pasteur de Tunis</td>
<td>ANDI Centre of Excellence for Bio-molecule Discovery</td>
<td>Tunisia</td>
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<tr>
<td>iThemba LABS</td>
<td>ANDI Centre of Excellence in Radiochemistry</td>
<td>South Africa</td>
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<tr>
<td>iThemba Pharmaceuticals (Pty) Ltd</td>
<td>ANDI Centre of Excellence in Medicinal Chemistry</td>
<td>South Africa</td>
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<tr>
<td>Joint Clinical Research Centre</td>
<td>ANDI Centre of Excellence in HIV/TB Clinical Research</td>
<td>Uganda</td>
</tr>
<tr>
<td>Kenya Medical Research Institute</td>
<td>ANDI Centre of Excellence in HIV Operational Research</td>
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<tr>
<td>Kwame Nkrumah University of Science and Technology</td>
<td>ANDI Centre of Excellence for Applied Biomedical Research</td>
<td>Ghana</td>
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<tr>
<td>National Center for Research</td>
<td>ANDI Centre of Excellence in Drug Discovery &amp; Diagnostic Innovation</td>
<td>Sudan</td>
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<tr>
<td>National Institute for Pharmaceutical R&amp;D</td>
<td>ANDI Centre of Excellence in Phytomedicine Research and Development</td>
<td>Nigeria</td>
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<td>Noguchi Memorial Institute for Medical Research</td>
<td>ANDI Centre of Excellence in Disease Surveillance and Prevention</td>
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<td>ANDI Centre of Excellence in IP Management in Health</td>
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<td>Theodor Bilharz Research Institute</td>
<td>ANDI Centre of Excellence in Anti-trematodal R&amp;D</td>
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<td>Trypanosomiasis Research Centre</td>
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<td>ANDI Centre of Excellence in Clinical Development of Malaria Products</td>
<td>Mali</td>
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<td>University of Buea</td>
<td>ANDI Centre of Excellence in Onchocerciasis Drug Research</td>
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<td>VACSERA</td>
<td>ANDI Centre of Excellence in Anti-venom Research</td>
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<td>ANDI Centre of Excellence in Virus Strains Diagnosis</td>
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<td>Botswana Vaccine Institute*</td>
<td>ANDI Centre of Excellence in Vaccine Production</td>
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<td>Kenya Medical Research Institute, Production Department*</td>
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<td>Kilimanjaro School of Pharmacy*</td>
<td>ANDI Centre of Excellence in Manufacturing and Regulatory Training</td>
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<td>LaGray Chemical Company Ltd*</td>
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<td>Ghana</td>
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<tr>
<td>The Biovac Institute (TBI)*</td>
<td>ANDI Centre of Excellence in Vaccine Production</td>
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<tr>
<td>VACSERA*</td>
<td>ANDI Centre of Excellence in Biologicals Production</td>
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*CoEs from the pharmaceutical/manufacturing sector

Table 1: ANDI Centres of Excellence in Health Innovation
The geographical distribution of these 38 CoEs is shown in Figure 7. A detailed profile for each CoE follows. The list of the institutions is provided in Table 1.

**Figure 7: Map of ANDI Centres of Excellence in health and innovation**
ANDI CENTRE OF EXCELLENCE IN DRUG METABOLISM, PHARMACOKINETICS, AND TOXICOLOGY (DMPK-TOXICOLOGY)

Head of CoE: Professor Collen Masimirembwa
Institution: African Institute of Biomedical Science & Technology
Country: Zimbabwe
Website: www.aibst.com

The African Institute of Biomedical Science & Technology, AIBST, was established with the aim of strengthening Africans’ scientific & technical capacity to contribute to healthcare solutions for Africa. This vision is being pursued through a focus on research and education in the sciences and technologies of drug discovery, development and optimal clinical use of medicines in Africa. Current areas of international expertise at AIBST are drug metabolism & pharmacokinetics and bioanalytical chemistry (DMPK-BAC) and pharmacogenomics.

AIBST has established a state-of-the-art DMPK & BAC laboratory. This is composed of computational modelling platforms to derive models for the prediction and design of molecules with desirable DMPK properties. The laboratory has a vast array of in vitro assays to determine the major components of a compound’s DMPK such as absorption (A), distribution (D), metabolism (M), excretion (E), and toxicity (T). The in vitro ADMET models include the use of cellular, sub-cellular and recombinant protein systems to either guide molecular design of molecules or conduct pharmacometric predictions of in vivo human pharmacokinetics. The laboratory is currently setting up in vivo pharmacokinetics and toxicokinetics capabilities. The backbone to the in vitro and in vivo physicochemical and DMPK & Toxicology studies is bioanalytical chemistry (BAC). The DMPK & BAC unit has 3 HPLCs, 4 LC-MSMS, several UV and FLUO plate readers, and liquid handling robots which provide the bioanalytical support to the ADMET assays conducted at AIBST. The DMPK & BAC platform at AIBST is benchmarked against best practices in the pharmaceutical industry which ensures that research and services meet international standards.

As a CoE in DMPK & Toxicology, AIBST will provide drug discovery DMPK & Toxicology support to drug discovery initiatives in Africa. This support will involve ADMET characterisation of new chemical entities in the discovery value chain from hit identification, lead discovery to lead optimisation. AIBST will also conduct DMPK research in various areas including method development, the rescue of old drugs by addressing their DMPK liabilities, and pharmacogenomics for personalised treatment. In a South-South technology transfer exercise, AIBST will strengthen three centres in Africa with DMPK-Toxicology expertise; ADMET for Medicinal Chemistry in South Africa,
Toxicokinetics in Kenya, and Drug-Drug-Herb Interactions in Nigeria. To increase the critical mass of scientists in DMPK-Toxicology,

AiBST will expand its postgraduate training program to produce 10 MSc and 5 PhD graduates each year from across Africa. To ensure increased awareness and provide continuing professional education in DMPK & Toxicology in Africa, AiBST will conduct a 4-week annual continental DMPK & BAC School and three specialised one-week regionally rotating courses.

Key publications


ANDI CENTRE OF EXCELLENCE IN NANOMEDICINE RESEARCH

Head of CoE: Dr Hulda Shaidi Swai
Institution: Council for Scientific and Industrial Research (CSIR)
Country: South Africa
Website: http://www.csir.co.za/msm/Encapsulation_and_Delivery/index.html

The Centre of Excellence (CoE) in Nanomedicine engages in applied nanomedicine research and training, in partnership with industry and academia, to develop therapeutic compounds for the treatment of PRDs. Funding over the last 8 years (2007–2014) has largely come from the Department of Science and Technology (DST) South Africa and others including the Bill and Melinda Gates Foundation, the National Research Foundation (NRF), CSIR Parliamentary Grant, the Royal Society, NIH, UNECA, WAITRO. The Centre is hosted and managed by the CSIR, which also provides the platform with both financial and infrastructural support. In terms of the latter, the platform has capabilities and facilities spanning manufacturing and characterization of nanocarriers right through to their biological assessment. The CoE has signed several agreements with most South African State-Universities and research councils; reputable institutions and experts in other African countries, as well as leading experts in nanomedicine to collaborate in nanomedicine research and training.

The CoE has shown in mice that the dose frequency for current TB treatment could be reduced from daily to just once-a-week, without the inherent toxic and/or unpleasant side effects. The TB project operates in a consortium of local Universities and Research Councils. Having made advances in nanomedicine-based PRD research in Africa, especially in TB, the CoE seeks to further the application of nanomedicine in other PRDs like malaria, as well as neglected diseases like schistosomiasis. This is being done with local, regional and international collaborators.

Summary of CoE training activities: The CoE aims to build human capital in nanomedicine in Africa. To this end, the CoE has been training its researchers in nanomedicine, in collaboration with Universities like North West University, University of Pretoria, University of Johannesburg, Stellenbosch University, University of Cape Town, Tshwane University of Technology, the Medical research Council, etc., where the researchers are registered for a graduate degree and/or do parts of their research. Moreover, several of the researchers received additional specialised training internationally, in reputable research groups and labs; about 15 such international programs have been completed to date.
The CoE has successfully organised a summer school and two international workshops in nanomedicine involving over 50 leading experts in nanomedicine and PRDs (representing 25 countries and 4 continents) to discuss perspectives and possibilities of advancing the technology in Africa. These initiatives have been followed by nanomedicine sensitisation seminars at 25 research institutions in Kenya, Nigeria, Cameroon and Ethiopia, with additional seminars planned in Tanzania (March 2012), Ghana (May 2012) and Uganda (August 2012). These additional efforts are to support the more formal training programs (e.g. towards a qualification), while also sensitising the broader scientific research community in South Africa and the wider African continent, on the potential of nanomedicine, hence building additional capacity.

Key Publications


The longitudinal cohorts unit at the Infectious Disease Institute (IDI) was formed with the following objectives:

- Describe the patient’s characteristics at initiation of care
- Determine the clinical outcomes of patients receiving ART, including development of side effects and drug toxicity, requirement for drug switching, development of OIs, morbidities, mortality, medication adherence and loss to follow-up
- Describe initial and subsequent ART regimens and the rationale identified for switching
- Assess the quality of routinely collected data

**Approach**

The Research Prospective Observational Cohort started at IDI in 2004 with 559 patients. IDI and the Kampala City Council Routine Clinics cohorts: 40,000 patients. Outreach Routine cohort in Kibaale and Kiboga Districts: 20,000 patients. Consultancy to researchers that intend to set up a Longitudinal Cohort.

**Structure Quality Assurance**

- Since 2011 provides real time data entry of clinical data
- Database checks for inconsistent or missing information
- Monthly reports
- Development of standard operating procedures for medical care and data storage

**Key Publications**


The Institute of Medical Research and Medicinal Plants Studies (French acronym, IMPM) is an administrative public establishment with financial autonomy under the technical auspices of the Ministry of Scientific Research and Innovation. The mission of the institute is to define and execute fundamental and applied research programmes as well as ensure development in all medical disciplines, medicinal plants, traditional medicine, and food and nutrition in view of improving the health status of Cameroonian.

In its administration, IMPM has a Board of Directors who are responsible for the management and implementation of Government research policies. There also exists a Research Programmes Committee, the official body competent for the validation of research projects. A Director heads the Institute, assisted by a Deputy Director in the everyday administrative and financial management of the structure after approval of the Board of Directors. Within the head office is the Department of Research and Valorisation of research results and the Department of Administrative and Financial Affairs answerable to the Director of the Institute.

In order to attain the mission assigned to IMPM, the Institute has four operational research centres which are:

- Centre for Medical Research in charge of the identification of public health problems and proposing strategic intervention measures, in collaboration with the Ministry of Public Health; a) Bilharzia Research, b) Human Biology, c) Endocrinology and Radioelements, d) Anatomy and Cytology Pathologies, e) Medical Analysis and f) Research on Tropical Medicine.
- Centre for Research on Medicinal Plants and Traditional Medicine responsible for the valorisation of the use of local medicinal plants and traditional medicine for the treatment of common ailments and the production of phyto-medicines; a) Botany and Traditional Medicine, b) Phytochemistry, c) Pharmacology and Toxicology and d) Pharmaceutical Technology.
- Centre for Research on Food and Nutrition in charge of the determination of the chemical composition of local foodstuffs and the development of appropriate technologies for the processing and preservation of foods; a) Quality control, b) Metabolic studies, c) Food Technology and d) Epidemiology and Nutritional Status.
• Centre for Research on Emerging and Re-emerging Diseases carries out research on HIVs, AIDS and the resistance of antiretroviral drugs.

IMPM also has two major production units: CAMDIAGNOSTIX (a unit for the production of kits used for the test of HIV/AIDS) and a PHARMACEUTICAL PRODUCTION UNIT (production of syrups, tablets, capsules etc. housing equipment that produces 3000 tablets/minute)

In order to meet the expectations and needs of the local population, the proposed fields of expertise are:
• Production of Improved Traditional Medicines (ITM's)
• Biological screens/assays
• Plant and derivatives chemical analyses
• Pharmacology and toxicology of medicinal products
• Drug development and production
• Biodiversity conservation
• Quality control and standardization of phyto preparations
• Epidemiology and entomology
• Clinical trials/therapeutic studies
• Physiopathology and etiology
• Immunology and molecular biosciences
• Socio-economic and anthropological studies
• Biotechnology
• Emerging and re-emerging diseases
• Nutrition and diseases

Key Publications


ANDI CENTRE OF EXCELLENCE IN PRECLINICAL RESEARCH

Head of CoE: Dr Thomas Kariuki
Institution: Institute of Primate Research
Country: Kenya
Website: http://www.primateresearch.org

The Institute of Primate Research is located in Nairobi, Kenya. IPR was established in 1960 by the world famous paleontologist Dr Louis SB Leakey. The Institute is built on 400 acres of an indigenous forest whose pristine environment provides the right scientific environment for fostering a culture of scientific creativity, innovation and relevance. The IPR is an ISO 9001:2008 certified organization and operates on the principle of total quality management applying best practices in administration and finance matters, as well as Good laboratory Practice (GLP) for the activities undertaken in its laboratories and animal facilities. The institute is a World Health Organization Collaborating Centre, and has Registration of Compliance (Assurance) with standards of humane care and use of laboratory animals by the USA National Institutes of Health, Office of Laboratory Animal Welfare (NIH-OLAW). IPR also recently became an Associate Partner of the EU Primate Network from whom it is receiving support on animal welfare and training in the ethics of using NHPs in medical research.

The scientific mandate of IPR is to develop and use animal models, including non-human primates for preclinical and biomedical research aimed at providing health care solutions for infectious diseases, human reproductive disorders and non-infectious diseases. Additionally the Institute also carries out studies that inform policy with regard to management and conservation of non-human primates. The institute has built an internationally renowned competence as a preclinical research facility for testing of candidate medical interventions. Research is organised into major and neglected infectious diseases, reproductive health, non-communicable diseases and animal sciences. Current projects include identification of diagnostic biomarkers for neglected tropical diseases (Leishmaniasis, schistosomiasis and Trypanosomiasis), and preclinical evaluation of candidate vaccines, drugs and diagnostic prototypes in animal models. The staff compliment of 150 core and support staff has expertise in biochemistry, comparative medicine, pathology, immunology, genetics, molecular biology, parasitology, reproductive biology, microbiology, veterinary medicine and animal sciences. One of the institute’s greatest strength has been the development of animal models, especially non-human primates (NHPs) for various major infectious and neglected diseases; for example the African Green monkey/vervet monkey (Chlorocebus aethiops) is a model of HIV/SIV, Human African Trypanosomiasis and leishmaniasis. The baboon is the best...
animal model of reproductive biology (including infertility causing endometriosis), and is naturally and experimentally susceptible to malaria, schistosomiasis and other neglected parasitic infections.

There is adequate laboratory space and animal facilities occupying a space area of more than 30,000 square feet, adequate for housing approximately 500 animals in paired cages or harmonious social group units. The various labs are suitably equipped to perform a wide range of biomedical techniques and BSL–2 labs for biomedical assays, common user technology facilities such as flow cytometry, immunology, pathology and diagnostic labs. IPR has complete veterinary facilities and equipment to hospitalize and clinically evaluate all research animals in health and disease. The animal facility is designed to allow for animal quarantine, colony management, primate medicine, clinical monitoring, simple and complex surgical procedures, intensive care, post-surgical care, and includes suites for carrying out general pathology, diagnosis and histopathology procedures.
The Institut Pasteur de Tunis (IPT) is the first Research Institution in biomedical sciences in Tunisia that developed strong national and international collaborations in its fields of activities (including research & development, training, biomedical analysis and public health activities (with several reference centres) and manufacturing of therapeutic sera and BCG vaccine). In general these collaborations are made in the frame of specific programs and supported by national or international funding.

Ever since the days of Charles Nicolle (IPT’s director from 1903 to 1936 and Nobel laureate in medicine in 1928), IPT has held a prominent place in the history of medicine in Tunisia, with important discoveries in the field of infectious diseases, (transmission cycles of typhus, the agent of toxoplasmosis, infantile visceral leishmaniasis, as well development of the original concept of asymptomatic infections). IPT has contributed to the eradication of several diseases like malaria, schistosomiasis and contributed with nationwide vaccination campaigns and cooperated actively in public health programs.

The Institut Pasteur de Tunis in 2014:

- 9 research laboratories
- 18 for the diagnosis of human and animal diseases, and an international vaccine and anti-rabies treatment center
- The only therapeutic vaccine and serum production facility in the country
- A Center for international vaccination and anti-rabies treatment
- Nearly 500 employees, including more than 110 scientists.
- 180 students
- 97 publications (89 in international reviews) in 2013
- 44 research projects (mostly international projects) funded by 11 funding agencies like NIH, WHO, European Commission, Institut Pasteur International Network.

The areas of research covered include:

- Epidemiology of infectious diseases (leishmaniasis, hydatidosis, tuberculosis, bovine theileriosis, hepatitis, rabies, papillomavirus, viral avian pathologies, mycoplasmosis, enteroviruses)
- Immunology of human and veterinary infectious diseases
- Pathologies caused by genetic or immune deficiencies (genodermatoses, metabolic diseases, hemoglobinopathies, ocular diseases, susceptibility to tuberculosis, and other rare pathologies)
- Biochemistry of venoms and toxins focusing on their therapeutic potential
- Biotechnological research and development in relation to design of genetically engineered vaccines and therapeutic proteins.
IPT is a member of the Institut Pasteur International Network, which consists of 32 institutes on 5 continents. The international scope of IPT is manifested in its many collaborative efforts on international research projects, an ever-increasing number of international publications (nearly a hundred in 2013), the filing of 14 patents, recognition of several laboratories as leading regional centres by the World Health Organization (WHO), and by the regular organization of high-level international courses and seminars. In 2012, IPT was identified as a privileged research partner by the Indian government under the India-Africa cooperation.

Product/technology (development, manufacturing, commercialization, and technology transfer): The IPT remains the only producer of vaccines and serums for human use in Tunisia. Our production is conducted according to current Good Manufacturing Practice (cGMP) and is focused on BCG and anti-sera (anti-rabies, anti-scorpions and anti-vipera).

Partnerships with the private sector (e.g. SMEs) enable the scale up of products/processes that were developed - for instance rabies vaccine produced on cell cultures. Such mechanisms will be sustained and similarly developed to support technology transfer activities within the ANDI network.

Key Publications


ANDI CENTRE OF EXCELLENCE IN RADIOCHEMISTRY

Head of CoE: Prof. Maaza Malik
Institution: iThemba LABS-National Research Foundation of South Africa
Country: South Africa
Website: http://www.tlabs.ac.za

iThemba Laboratory for Accelerator-Based Sciences (iThemba LABS) is a group of multi-disciplinary research laboratories administered by the National Research Foundation of South Africa. Based at two sites in Western Cape and Gauteng, these provide facilities for:

- Basic and applied research using particle beams
- Particle radiotherapy for the treatment of cancer
- Supply of accelerator-produced radioactive isotopes for nuclear medicine and research

At iThemba LABS, the basic skills and facilities are in the applied and pure sub-atomic sciences and associated technologies. The applications of these sciences to technology are growing rapidly indeed. For example, there is an international scarcity of radioisotopes creating a market into which iThemba LABS’ products have had speedy access due to their quality and innovative nature. The training programs at iThemba LABS are essential both for transforming the African and the South African science and technology (S&T) workforce and for growing the skills required to build a successful economy in which there are sufficient resources to eradicate poverty.

iThemba LABS, as a national research facility working within the National System of Innovation has the intention to achieve the following strategic objectives:

- Grow the research facilities to increase training, human resource development, international collaborations (especially within Africa) and the Science and Technology profile of South Africa
- To spin off economic units that are self-sustaining and benefit from the skills, sciences and technologies developed and available at iThemba LABS

iThemba LABS-National Research Foundation of South Africa, is the unique institution in Africa and/or in the southern hemisphere which is:

- The sole continental owner and expert in cyclotron sciences/technology know-how
- A unique continental worldwide isotopes and radio-pharmaceuticals accelerator based manufactured supplier
- A supplier of 1/4 of 82Sr to the world market
- The sole world supplier of 22Na isotope
Key Publications


iThemba Pharmaceuticals (iThemba) is South Africa’s only medicinal chemistry-based drug discovery company dedicated to the discovery and development of new treatments for infectious diseases, with a particular focus on tuberculosis (TB). It was established by a group of international academics who shared their concerns about the lack of capacity in Africa to address endemic diseases and the absence of career opportunities for young medicinal chemists graduating from the region’s tertiary institutions. The Technology Innovation Agency is the major shareholder.

The vision of the company is to “become a world class, research based fully integrated South African pharmaceutical company” with its core purposes being to “discover and develop novel pharmaceuticals for the prevention and treatment of neglected diseases; and build local capacity in pharmaceutical research and development, particularly medicinal chemistry and antiretroviral process technology”.

Located at Modderfontein outside Johannesburg, it began operations four years ago in a high quality laboratory facility with 800 m² of usable space. The company has 16 employees of whom 12 are PhD-level organic chemists. It has the capacity to perform parallel, medium throughput organic synthesis and small scale process development. The company has recently acquired and installed state of the art NMR (Bruker 400MHz) and LCMS (Agilent) equipment. iThemba has implemented CambridgeSoft’s electronic note book to expedite storage and accessibility of chemical information, and the company’s workflow, documentation practices and safety protocols meet global research standards.

iThemba’s programmes in TB drug discovery are unique on the continent; it has five active TB projects of which two are at an advanced stage of lead optimization. The TB portfolio encompasses a variety of innovative approaches including a series of novel nitroimidazoles (already covered by a provisional patent); the development of first-of-kind isocitrate lyase inhibitors; progression of several novel series of lead anti-TB compounds identified through a screening programme; and an approach which targets TB-infected macrophages.
The company is also developing an improved route to the manufacture of tenofovir; the latter is an essential component of first line antiretroviral treatment (for HIV) and has a local market in excess of 100 tons per annum. The iThemba route may be as much as 30% cheaper than the present technology and will help to improve the access/affordability antiretroviral treatment.

Strong international partnerships have been established with GSK, Chimerix, Bioventures for Global Health, Emory Institute of Drug Discovery, Howard University, Clinton Health Access Initiative, Chroma Therapeutics, Institute Pasteur Korea, Novartis Institute for Tropical Diseases, The London School of Hygiene and Tropical Medicine, The Swiss Tropical and Public Health Institute, Cambridge University, African Institute of Biomedical Research and Technology, and others. iThemba has signed and exchanged over 100 CDAs with international organizations and agencies and has six peer-reviewed publications and three conference papers.

The company is well positioned to improve the treatment of TB and HIV in Africa. It is presently seeking second round funding to complete its present projects.
Established in 1990, the Joint Clinical Research Centre (JCRC) is now an established clinical research site that has formed extensive partnerships and collaborations locally and internationally that have allowed joint utilization of resources, core facilities on-site and data management. Consequently the centre has become recognized as a model for Medical and public health research with an outstanding track record of AIDS clinical and epidemiological trials. The Centre pioneered the use and research on Antiretroviral drugs (ART) in Africa in 1992 and has been involved in pioneering studies on HIV preventive and therapeutic vaccines and the most scientifically advanced and biggest ART trials so far in Africa. JCRC based investigators have been involved intimately in shaping the national approach to AIDS and their research has achieved regional and international recognition.

The Center’s vision is: A vibrant self-sustaining centre of excellence in medical research, training and health care services.

The Mission: To conduct quality medical research and training, provide equitable and sustainable HIV/AIDS care and other care services in Uganda and other parts of Africa. The Core values of the institution include integrity, confidentiality, compassion, mutual respect, team-work, accountability, continuous learning and excellence.

Over the years JCRC has established Regional Research/Reference laboratories in all the five major regions of the Country. This has enabled the centre to extend its services to all corners of the country, thereby giving it a national outlook. The regional reference laboratories are equipped with state of the art technology that has been supporting various medical research programs in Uganda and the great lakes region for more than a decade. The JCRC currently employs more than 350 staff that includes highly qualified scientists and program implementers working harmoniously with local and foreign counterparts.

Key Publications

The Research, Care Training, and Program (RCTP) was established in 1994 by leading medical researchers from the Kenya Medical Research Institute (KEMRI), the University of Nairobi (UoN) and University of California San Francisco (UCSF) to facilitate collaborative research on Sexually Transmitted Infections including HIV prevention, care and treatment. RCTP is currently co-headed by Dr Elizabeth Bukusi (Deputy Director Research and Training, KEMRI) and Dr Craig Cohen (Associate Professor, UCSF).

RCTP has three complementary arms: research, care and training. Under the care arm, RCTP runs a U.S. Presidential Emergency Fund for AIDS Relief (PEPFAR)/CDC funded program known as the Family AIDS Care and Education Services (FACES: www.faces-kenya.org), which provides care and treatment to HIV/AIDS clients using a family model of care. There are 139 sites currently that have HIV care services, 127 that offer ART, 139 offering Prevention of Parent-to-Child Transmission (PPCT) services and 28 that offer Voluntary Male Medical Circumcision (VMMC services).

Over the years we have managed to enroll 146,615 HIV infected patients and initiated 69,002 on antiretroviral medication. Under the research arm, RCTP collaborates with international organizations to conduct a number of HIV prevention and treatment research projects including microbicide for HIV prevention transmission, Pre-exposure Prophylaxis (PrEP) and Sustainable East Africa Research for Community Health (SEARCH).

Under the training arm, RCTP sponsors and provides mentorship to doctorate, post graduate courses in partnership with various universities, mainly the UoN, Jomo Kenyatta University of Agriculture and Technology, UCSF and University of Washington. RCTP is an accredited continuous professional development (CPD) provider and offers CPD to care and research staff working within the Program to enhance their output.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
APPLIED BIOMEDICAL RESEARCH

Head of CoE: Dr Ellis Owusu-Dabo
Institution: Kwame Nkrumah University of Science and Technology
Country: Ghana
Website: www.knust.edu.gh; www.kccr-ghana.org

The Kumasi Centre for Collaborative Research in Tropical Medicine (KCCR) is an international collaborative biomedical research platform located in the heart of Ghana. Founded in 199, as a joint venture between the Ministry of Health of Ghana, the Kwame Nkrumah University of Science and Technology, (KNUST) in Kumasi and the Bernhard Nocht Institute for Tropical Medicine (BNITM), Hamburg, Germany.

Through the work of our esteemed Scientists, the Centre has over the years achieved many breakthroughs in the field of biomedical research; including the on-going Malaria (RTS’S vaccine trial), Tuberculosis (including the localisation of the locus for TB resistance), Entomology, Aflatoxin, Filariasis, Buruli ulcer and Burkitt’s Lymphoma pathogenesis and pharmacogenomics.

Our facilities, comprising a 300m2 laboratory space, is well-equipped with microscopes, autoclaves, biosafety hoods, incubators, cooled centrifuges, ELISA readers, thermal cyclers, agarose gel electrophoresis set-up, transluminator, flow cytometer, -20o and -80o freezers, liquid nitrogen supply, a five-channelled cobert real-time PCR machine as well as a three channelled Roche light cycler. We are also proud hosts to a newly furnished Biosafety level 3 laboratory, the second in the country. We also boast of 4-wheel-drive vehicles, which are used for fieldwork in remote areas.

Our elevation as a centre of excellence in applied biomedical research will further help us achieve our core duty of generating a critical mass of researchers by building the next generation of scientists. The current on-going large genetic epidemiology studies, establishment of hospital and community based studies, implementation of Good Clinical and laboratory Practice, and the availability of accredited clinical trials sites enable us to use state of the art methodologies and newer approaches to address research needs in Tropical Medicine.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
DRUG DISCOVERY & DIAGNOSTIC
INNOVATION

Head of CoE: Prof. Dr M. Galal M. Ahmed
Institution: National Center for Research
Country: Sudan

The National Centre for Research (NCR) was established in 1970 and is one of the finest government research institutes in Sudan. NCR and all its 13 institutes are located in Khartoum, Sudan.

NCR includes the following 13 research institutes: (1) Medicinal and Aromatic Plants Research Institute (MAPRI); (2) Tropical Medicine Research Institute; (3) Environment and Natural Resources Research Institute; (4) Technological Research Institute; (5) Energy Research Institute; (6) Desertification Research Institute; (7) Seismological Research Institute; (8) Traditional Medicine Research Institute; (9) Materials and Electronics Research Institute; (10) Commission for Biotechnology and Genetic Resources; (11) Documentation and Information Center; (12) Commission for Biotechnology and Genetic Engineering; and (13) Authority for Technology Transfer, Information and Scientific Publishing. However, out of the 13 institutes of the NCR, only the labs of the Medicinal and Aromatic Plants Research Institute (MAPRI), Tropical Medicine Research Institute, Commission for Biotechnology and Genetic Engineering and the Traditional Medicine Research Institute are extensively involved in drug discovery. The staff of the NCR and particularly these four institutions have an international track record of publications in the area of natural products, drug discovery and diagnostic research.

The NCR is one of the best funded institutes in Sudan. During the last three years the budget of the NCR was in the range of US$4-5 million annually out of which US$ ~1.0 million were provided annually for the institutes involved in health related research. During the last 10 years the NCR has been successful in attracting more than US$6 million from international agencies for funding health related research. The laboratories of the NCR are some of the best established research laboratories in terms of equipments and functional research infrastructure.

The institute has several interesting achievements in endemic diseases including several patents and herbal drugs used locally in Sudan for treatment. NCR has published more than 150 publications during the last five year in areas related to health innovation. During the last few years, researchers of the institute have discovered hundreds of drug hits and developed a number of herbal medicines currently used in Sudan for the treatment of hepatitis and other diseases. In a first for Africa, the institute has also developed a new...
sterile-mate technique for control of malaria vector. NCR has also contributed in the improvement of some diagnostic techniques for neglected and endemic diseases.

NCR is also a member of several regional & international networks including: (1) COST (European Cooperation in Science and Technology) CMST Action CM0801 “New Drugs for Neglected Diseases”; (2) Eastern African Network for Trypanosomiasis (EANETT) (3) ICGEB; (4) Eastern African Network for infectious diseases Surveillance (EACIDS); and (5) HAT Platform /DNDi.

Key Publications


ANDI CENTRE OF EXCELLENCE IN PHYTOMEDICINE RESEARCH AND DEVELOPMENT

Head of CoE: Prof. Karniyus Shingu Gamaniel
Institution: National Institute for Pharmaceutical Research and Development (NIPRD)
Country: Nigeria

The National Institute for Pharmaceutical Research and Development (NIPRD), is a parastatal of the Federal Government of Nigeria under the Federal Ministry of Health. Our vision is to build a Center of Excellence in research and development of phytomedicines, pharmaceutical and biological products, drugs and diagnostics towards improving the health and well-being of mankind. Our mission: To apply appropriate modern science and technological resources to stimulate local production of drugs through effective collaboration with the industry and experts within and outside Nigeria; Develop herbal and phytomedicines to pilot stage for commercialization; Develop quality standards for phytomedicines, drugs and diagnostics for the purpose of control and regulation; Provide quality assurance services on all drugs used in healthcare delivery; and Provide safety data and essential information on herbal and other drugs towards achieving self-sufficiency in the production and control of essential drugs in such a way that would guarantee the overall health of Nigerians and mankind in general.

The NIPRD strategic plan (2010–2015) has been articulated around the following priority areas:

• Research and Development of Phytomedicines: To establish a Center of Excellence for the R&D of phytomedicines and related products.
• Partnership & Support to the Industry: To provide R&D support on pharmaceutical raw materials (Active Pharmaceutical Ingredients and Excipients) and develop workable partnerships with the local industry including, SMEs, towards sustainable growth and development.
• Supporting Evidence Based Health Policies and Actions: Provide evidence-based information to support food and drug products regulation, development and implementation of appropriate national health policies.
• Partnership and Collaborations: To partner with the relevant national and international organisations/networks, in order to enjoy their support and also to enable us to contribute to the global knowledge platform.

Role as ANDI Centre of Excellence in Phytomedicine R&D:

• Documentation of medicinal plants used in traditional medicine and pharmaceutical R&D of indigenous drugs used against malaria, HIV/AIDS, TB, sickle cell anaemia, diabetes, fungal infections, peptic ulcer, worm infestations, and for pharmaceutical raw materials development.
• Capacity building in respect of medicinal plant research: 1) Phytochemical screening, safety, efficacy and toxicity determination, 2) Pharmaceutical technology and pharmaceutical quality assessments including stability, shelf life, moisture content, microbial load etc, bio-analytical methods, chromatographic methods, finger printing, 3) Clinical facilities for drug trials.
• Commercialisation, technology incubation, SME development and technology transfer. NIPRD has expertise in commercialising its innovations by supporting the protection of IPR and decision-making e.g. outright sale, licensing or commercialisation.

We plan to pursue regional excellence in pharmaceutical R&D of phytomedicines by supporting growth and maintenance of Network for National and international collaborations based on the ANDI Platform, provide support in terms of laboratory space, R&D infrastructure and other facilities to support exchange programmes, training and skill acquisition for interns, undergraduate and postgraduate students and visiting researchers, and provide any other support that ANDI may deem necessary in order to forge ahead with capacity building and product development research in Africa.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
DISEASE SURVEILLANCE AND PREVENTION

Head of CoE: Professor Prof Kwadwo Koram
Institution: Noguchi Memorial Institute for Medical Research
Country: Ghana
Website: www.noguchimedres.org

The Noguchi Memorial Institute for Medical Research (NMIMR), was established in 1979 in memory of Dr Hideyo Noguchi, a Japanese Scientist who died in the then Gold Coast researching Yellow Fever. Set up with a focus on infectious diseases, research has recently expanded into non-communicable diseases and traditional/herbal medicines in response to local demand. The Institute’s mission is to become a centre of excellence for research into diseases of public health importance, especially in Ghana; and to contribute to manpower development for scientific research and the health service.

The Centre mandate is to:
- Conduct research into health problems of public health importance in Ghana
- Provide training opportunities for postgraduate students in medical research
- Provide specialized laboratory diagnostic monitoring services in support of public health

The ANDI CoE at the NMIMR with its current infrastructure, including a Biosafety Level 3 (BSL3 or P3 facility) and human resource/expertise is capable of conducting surveillance studies on various infectious diseases such as HIV/AIDS, Buruli ulcer, Tuberculosis, malaria. It also works on neglected tropical disease such as lymphatic filariasis, schistosomiasis and onchocerciasis. The NMIMR ANDI Centre is also capable of conducting research into emerging dangerous pathogens such as influenzas and Lassa fever among others.

Key Publications


ANDI CENTRE OF EXCELLENCE IN INTELLECTUAL PROPERTY MANAGEMENT IN HEALTH

Head of CoE: Professor Tony (Anthony) Bunn
Institution: SA Medical Research Council
Country: South Africa
Website: http://innovation.mrc.ac.za

The Innovation Centre (IC) of the SA Medical Research Council (MRC) has been selected as the ANDI Centre of Excellence for IP Management in Health (IPMH). It has a total staff complement of 8, including 2 administrative staff members and operates out of fully equipped offices at the MRC headquarters in Cape Town.

The IC has been, and continues to be significantly involved in capacity building activities in Southern and Eastern Africa in the areas of IP management and technology transfer. Through these activities, the IC has built networks with individuals and institutions involved in technology transfer in Africa, Europe, the UK and the USA and would like to ensure that a vibrant ANDI network of Technology Transfer Offices and technology transfer professionals is created to achieve African and global impact.

In order to promote and grow African-led health product innovation to address African public health needs for drugs, diagnostics and medical devices it is imperative to harness the research discoveries from the 31 ANDI CoEs in Africa. As such the CoE for IPMH will be responsible for:

• Developing a formal and sustainable network of ANDI Technology Transfer Offices and tech transfer professionals throughout the region to effectively protect and exploit African generated intellectual property
• Putting in place the project specific, inter-CoE, agreements with emphasis on IP rights and revenue sharing
• Conducting due diligence on new inventions
• Sourcing of funding for commercialisation
• Marketing and licensing of IP to industry
• Negotiating IP rights and resulting agreements
• Forming and incubating spin-out companies
• Managing revenue sharing resulting from successful commercialisation activities
• Raising awareness of IP & TT among ANDI researchers
• Delivering training workshops through vehicles such as SARIMA on IP and tech transfer in the region.
• Generating and providing information resources on IP and tech transfer to colleagues in the network
• Acting as a host for exchange programmes with technology transfer professionals in the network

The Innovation Centre has to date facilitated the establishment and incubation of 5 spin-out/start-up companies and has concluded 7 license agreements for the commercialisation of new health technologies in the fields of genetic testing, medical devices, novel nutritional products, and various eHealth solutions. In addition, the IC is currently managing a portfolio of over 20 patents in the fields of vaccines, new drugs (including novel plant-based medicines), diagnostics and medical devices. These patents are in various stages of development, evaluation and commercialisation.
The ANDI Centre of Excellence on Anti-trematodal R&D has over 25 years of research activities in this field. Researchers affiliated to the centre possess the necessary skills to conduct the work; furthermore they cover diverse backgrounds (Medicine, Pharmacy and Science). The Anti-trematodal R&D excellence centre possesses the suitable infrastructure with the essential facilities and access to biological material, including experimental animals and vector snails essential for fulfilment of the research. The centre is capable of conducting screens of natural and synthetic preparations. Also the in vitro and in vivo evaluation of potential anti-trematodal activity coupled with bioavailability studies, crude and refined extracts a bioassay-guided isolation of bioactive compounds in collaboration with medicinal chemists. Scanning and transmission electron microscopic studies of parasites of human importance are also performed. Conventional
and immunoelectron labelling techniques are applied to visualize pathological structural changes and immunological host-parasitic interaction secondary to specific treatment. In addition, humoral and cellular immunological parameters under therapeutic interventions, monitoring of cure by measuring circulating Ags before and after treatment and assessment of patients cellular immune response during active infection are also performed.

TBRI and the centre are willing to partner with other ANDI CoEs and with African institutions. We would like to link with institutions with a focus on natural products, to complement research lines regarding the specified disease. We are aiming to increase our south-south collaboration and we expect more fruitful and complementary research to address specific health problems in the African continent as a result of better alignment of efforts under the umbrella of ANDI.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
PRE-CLINICAL DEVELOPMENT

Head of CoE: Dr Grace Adira Murilla
Institution: Kenya Agricultural Research Institute (KARI)
Country: Kenya
Website: www.kari.org

TRC, whose headquarters and main laboratories are based in Muguga, Kenya, approximately 40 km from Nairobi, is one of 23 main research centres of KARI. The centre also conducts laboratory and field research at the Alupe Referral Sleeping Sickness Hospital in Busia/Teso, Western Kenya. The Centre, previously known as KETRI, was formed under the legal framework of an Act of Parliament, the 1979 Science and Technology Act Cap.250 of the Laws of the Republic of Kenya. This mandate is ‘to carry out research into all aspects that would eventually lead to effective control of human and animal trypanosomosis and effective reclamation of tsetse infested lands.

In the 1980’s, the well-known and well characterized Sleeping Sickness non-human primate model was developed to facilitate research into new drugs and diagnostics. For several years (late 1980’s-1990’s) many lead compounds from various pharmaceutical firms and international research laboratories were evaluated, as well as combinations of existing drugs. The centre is currently a member of the multi-institutional North Carolina University-led Consortium on Parasitic Drug Development. TRC’s role is to generate safety/toxicity, efficacy and pharmacokinetic/PD data on lead compounds against SS in the non-human primate model utilizing well-trained staff. Other collaborating institutions include DNDi/HAT Platform in product development and capacity building for clinical trials and Yale University, School of Public Heath for capacity building of scientists from the region in molecular biology and genetics, promoting South-South and North-South technology transfer.

The Centre has received regional and international recognition as a:

- WHO/TDR CoE in HAT Research Capacity Strengthening in Africa – 2004
- WHO/TDR Reference Training Centre for Effective Project Planning and Evaluation for biomedical research -2007
- AU/NEPAD/Biosciences eastern and central Africa Network (BecaNet) CoE for Research and Training on Tsetse and Trypanosomiasis (T&T) - 2007
- ANDI Centre of Excellence in Preclinical Development - 2011
Key Publications


ANDI CENTRE OF EXCELLENCE IN CLINICAL DEVELOPMENT OF MALARIA PRODUCTS

Head of CoE: Prof. Mahamadou Ali Thera
Institution: Malaria Research and Training Center
Country: Mali
Website: www.ml.refer.org/u-bamako

The Malaria Research and Training Center (MRTC) established in 1989 was a collaborative effort between the staff of the Faculty of Medicine, Pharmacy and Dentistry and the National Institutes of Health (NIH), USA, with support from the Rockefeller Foundation and the WHO. With strong support from the government of Mali, the centre offers a successful organizational model. Our cutting-edge research is grounded in African needs and priorities, connected with local communities and health care systems, and directed and executed by Malian staff, networking and communicating with scientific counterparts worldwide.

In 2002, the University of Bamako’s Faculty of Medicine was designated one of three International Centers of Excellence in Research (ICER) by NIH, based primarily on the scientific accomplishments of the MRTC. The ICER offers core support to all MRTC activities including high-speed Internet connection via a 128Kbps-VSAT of field sites such as Bandiagara and others. In 2003, the MRTC was awarded “Pole Regional d’Excellence” from the Francophone Agency for Universities; the award made of MRTC a Regional Center of Excellence for providing high quality training and research opportunities to French-speaking scientists in West Africa.

The MRTC serves as the primary research and training arm of the Ministry of Health for malaria. The headquarters in Bamako is a large campus of seven buildings with state-of-the art laboratories, dedicated to Molecular Biology, Immunology, Parasitology, LAN facilities and a guest house. Its research scope includes clinical trials, clinical and molecular parasitology, immunology, pathogenesis, drug resistance, basic and molecular epidemiology, clinical biology, basic and molecular entomology, geographic information systems and remote sensing. The centre maintains multiple clinical trial sites.

The most fully developed of these, the Bandiagara Malaria Project (BMP), is an NIH-supported collaboration between the MRTC and the University of Maryland’s Center for Vaccine Development, and has been the site of five malaria vaccine trials and numerous epidemiological studies. The site in Bandiagara offers excellent facilities for training and clinical research. The BMP/MRTC has established a very good relationship with the
local population, leading to a high participation rate in studies. Large cohorts of children enrolled in Bandiagara have been followed during 3 to 5 years with less than 7% of loss to follow up. The centre infrastructure has been renovated in 2010 and can now handle large efficacy field clinical trials of drugs, vaccines and devices. The clinical trials are conducted in compliance with ICH-GCP guidelines, with quality management plans, standard operating procedures and space for confidential storage of sources documents.

As an ANDI centre of excellence BMP/MRTC will contribute by ensuring full clinical development of products that require well-established clinical trial centres with international level competent staff and the training of human resources in the field of clinical trials and product development.

Key Publications


This pan-African Centre of Excellence focuses on three sub-activities:

- Looking for medicinal plants and isolating/improving on activities of natural products relevant to onchocerciasis macrofilaricide (a cure for onchocerciasis);
- Developing and improving relevant biological assays, in vitro and in vivo for onchocerciasis drug discovery, along with an in vivo Loa loa microfilarial counter screen currently done in grids;
- Screening pure compounds, re-purposing drugs, large compound libraries and plant extracts for ultimate discovery of novel Onchocerca macrofilaricide candidates.

We run biological screening and phyto-/synthetic chemistry laboratories. Our experience on onchocerciasis dates back to the 1980’s. We rely primarily on the bovine model and closest known relative of Onchocerca volvulus, O. ochengi for our screens. O volvulus and Loa loa, both from humans, come in later in the funnel. In 1999, the Centre Head (PI) visited Ngaoundere, Cameroon to study the biology of Onchocerca ochengi under the mentorship of Dr Norbert Brattig from the Bernhard Nocht Inst. for Trop. Med. Germany, Dr Alphonse Renz and some WHO Macrofil Project scientists. The PI later developed the currently most efficient technique for very large-scale preparation of clean, sterile and highly viable O. ochengi microfilariae from cow skin. This technique can yield over a million of the microfilariae in one day.

At the same time, great improvements were made in the preparation and culturing of O. ochengi adult male and female worms. O. ochengi is endemic only in Africa. Efforts at the Centre were stepped up in 2007 when the team won a WHO/TDR grant to establish a WHO/TDR Onchocerciasis Drug Screening Centre at U Buea. The biological assays we have developed are highly efficient, reproducible, and were validated by the Expert Drug Advisory Committee (EDAC) of the WHO/TDR. We are currently part of a BMGF funded consortium, involving also University of California, SF; New York Blood Center and ANACOR Pharmaceuticals, to develop a safe macrofilaricide for onchocerciasis.

We are also running a BMGF Grand Challenges Exploration (GCE) grant on developing an in vivo Loa loa counter screening model for Onchocerca macrofilaricides. Our calculated
screening capacity is high (could be up to 50,000 compounds on microfilariae or 4,000 on adult worms per year) and depends largely on the amount of funding available.

**Key Publications**


ANDI CENTRE OF EXCELLENCE IN
TB DIAGNOSTICS RESEARCH

Head of CoE: Professor Keertan Dheda
Institution: University of Cape Town
Country: South Africa
Website: www.lunginstitute.co.za/content/lung_infection.html

The Lung Infection and Immunity Unit of the University of Cape Town is an expert grouping within in the Division of Pulmonology in the Department of Medicine. It is a research group of approximately 50 students and staff whose research interest encompasses 3 main areas:

- Development and evaluation of novel and newer tools for the field friendly diagnosis of human tuberculosis
- Immunopathogenesis, diagnosis and management of MDR and XDR-TB
- The immunology of tuberculosis and other pulmonary infections using samples from the human lung

Key achievements, competencies in each of these areas are outlined below:

Diagnosis of TB: Current tools for the diagnosis of TB are sub-optimal. This enhances transmission of TB in the community and causes increased morbidity, chronic lung disability, and mortality. Thus, there is an urgent need for the development and validation of field friendly diagnostic tools in high HIV prevalence environments like Africa, where TB is out of control.

The Lung Infection and Immunity Unit has core competencies in the following areas:

- Expertise in the design, management and performance of TB diagnostic trials.
- Expertise and experience with evaluation of newer TB diagnostic technologies, including NAAT (Xpert and LAMP), IGRAs, LAM assays, alternative culture platforms, and user friendly microscopy platforms, including enhancement of smear microscopy, e.g. bead-related technology, LED microscopy etc.
- The identification of novel TB diagnostic targets using proteomic and genomic technologies.
- Development of novel user friendly tools, including novel detection platforms, for the diagnosis of pulmonary and extra-pulmonary TB.

Immunopathogenesis, diagnosis and management of MDR and XDR-TB: MDR and XDR-TB threatens to destabilize control in several regions of the world, including Africa. Our recent work highlights the ominous specter of XDR-TB through publications in The Lancet (K Dheda Lancet 2010) and our paper in The Annals of Internal Medicine which highlights the increased risk of health care workers in Africa in acquiring M & XDR-TB. These publications have implications for the programmatic management of M & XDR-TB, advocacy, and the need to introduce rapid diagnostic tools and infection control
measure in health care workers and patients to diagnose drug-resistant TB. Our ongoing work seeks to develop and evaluate diagnostic platforms for drug-resistant TB.

The immunology of tuberculosis using samples from the human lung: Correlates of immune protection are poorly understood and human studies about the immunopathogenesis of TB are required to move the field forward. The Lung Infection and Immunity Unit has well equipped and spacious laboratories capable of under 9 colour flow cytometry, proliferation studies, molecular biological studies, and studies requiring the use of category 3 laboratory facilities. These are all housed within the Department of Medicine. Recent work has focused on immunodiagnostic tests in different body compartments and there is ongoing work on the role of regulatory T cells and the role of innate immunity in the immunopathogenesis of TB in the human lung.

Key Publications


ANDI CENTRE OF EXCELLENCE IN PROTEOMICS AND GENOMICS

Head of CoE: Professor Jonathan Blackburn
Institution: University of Cape Town, Institute of Infectious Disease and Molecular Medicine
Country: South Africa
Website: http://www.iidmm.uct.ac.za

Using the techniques of genetics, genomics, proteomics, lipidomics & bioinformatics, the Centre of Excellence has active translational research projects on, amongst other topics:

• Investigating molecular mechanisms of disease (tuberculosis, colorectal cancer, HIV-associated dementia, etc)
• Identification of novel drug targets (tuberculosis, HIV-associated dementia, etc)

• Biomarker discovery in both communicable and non-communicable diseases, including:
  ◦ Identifying patterns of biomarker expression which correlate with e.g. disease and/or disease progression and which could be used as the basis for new diagnostic/prognostic tests (tuberculosis, colorectal cancer, melanoma, HIV-associated dementia, etc)
  ◦ Identifying patterns of surrogate marker expression which correlate with response to treatment and which could be used for patient stratification and monitoring during clinical trials of new drugs (tuberculosis, colorectal cancer, melanoma, etc).
• Biomarker validation through both quantitative multiple reaction monitoring (MRM) mass spectrometry- and ELISA-based methodologies (tuberculosis, colorectal cancer, melanoma, HIV-associated dementia, etc)

Core groups of the CoE in Proteomics & Genomics:

• Applied Proteomics & Chemical Biology Group (Blackburn): mass spec-based proteomics & lipidomics for biomarker discovery in infectious and non-communicable disease areas; mass spectrometry-based biomarker validation; protein arrays for biomarker validation, drug binding & drug metabolism assays.
• Human Genetics Research Unit (Ramesar): genetics of inherited and non-communicable diseases including cancers, neuropsychiatric disorders, autoimmune diseases & retinal degenerative diseases; pharmacogenomics; population genetics; etc
• Bioinformatics Group (Mulder): evolutionary, functional and network analysis of M. tuberculosis (M.tb); genome wide association studies on susceptibility to various human diseases; development of new tools for data analysis & visualization; etc
• Molecular Mycobacteriology Research Unit (Mizrahi & Warner): physiology and metabolism of M.tb; drug discovery & drug resistance in M.tb; mycobacterial genetics, genomics & whole-genome re-sequencing; targeted mycobacterial gene knock-out/knock-down.

• Centre for Proteomic & Genomic Research (CPGR; Hiller): The CPGR is based on an initiative by the South African Department of Science and Technology (DST) to stimulate biotech innovation and to grow an internationally competitive biotech sector in South Africa. The organization was created in 2006 with a vision of establishing a modern, world-class facility that serves the needs of the scientific community in South Africa by providing state-of-the-art services, technical expertise and collaborative research capabilities in Genomics, Proteomics and Bioinformatics. In addressing the multidisciplinary, frequently complex aspects of managing genomic and proteomic projects, the CPGR aims at becoming an efficient enabler of Translational Research and socio-economic development in Africa. The CPGR is physically located in purpose-designed laboratories within the IIDMM, to which it is affiliated. More information about the CPGR can be found at www.cpgr.org.za or by contacting info@cpgr.org.za.

Key facilities & infrastructure of the CoE in Proteomics & Genomics:

The component groups in the IIDMM & CPGR are housed in large, well-equipped laboratories suitable for research & training. We have a state-of-the-art equipment base in mass spectrometry (for both discovery and targeted applications), protein microarrays, DNA microarrays (Affymetrix, Agilent, etc), Luminex bead arrays, and real-time PCR, amongst others. We also have tissue culture facilities in both BSL2 and BSL3 laboratories.
ANDI CENTRE OF EXCELLENCE IN 
DRUG DISCOVERY

**Institution:** University of Cape Town  
**Country:** South Africa

(data not available)
ANDI CENTRE OF EXCELLENCE IN MALARIA TRANSLATIONAL RESEARCH

Head of CoE: Dr Grace Olusola Gbotosho  
Institution: College of Medicine, University of Ibadan  
Country: Nigeria  
Website: www.ui.edu.ng

The Malaria Translational Research Centre is a multidisciplinary research group which has acquired expertise and established infrastructure to support basic and applied research especially in malaria over the past 25 years. The aim of the centre is to impact on public health through the reduction of malaria morbidity and mortality.

The primary research areas include:

- Application of basic (molecular biology, parasite genomics, molecular epidemiology) and clinical research (clinical trials at hospital and community levels) on chemotherapy of drug resistant malaria
- Novel treatment modalities
- Evaluation of novel diagnostic techniques
- Community and public health education

Some of our key achievements include:

- Development of new in vitro techniques
- Development of new drug combinations
- Development of new pharmacokinetic techniques
- Development of new diagnostic systems
- Development of molecular markers of drug resistance
- Building human capacity for research through mentorship and training.

The Leadership of MTRC comprises an academy of both senior and mid-career scientists with international backgrounds and successful track records in research and international funding. The infrastructure to support our research has been strengthened and sustained through collaboration and transfer of technology from international institutions, networking with southern and northern institutions. The group also partners with decision makers on evidence for policy.

Key Publications


Our major focus is on malaria diagnostic evaluation/quality assurance, research and development, capacity building and policy implementation of malaria diagnosis. The malaria diagnostic activities cover high quality basic microscopy employed in health facilities, clinical trials, epidemiologic studies and capacity building. In addition, we also undertake quality assurance activities which included malaria slide-banking, high quality Giemsa stain production, proficiency testing among others.

In the area of malaria rapid diagnostic test (RDT), the Centre has contributed to quality control sample development in partnership with WHO/FIND laboratories that included the Centres for Disease Control, Atlanta, USA; The Hospital for Tropical Diseases, London, UK; The Australian Army Malaria Institute, Australia, among ten other laboratories. We are currently evaluating noninvasive malaria patient samples such as urine and saliva as potential specimens for malaria RDT testing.

Other malaria diagnostic testing platforms in immunology, molecular genotyping and detection of Plasmodium species are being strengthened while plans are on to establish a malaria proteomic activity and the development of field adaptable technologies for malaria diagnosis. Our malaria diagnostic policy implementation activities elucidated challenges to the use of blood transfer devices in RDTs and are now looking at barriers to the implementation of the malaria parasite confirmation policy.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
BIOMEDICAL AND BIOMATERIALS
RESEARCH

Head of CoE: Prof. Dhanjay Jhurry
Institution: University of Mauritius
Country: Mauritius
Website: http://vcampus.uom.ac.mu/cbbr

CBBR pools together researchers with Biosciences, Biotechnology, Bioengineering, Chemistry, Medical and Pharmaceutical expertise. Our objectives are to build a critical mass of expertise, resources and technology, foster multi-institutional partnerships, assist in technology transfer and act as an interface between the University and the private sector both at the national and international levels.

CBBR puts much emphasis on human capacity development and invests in the recruitment of Postdocs and PhDs. The Centre also offers specialized courses on Biomaterials and Drug Delivery open to the African region in close collaboration with resource persons from the USA and Europe.

CBBR focuses on research at the interface between materials/polymer science and biosciences with emerging fields such as nanotechnology and nanomedicine. Its main research thrusts include:

Key Publications


ANDI CENTRE OF EXCELLENCE IN
TB TRANSLATIONAL RESEARCH

Head of CoE: Prof. Paul D van Helden
Institution: Stellenbosch University
Country: South Africa
Website: http://www.sun.ac.za

The projects in this Centre are aimed at forming a continuum of research from the basic to the applied and oriented towards bridging the gap between basic and clinical research.

They include many different research areas, some of which are listed below:

- Genetics of human TB susceptibility
- Molecular epidemiology which covers both the drug susceptible and resistant forms of the disease
- Evolution of drug resistance diagnostics
- Bacterial genetics
- Basic microbiology
- Candidate (drug) compound design and chemical synthesis, as well as testing of these in vitro
- Immunology, including Mycobacteria/Helminth co-infections, effect of hormonal contraception, vaccine trials
- Surrogate markers for clinical trials
- Drug targets
- EBA and other clinical drug trials

Note that the Centre operates two category 3 biosafety level labs for this work. This aspect of our work also takes place within a partnership with the DST/NRF and MRC of South Africa. South Africa has perhaps the third-highest incidence rate in the world, and TB has been declared not only a national, but global emergency. Tuberculosis is identified as one of the Department of Health priorities.

In addition to human Tuberculosis, M bovis is currently raging in our wildlife and to a limited extent in domestic stock. This poses a new threat to our tourism and wildlife industries, as well as an emergent zoonotic threat particularly at the animal/human interface and with HIV prevalence. We are also working on this problem, together with investigating the influence of mycobacteria-other-than-tuberculosis in our populations of humans and animals.
Key Publications


ANDI CENTRE OF EXCELLENCE IN HIV TRANSLATIONAL RESEARCH

Heads of CoE: Prof. Jean B. Nachega, Director, Centre for Infectious Diseases;
Prof. Wolfgang Preiser, Head, Division of Medical Virology
Institution: Faculty of Health Sciences, University of Stellenbosch
Country: South Africa

The Centre for Infectious Diseases (CID) is a multidisciplinary entity within the Faculty of Health Sciences, University of Stellenbosch, investigating infections and infectious diseases on a regional and national basis in the South African community, through collaboration of basic and clinical science. The purpose is to provide a scientific and evidence-based service that addresses the prevention, diagnosis and treatment of infectious diseases.

CID does not only contribute to the national and international knowledge base but transfers this scientific knowledge and skills through the provision of a wide range of formal (on under- and postgraduate level) and informal teaching and training programmes to students and to the broader community through healthcare worker education. CID integrates the following disciplines as collaborative functional areas on a shared service and academic platform: Adult infectious diseases; Paediatric infectious diseases including KID-CRU; Infectious diseases pathology: medical virology and medical microbiology; Infection prevention and control; Public health aspects of infectious diseases; Social and ethical aspects of infectious diseases; Molecular biology of infectious diseases, as a basic science support and development tool for the clinical sciences. In addition, CID cooperates with the South African Centre for Epidemiological Modelling and Analysis (SACEMA) at Stellenbosch University.

CID has sustained distinction in HIV research that is of significance and recognized both in the national and in the international context. It can draw from numerous already established and well-functioning research collaborations with national and international partners both within Africa and beyond.

The CoE is a mix between a virtual and a physical centre; while it has offices and staff its strengths lie in its close links with and collaboration between its constituent units located within the University and Tygerberg Academic Hospital. Thus it is a platform that brings together an exceptionally wide range of expertise, from basic via laboratory and clinical sciences to epidemiology and modelling.

The CoE addresses all factors affecting the success of antiretroviral treatment. These include point-of-care HIV testing, pharmacodynamic and kinetic factors, modalities and
strategies for optimal and cost-effective treatment monitoring, factors affecting treatment adherence and antiretroviral drug resistance as a cause or endpoint of treatment failure.

The CoE envisions to:

• Develop and evaluate affordable and practical novel HIV diagnostic and treatment adherence monitoring tools to assist in the roll out of HIV testing in Africa and universal access to antiretroviral therapy
• Study antiretroviral treatment resistance mechanisms and risk factors from laboratory in the bench to the patient in the clinic, and back
• Conduct cohort studies and clinical trials to evaluate novel interventions for linkage, retention in HIV care and their cost-effectiveness
• Serve as a teaching and training facility for the development of expertise in these research areas
• Network with other research projects and centres in Africa and beyond
• Transfer knowledge gained from this research to the benefit of the health of the community
• Serve as a platform for HIV treatment training and research in collaboration with other ANDI CoEs

The willingness to collaborate and co-operate is strongly visible in the track records of the partners involved; e.g. the first-ever International Research Training Group with any African country, the Wellcome Trust-funded Southern Africa Consortium for Research Excellence including Malawi, Zimbabwe, Botswana, Zambia, and South Africa, the NIH/FIC/PEPFAR Medical Education Partnership Initiative (MEPI) and many others.

Key Publications


The Wits Advanced Drug Delivery Platform (WADDP) Research Unit under the Directorship of Prof. Viness Pillay has a track record of achievement in multiple areas of pharmaceutical biomaterials and polymer-engineered drug delivery technologies that aptly contribute to the pharmaceutical product value chain. The research of the WADDP also has a focus on the effective treatment of diseases that disproportionately affect Africa.

Drug delivery technologies are patent protected formulation technologies that modify drug release profiles as well as drug absorption, distribution and elimination from the body for the benefit of improving drug efficacy, re-purposing, safety as well as patient convenience and compliance.

The WADDP has revolutionized this paradigm with research that is focused on ‘advanced’ solutions for drug delivery technology by designing active/passive programmable innovative polymeric systems that positively impacts the global pharmaceutical industry challenges in the majority of therapeutic categories.

It is important to note that the advances in drug delivery technologies have gone hand in hand with the new era of drug discovery and development. For example the WADDP’s molecularly targeted based therapies, which utilize pseudo-peptides to stabilize large active protein molecules may provide novel treatments for diseases such as cancer, infectious diseases, neurodegeneration and metabolic disorders to name but a few.

Research at the WADDP has merged the concept of in silico techniques to design drug delivery technologies that can be passively pre-programmed utilizing a suite of highly advanced and sophisticated computing algorithms to generate, optimize and simulate the prospective advanced drug delivery products. This is a first for drug delivery research.

Such advances offer new capabilities to revive the market potential for drug products by providing new solutions to old problems. This tradition of the WADDP is instituted within the ANDI CoE awarded.

The CoE provides sustained distinction in advanced drug delivery research to provide more efficacious drug therapy solutions for Africa as a key area of national and global knowledge that will simultaneously generate human capacity development. With
the opportunity to function as a formal CoE through ANDI, the CoE concentrates on enhancing its existing capacity and resources to enable researchers to collaborate across disciplines on long-term projects that are locally relevant and internationally competitive. The CoE already has a wide and promising technology platform to support the objectives of ANDI with over 38 drug delivery technology patents under prosecution in the USA, UK, Europe, China, Japan and South Africa.

In addition, Prof. Pillay and his team of over 50 researchers, postdoctoral fellows, postgraduate students, expert clinicians and collaborators have an established and internationally-recognized track record in the fields of drug delivery, polymer science and nanomedicine with over 165 scientific publications in ISI-accredited international journals of high impact-factor in addition to the over 365 peer-reviewed conference presentations delivered.

The CoE has the capacity to network with other ANDI CoE’s to facilitate the training of students, technology transfer and diffusion of drug delivery research in Africa due to the existing specific capacity, capability and research infrastructure.

The CoE in ‘Advanced Drug Delivery Technology’ thus forms a strong backbone for concerted and coordinated collaboration, support pan-African institutional technology transfer in advanced drug delivery technology and disseminate new knowledge in the field through broader collaborations within Africa and subsequent expansion beyond the continent. This will also enable a wider cohort of African students to be given the opportunity to read for their postgraduate degrees or train as Postdoctoral Fellows at the CoE and at the same time provide exceptionally viable and efficient pharmaceutical products on the African continent through tangible research outputs that will be generated.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
VIRAL GENE THERAPY

CoE Head: Prof. Patrick Arbuthnot
Institution: University of the Witwatersrand
Country: South Africa
Website: www.wits.ac.za/agtru

The Antiviral Gene Therapy Research Unit (AGTRU) is located within the Department of Molecular Medicine and Haematology of the University of the Witwatersrand in Johannesburg. There are approximately 20 members of the AGTRU and these include molecular biologists, biochemists, clinicians and postgraduate students. The research unit has the broad aim of developing new approaches to countering HBV. Our main focus is on gene therapy for HBV infection.

Expertise includes research and development using a range of molecular biology procedures, gene transfer to mammalian liver cells in vitro and in vivo, synthesis and use of liposomal non-viral vectors and recombinant viral vectors. Resources outside of the AGTRU include university administrative support, clinical facilities of the provincial tertiary hospitals, access to organic chemistry expertise and accredited diagnostic services of the National Health Laboratory Services (NHLS). In addition AGTRU has many collaborations with South African and international research laboratories. These partnerships further broaden the unit’s research capabilities, particularly in the field of synthetic organic chemistry.

AGTRU is equipped to carry out modern molecular biology research. Instruments include basic items such as balances, pH meters, electrophoresis equipment, digital gel documentation capabilities (phosphorimager, chemiluminescence and fluorescence detection), luminometer, low and high speed centrifuges, ELISA plate reader and washer, tissue culture rooms and a PCR facility. The laboratory suite is set up for work on uncontaminated as well as biohazardous material according to approved standard operating procedures. The AGTRU also houses a HBV transgenic mouse colony within the university Central Animal Service. This important resource is particularly useful for in vivo testing of anti HBV. Specialised major items of equipment include a MagNApure (Roche) robotic nucleic acid extractor, Lightcycler II (Roche) real time PCR instrument and confocal microscope (Carl Zeiss). An imaging system to enable direct in vivo detection of chemiluminescent and fluorescent signals in mice is soon to be acquired. Large items of equipment, e.g. transmission and scanning electron microscopes, are available in central university facilities.
For more than 20 years, ZAMBART has worked with the Ministry of Health in Zambia to conduct research into the dual epidemics of tuberculosis and HIV. In 2004, ZAMBART became an independent Zambian research organization with close links to the University of Zambia (UNZA) School of Medicine and the London School of Hygiene and Tropical Medicine (LSHTM) with a mission to reduce the burden of HIV-associated tuberculosis through conducting international standard, locally relevant research and to build Zambian research capacity.

Based in Lusaka, ZAMBART collaborates closely with government, non-governmental and academic institutions within Zambia, Africa and the rest of the world. ZAMBART has a long history of diagnostics research including studies involving polymerase chain reaction and bacteriophages, evaluation of liquid culture use in resource limited settings and interferon gamma release assays in these settings.

ZAMBART staff form an interdisciplinary team with a range of expertise including epidemiology, clinical science, social science, laboratory, operations research, health systems and services research, health policy analysis, health economics, development communication and counselling. ZAMBART has the capacity to design, manage and execute large epidemiological studies as well as design and handle large data sets. A comprehensive list of ZAMBART’s current and previous research can be viewed at http://www.zambart.org.zm.

ZAMBART has TB culture facilities, a serology laboratory and a TB molecular laboratory. ZAMBART is located at ZAMBART House (a stand-alone office block, whose construction was funded by the organization and is able to accommodate 40 full-time staff members), within the UNZA School of Medicine grounds.

Key Publications


Our centre will be a national model in developing partnerships among venom and anti-venom researchers for the purpose of enhancing R&D initiatives to meet the current and future needs of anti-venoms. We have specific capacity, capability and infrastructure in various biological products, with expertise in the management and relation with dangerous venomous animals such as venoms milking, purification, and fractionation. Also analysis of animal toxins and fractions purified from snakes, scorpions and spiders, Ad-hoc we are expertise in management and immunization of animals by different types of venoms for the production of specific antivenin on the national level and global knowledge that simultaneously generate highly qualified human resource capacity.

We concentrate and build on existing capacity and resources to enable researchers to collaborate across disciplines on long-term projects that are locally relevant and internationally competitive. We can form the backbone for concerted and coordinated collaborations, strengthening the link between the R&D sector and the industry nationally and globally to enhance the knowledge based economy via producing an innovative product meeting market demands.

Key Publications


ANDI CENTRE OF EXCELLENCE IN
VIRUS STRAIN DIAGNOSIS

Head of CoE: Dr Laila Bassioni
Institution: Egyvac, Vacsera
Country: Egypt
Website: www.vacsera.com

Vacsera was established in 1881 by the Egyptian Health Department as a small laboratory to engage in disease prevention through vaccine production. Its name derives from the words (vaccines) and (sera) reflecting the company’s commitment to serve the preventive medicine branch in the healthcare sector through the production of high quality vaccines and antiserum. The Company produced the small-pox vaccine for the first time in Egypt in 1893, followed by the rabies vaccine in Kasr El-Ainy in 1907. It is the leading manufacturer of vaccines and biological products both in Egypt and the Arab world, and focuses on improving the quality of human life through the production of conventional as well as innovative, high-value products for disease prevention, control, and treatment.

VACSERA is a government owned holding Company that works under the umbrella of the Ministry of Health, and comprises the following affiliated Companies:

- The Egyptian Company for production of vaccines, sera and pharmaceuticals (EGYVAC)
- The Egyptian Company for Blood Transfusion Services (EGYBLOOD).
- The Egyptian Company for Drugs and Veterinary Products (EGYVET).

The Company exports quality products to many countries, and is also the only manufacturer of human vaccines in Egypt. It holds the main Egyptian blood bank and is one of three suppliers of insulin products nation–wide. VACSERA has many laboratories that operate at international standards among which are the laboratories for Epidemiological surveillance; the WHO regional reference lab for Polio and the WHO Influenza national reference centre. VACSERA is GMP certified by local authorities, and has also received the ISO 90001 and ISO 14001 certification.

The R&D building facility at VACSERA is equipped for the following research activities: Cell culture technology; primary cell culture preparation, development of established cell lines, and virus propagation on cell cultures; monoclonal antibody production technology; hepatitis, polio and enterovirus diagnosis; diagnosis of diseases and pathogens using PCR and Real-time PCR technologies; developing new applications of nanotechnology in medical devices for viral diagnosis; electron microscopy. VACSERA collaborates with a number of local and international partners.
Key Publications

Prolonged Detection of Indigenous Wild Poliovirus in Sewage from Communities in Egypt. American Journal of Epidemiology - Vol.158, No 8

ANDI CENTRE OF EXCELLENCE IN VACCINE PRODUCTION

Head of CoE: Mr. Richard van Duyse
Institution: The Biovac Institute
Country: Botswana
Website: www.biovac.co.za

The Biovac Institute (Biovac), Cape Town, South Africa, was established as a Public-Private Partnership between the South African government and the Biovac Consortium in 2003. The Consortium is led by Litha Healthcare Group Limited, a diversified healthcare company. As the only human vaccine manufacturing facility in Southern Africa, Biovac’s focus is on ensuring that South Africa has the required domestic capacity to respond to both local and regional vaccine needs and epidemic emergencies.

Our vision is to be a Centre of Excellence routed in Africa for the development and manufacture of affordable vaccines for Africa and the developing world’s needs. This is underpinned by 6 key objectives:

- Establish domestic vaccine production capacity
- Ensure economic viability
- Develop and retain local vaccine production skills
- Establish strong R&D capability
- Create a competitive platform for export
- Enable broad based black economic empowerment

Biovac’s most recent investment in a state-of-the-art cGMP (current Good Manufacturing Practice) commercial scale vaccine manufacturing facility is expected to be licensed by the South African Medicines Control Council in 2013. The facility will provide Biovac with the commercial scale capacity for antigen manufacture using a fermentation based technology platform and for multi-product vaccine formulation and filling. Already established capability in quality assurance, quality control, regulatory affairs, labelling and packaging, cold chain storage and distribution, logistics, engineering, project management, HR, finance, IT and R&D will provide support to the commercial production activities. Thus, the full value chain of vaccine manufacturing activities will be in place.

Manufacturing and R&D platforms include fermentation, purification, conjugation, analytical method development, formulation, filling. Upstream production activities are located in BSL3 containment facilities. Capacity to fill product into both single and multi-dose vials and pre-filled syringes will be installed.
Funding has been secured from WHO to support the establishment of seasonal and pandemic influenza vaccine manufacturing capacity at Biovac. Biovac has successfully developed its own high yielding Haemophilus influenzae type b (Hib), conjugate vaccine technology which it has out-licensed to two international vaccine manufacturers.
ANDI CENTRE OF EXCELLENCE IN DIAGNOSTICS DEVELOPMENT AND PRODUCTION

Head of CoE: Dr James Kimotho
Institution: Kemri Production Facility
Country: Kenya
Website: www.kemri.org

The KEMRI Production facility was constructed and equipped in 2004/2005 through collaboration between KEMRI and the government of Japan. The facility was designed for manufacturing of sustainable, locally developed, quality and affordable medical diagnostics in Africa. So far the facility has instituted the necessary Quality Management System and it has been certified as GMP-compliant by the Kenya Pharmacy & Poison Board. The facility is also currently close to completing the process of ISO 9001:2008 certification and it has embarked on the process of acquisition of ISO 13485:2003 and ISO 17024:2003, with an ultimate goal of attaining WHO-Prequalification status of its key products.

Currently, the facility manufactures a number of products that have been developed by other Centres of KEMRI and its own Research & Development section and they include the following:

- Hepcell RPHA kit for detection of hepatitis B virus (HBV)
- HIV 1 & 2 (Kemcom® Rapid), HBV (Hepcell® Rapid) and HCV (Kempac® Rapid) test kits
- Molecular diagnostic reagents that include: Taq polymerase (Kemtaq®), Nucleic Acid Extraction kits and various molecular grade buffers.
- Disinfectants: Chlorine-based disinfectants (TBcide®) and an alcohol-based disinfectant (KEMrub®)
- Proficiency Testing Panels for HIV to support the Regional External Quality Assessment Scheme (REQAS)

The facility is currently developing rapid test strips to support early diagnosis of Yellow Fever and Rift Valley.

Collaboration and Support

The facility has in the past received substantial support from key development partners that include: Japanese International Corporation Agency (JICA); Centers for Disease Control and Prevention (CDC) of USA, CDC Foundation and Program for Appropriate Technology in Health (PATH) among others. The facility also works very closely with other institutions in Africa in evaluation of its products.
The facility hopes to enhance its collaborations with various institutions in Africa by exchanging ideas on product development and by operating on the open-door policy that allows interested professionals on the continent to come to KEMRI for relevant on-job training on any of the available technology platforms at the facility.

Key Publications


ANDI CENTRE OF EXCELLENCE IN MANUFACTURING AND REGULATORY TRAINING

Head of CoE: Wilson A. Mlaki
Institution: Kilimanjaro School of Pharmacy
Country: Tanzania
Website: http://saintlukefoundation.co.tz/kilimanjaro-school-of-pharmacy/

Kilimanjaro School of Pharmacy (KSP) CoE focuses on the areas of Pharmaceutical Manufacturing and Regulatory Training, Active Pharmaceutical Ingredients (APIs), Formulation and Drug Product Development and Manufacturing. The KSP CoE has successfully initiated a number of Innovations for Africa. The Centre relies upon the participation of excellent scientists to specifically promote improved access to medicines. These experts have a wealth of experience and are world experts at drug development.

Figure 8: Model for CoE Killimanjaro School of Pharmacy (KSP)
The KSP Centre of Excellence was founded as an Industrial Pharmacy Training Unit (IPTU) to catalyse three important goals. Each of these goals is grounded in the conviction that local production of high-quality medicines in Africa will increase availability, decrease overall costs, eliminate counterfeit medicines, and build long-term independence in medicines production. Our first goal is to educate African scientists employed by the pharmaceutical industry or as regulators in government. We provide advanced training programs, including a unique manufacturing laboratory that educates African professionals on the details of drug manufacturing and regulation. We believe that African National Drug Regulatory Authorities (NDRAs) with Strict Regulatory Authority (SRA) status will detect counterfeit and substandard drugs more effectively and at a much lower cost than the multiple, expensive, complicated systems of drug management presently in place. A second goal is based on the premise that education in Manufacturing Development will increase local production in Africa and that increase will greatly reduce the incidence of stock-outs of important medicines. A third goal is to enable the manufacture and distribution of pediatric medicines.

The KSP Centre of Excellence is a non-profit organization. KSP is fundamentally a training institution, and will remain so in the future. Our CoE will enable the introduction of increased numbers of new products, increase the capacity, and improve the quality of medicines in Sub-Saharan Africa. Our efforts will eventually be self-sustaining by the introduction of niche commercial products either at the Centre or through collaborating companies. In doing this, we will not compete with other Quality-Assured production in Africa, and we will not compete with commercial entities. Our reasons for acquiring manufacturing approval are to improve our education, to ensure our technology transfer to African Pharmaceutical companies, and to finance ongoing operations. The model for the KSP CoE is shown in Figure 8.
LaGray Chemical Company Ltd, the first manufacturer of APIs in West Africa, is a fully vertically integrated pharmaceutical manufacturing company, with technology for the manufacture of active pharmaceutical ingredients (APIs) as well as finished dosage forms.

LaGray has the following departments:

Research and Development: Currently primarily engaged in a) the development of liquid, semi-solid and solid non-sterile dosage forms, b) the development of chemical processes for the manufacture of APIs of interest and c) primary anti-infective drug discovery in collaboration with the University of Ghana.

Quality Control: Engaged in analytical methods development, methods validation and control of product release. We have a wet chemistry laboratory, instrumentation and a microbiology laboratory.

Quality Assurance and Regulatory Affairs: Responsible for compliance, quality systems management and pharmaco-vigilance. This function is spearheading the company’s efforts toward attaining WHO prequalification for the manufacture of some selected products for the treatment of priority endemic diseases.

Production: Responsible for the manufacture of the company’s products as well as contract manufacturing. LaGray has flexible technological capabilities for manufacturing fully synthetic APIs as well as for structural modifications of natural products. Finished dosage forms manufactured at LaGray include solutions and suspensions, creams and ointments, capsules, tablets and powder sachets.

Facilities and Infrastructure

The facilities at LaGray are fully cGMP compliant in design, construction and operation. The Company is the recipient of the 2009 Frost & Sullivan African Excellence Award for innovation in the pharmaceutical industry; the 2009 Gold Award for Ghanaian Business Excellence, and striving toward excellence recently received the 2010 Pharmaceutical Society of Ghana award for Innovation in
Manufacturing. LaGray’s focus is the manufacture of drugs for the treatment of priority endemic diseases and so the Company remains very selective in the choice of generic products for commercialization. These include anti-infectives such as azithromycin, clindamycin, doxycycline and fluconazole that also show utility for the treatment of opportunistic infections in HIV-AIDS. Conscious of the dearth of formulations for pediatric diseases LaGray has introduced pediatric formulations for azithromycin, fluconazole and ibuprofen and are working on a formulation of zinc sulphate for diarrhea.

The company is situated on a 4 acre property with room for expansion. The facilities consist of an administrative wing, laboratories and a manufacturing block. The laboratories consist of Quality Control laboratories and Research and Development laboratories.

**Quality Control Laboratories**

The quality control laboratories include a wet chemistry lab equipped with instrumentation such as autotitratotrs, comparative dissolution testers, Karl Fisher titrators and fume hoods. Next is an instrumentation laboratory equipped with an atomic absorption spectrometer, an FTIR, HPLCs, UV and visible spectrophotometers etc. A microbiology laboratory with a laminar-flow biohazard hood and a Class 10,000 clean room environment, classified as a BSL-2 lab.

**R&D Laboratories**

The R&D laboratories comprise a pharmaceutical development laboratory and a process chemistry laboratory. The pharmaceutical development lab has equipment for the development of liquid formulations, such as syrups and tincture, semi-solids such as creams and ointments, as well as solid dosage forms including tablets, capsules and powders for oral suspension.

The process chemistry laboratory is equipped with regular chemistry laboratory glassware for synthetic organic chemistry as well as kilo-scale reactors, a kilo-scale rotary evaporator and kilo-scale fraction collector for industrial scale separations and purifications.
The Botswana Vaccine Institute was established in 1979 as a wholly owned government company with the aim of utilizing the locally available foot and mouth disease virus strains to manufacture relevant FMD vaccine locally. BVI has thus accrued over 30 years of experience and expertise in the vaccine-production business and has been able to move with the latest trends/technologies in vaccine production. The Institute was set up with the cooperation of IFFA MERIEUX now Merial who to this date remain as Technical partners. After an initial production of 2000 mono-doses of FMD vaccine annually BVI now produces 13 million mono-doses annually and also produces other vaccines. The Botswana Vaccine Institute, over the years, has also diversified its product line namely introducing Rinderpest vaccine in 1985; Anthrax and Blackquarter vaccines in 1992; Contagious Bovine Pleuropneumonia vaccine in 1993; Thermo-stable Rinderpest vaccine in 1994 and Peste des Petits ruminants vaccine in 1998. In 2005 Rinderpest vaccine was discontinued following recommendation by FAO on the Global Rinderpest Eradication Program after the successful eradication of the disease in Africa.

BVI is currently expanding its facilities and will, by the end of this 2010, be the first lab in Africa to produce purified FMD vaccine. BVI remains the only lab in Africa to produce FMD vaccine at Industrial scale and using the latest technology in cell suspension culture. The Company continues to excel in vaccine production and is continuously and remains Africa’s centre for excellence in vaccine production. BVI is run as a public company with no funding from government. All profits realized from sales are re-invested into the company. BVI has been successfully exported its vaccines to most Southern African Development Community (SADC) countries, the rest of Africa as well as in countries of the Middle East. The Company is currently investigating the possibility of increasing its product range by utilizing some newly available space in its old laboratory. Vaccines that would be targeted in the new facility are those against diseases that are of national and continental importance.

BVI adheres to producing vaccines in accordance with the best practice (GMP) and OIE standards and thus has structured its work force in a manner to meet the challenges of producing to the highest standards.
BVI successfully helped spearhead the production of a thermo-stable Rinderpest vaccine that was used in the eradication of the disease in Africa, and by the end of 2010 will be producing purified FMD vaccine which will revolutionize the livestock export market throughout Africa. Moving forward BVI will be involved in the potential lypholization efforts of the East Coast Fever Vaccine.

Through its OIE mandate, the BVI provides relevant expertise during FMD outbreak investigation and disease surveillance for the region including sample collections and confirmation and buffalo surveys. BVI performs a vaccine matching proficiency testing with the OIE/FAO network of reference laboratories annually to contribute to the international surveillance of FMD worldwide. BVI trains the national laboratories personnel for capacity building, harmonization and standardization of laboratory methods and techniques.
VACSERA is a government owned holding company that works under the umbrella of the Ministry of Health. It started with a small laboratory established in 1881, and joined the long journey of disease prevention and vaccine production by producing the small pox vaccine for the first time in Egypt on 1893, followed by the rabies in 1907. Finally VACSERA starts the establishment of a state-of-the-art seasonal and pandemic influenza manufacturing facility funded by WHO since 2010.

The word “VACSERA” is derived from the words (vaccines) and (sera) reflecting our commitment to serve the preventive medicine branch in the healthcare sector through production of top quality vaccines and antiserum. VACSERA is a leading manufacturer of vaccines and biological products in Egypt and the whole region, focusing on “improving quality of human life” through the production of conventional and innovative, high-value products for disease prevention, control, and treatment.

One of VACSERA’s main strategic goals is to magnify the role of R&D and cooperate with research centres and multinational companies in exchange of knowledge and technology transfer, thus we extended its business to cover the field of applied research and development of vaccines production.

VACSERA main laboratories and research centres which are highly equipped to allow conducting research are:

• Preclinical Animal House for Preclinical Studies & Research
• Clinical Trials Center
• Microbiology, Immunology, Virology and Molecular Biology research centres
• Pilot Plant Conjugate Bacterial Vaccine Laboratory
• Innovation Development Center
• Helwan Husbandry Farm
• WHO Regional Reference Polio Laboratory-VACSERA
• WHO national Reference influenza Laboratory-VACSERA
• Venom & Antisera Applied Research Center

List of Product titles (for a complete list, please see website):

• Bacterial vaccines
• Viral vaccines
• Antiseras
• Immunoglobulin
• Biopharmaceuticals products
• Blood derivatives local products
• Diagnostics
• Cell culture
• Veterinary Vaccines

Some Of VACSERA Patents (for a complete list, please see website):
• Production of diphtheria antitoxin of horse
• Method of preparation of anti-scorpion serum
• Method of preparation of anti-snake serum
• Production of hemagel
• Blood Grouping reagents A;B by monoclonal
• Production of tetanus antitoxin of horse
• Treatment and prophylactic drug for Malaria
CONCLUSION

ANDI sees these pan-African Centres of Excellence and other highly capable research and manufacturing institutions in Africa as the critical building block for sustainable health innovation on the continent. This innovative network is at the crossroads between today’s needs and tomorrow’s challenges.

These interdisciplinary centres span the various parts of the innovation value chain for drugs, diagnostics, medical devices as well as implementation and health systems research. The dynamic nature of this network or consortium allows for the addition of other centres through future calls. Existing CoEs will be regularly evaluated to ensure that they remain competitive.

Finally, the CoEs network provides a critical mass of capacity to tackle translational research challenges and contribute to the following:

- Carry out training and other capacity building activities, including support for grant writing, project management and IP management
- Offer exchange programmes, placements and sabbaticals to researchers and institutions within Africa and internationally
- Share knowledge, technology transfer
- Disseminate information, knowledge/resources across the continent
- Promote public-private partnerships, and serve as incubator hubs for new companies
- Host experts from developed countries and emerging economies in support of capacity building in various areas of the innovation value chain, in an effort to increase North-South and South-South collaborations with CoEs.
- Host specialized R&D equipment, including those secured through donations supporting other institutions in Africa
- Support training for product regulation, quality assurance and local production projects
- Support established technology incubators in Africa
ANDI is actively seeking funding to implement some of the activities outlined above in collaboration with CoEs and other partners. Please contact the ANDI Secretariat if you have any questions or if you are interested in supporting this initiative, or the work of ANDI in general: secretariat@andi-africa.org.

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