CSRS
Centre Suisse de Recherches Scientifiques en Côte d'Ivoire

Afrique One

Aspire

Call for Fellowships Afrique One-ASPIRE

TTP3: Mycobacterial Infection and Control

For more information concerning TTP3, contact the Co-leads:

Kennedy Kwasi Addo, NMIMR, Ghana, kaddo@noguchi.ug.edu.gh

Rudovick Kazwala, SUA, Tanzania, kazwala@gmail.com

Ref: TTP3-Mycobacteria-PDF1

Project Title: Identification and assessment of new diagnostic strategies for mycobacterial infections

Postdoc Fellowship: To be conducted within the Afrique One-ASPIRE consortium in population and ecosystems health

Project Description: Diagnosis of human pulmonary tuberculosis (TB) has, for many years, been based on microbiological analysis of sputum for *Mycobacterium tuberculosis*. Novel diagnostic tools are being continuously developed to enhance the diagnosis of TB from sputum samples. However, in the absence of sputum (e.g. cases of childhood or extra-pulmonary TB) diagnosis is based on history, clinical signs and symptoms. This could lead to either unnecessary TB treatment, due to false positive interpretations, or to undiagnosed TB in children. These clinical methods have not been validated against the gold-standard in the paediatric population, which is to culture the pathogen. There is a need to use a combination of novel microbiological and immunological methods to find a best way of diagnosing TB in children and to resolve those challenges.

Buruli ulcer disease is endemic in many tropical parts of the world with highest prevalences reported from West African countries including Togo, Benin, Côte d'Ivoire, Burkina Faso and Ghana. The disease is associated with skin lesions that appear, at early stages, as hard, painless subcutaneous nodules fixed to the skin but mobile over the underlying tissue, which may cause itching. As the disease progresses, the fat and the overlying skin become necrotic, and ulcers with deeply undercut edges are formed. Any part of the body may be affected; however, most lesions occur on the limbs. *M. ulcerans* produces a toxin called mycolactone that destroys skin and bone and suppresses the immune system. There are three main pre-ulcerative forms: nodules, plaques and non-ulcerative oedema. The exact mode of transmission is not entirely known. The majority of victims are children under the age of 15 who live in poor rural areas near rivers, wetlands and stagnant water bodies.

The postdoctoral candidate should develop a research concept along the following project areas:

(1) Identification of a suitable combination of old and new microbiological and immunological tools to develop a feasible diagnostic algorithm for TB in children
(2) Development of diagnostic tools for a Buruli ulcer–Point of Care (POC) test kit. The test would involve taking either a small amount of body fluids or material from the site of the infection for a rapid point of care assay.

Enrolment: The successful postdoc fellow will be hosted in any of the following institutions: NIMR, KCRI/KCMC, MUHAS, NM-AIST or SUA, Tanzania, University of Ghana, Ghana or University of Doba, Chad.

Mentorship Team: Sayoki G. Mfinanga, Bernad Ngowi and Esther Ngadaya (NIMR); Sven G. Hinderaker (University of Bergen, Norway); Rudovick Kazwala (SUA); Blandina Mmbaga, Hadija Semvua, Marion De Boere Sumari and Stellah Mpagama (KCRI/KCMC); Kennedy Kwasi Addo (NMIMR); Lydi Mosi (University of Ghana); Richard Ngandolo Bongo (IRED); Jakob Zinsstag and Felix Roth (Swiss TPH); Julius Keyyu (TAWIRI); Joram Buza (NM-AIST); Bassirou Bonfoh (CSRS); Sarah Cleaveland (GoU); Frank Adae Bonsu (Ghana Health)

Qualifications: The candidate must be a citizen of an African country. Applicants should have a PhD, MD/PhD or an equivalent degree with a strong background in relevant biomedical sciences.

Individuals who have submitted their PhD dissertations are also eligible to apply but must submit proof of this submission (e.g. a letter attesting to the submission from the Registrar of the University).

Applicants must be highly motivated, exhibit strong research and conceptual skills and be interested in developing novel research directions.

Individuals should have proven abilities to organize and execute research projects with minimal supervision to perform work independently and to document their results to a high standard.

Applicants must have strong written and oral communication skills in English - working knowledge of English would be an advantage. Experience in management and training of junior staff is desirable. Applicants must also have the ability to work in an inter-disciplinary research environment involving collaborations with Afrique One-ASPIRE partners.

Individuals will be responsible for developing their own research protocols, obtaining the necessary regulatory approvals and carrying out all the required experiments at the responsible institutions.

Duration and Training: Successful candidates will be engaged at the Research Fellow grade in the chosen institute on a one year contract, renewable up to a maximum of 3 years based on satisfactory performance. The postdoc fellow will undergo a thematic training program on mycobacterial infections. Training will be provided primarily in Tanzania, with opportunities for further training within the AO-ASPIRE consortium and with supervisory partners in the UK, US and Switzerland, depending on needs and internal budget considerations.

Ref: TTP3-Mycobacteria-PhD/MSc

Project Title: Bio-molecular techniques to differentiate mycobacterial species with zoonotic potential to determine drug susceptibility patterns and advise on policy changes on existing treatment options

PhD and MSc Fellowship: 3 PhD and 4 MSc fellows will develop projects in line with the above topic to be conducted within the Afrique One-ASPIRE consortium in population and ecosystem health.

Enrolment: Fellows will be enrolled at any of the following institutions: University of Ghana, Ghana, University of Doba, Chad, KCRI/KCMC, MUHAS, NM-AIST and SUA, Tanzania, EISMV, Senegal or Université Félix Houphouët-Boigny, Côte d'Ivoire.

Project Description: Tuberculosis (TB) causes 8 million infections and 1.5 million deaths annually with a rise in multi-drug resistance cases in developing countries. There is an increased rate of TB treatment failure which urges to invest more resources in studying species and aetiologies using available and novel techniques. The outcomes of the overall project will serve as a guide to governments and members of the public health community in formulating new or reviewing existing treatment options and policies for TB and non-TB mycobacterial diseases in African population.

This project will be conducted by 3 PhD and 4 MSc students who will develop/add to the existing expert team to fight against TB in Africa. The PhD and MSc students are expected to develop their own concepts along the following objectives:

1. to differentiate *Mycobacterium tuberculosis* complex (MTBC) isolates at the species level from TB disease prevalence surveys and selected clinics including MDR clinics and animal sources

2. to differentiate non-tuberculous Mycobacteria (NTM) isolates to the species level from TB disease prevalence surveys, selected clinics including MDR clinics and animal sources

3. to use innovative techniques to uncover the etiological agent(s) of extra-pulmonary TB and their drug susceptibility profiles

4. to determine the presence of mutations associated with drug resistance using sequencing

5. to determine the first and second line drug susceptibility patterns of MTBC isolates

6. to determine the drug susceptibility patterns of NTM isolates

7. to identify novel immunological and microbiological techniques for diagnosing TB in cattle

Mentorship Team: Sayoki G. Mfinanga, Bernad Ngowi and Esther Ngadaya (NIMR); Sven G. Hinderaker (University of Bergen, Norway); Rudovick Kazwala (SUA); Blandina Mmbaga, Hadija Semvua, Stellah Mpagama and Marion De Boere Sumari (KCRI/KCMC); Kennedy Kwasi Addo (NMIMR); Lydi Mosi (University of Ghana); Richard Ngandolo Bongo (IRED); Jacob Zinsstag, Sebastian Gagneux and Felix Roth (Swiss TPH); Julius Keyyu (TAWIRI), Joram Buza and Francis Shahada (NM-AIST); Bassirou Bonfoh (CSRS); Sarah Cleaveland (GoU); Mark Wamalwa (BecA-ILRI)

Qualifications: The candidate must be a citizen of an African country. Candidates from any discipline contributing to One Health (e.g. public health, veterinary and animal sciences, social sciences, geography, epidemiology and health economics) will be considered. Candidates with an MSc degree in a relevant field are preferred.

Duration and Training: The PhD is funded for 3–4 years (including maternity leave) and the MSc for 2 to a maximum of 2.5 years. Fellows will absolve a thematic training program on mycobacterial infections. Training will be provided primarily in Afrique One-ASPIRE countries, with opportunities for further training within the Afrique One-ASPIRE consortium and with supervisory partners in the UK, Switzerland and US, depending on needs and internal budget considerations.