



Call for MSC Studentship



Armauer Hansen Research Institute (AHRI) is a basic/translational biomedical and clinical epidemiology researches, and clinical trial facility under the Federal Ministry of Health of Ethiopia. In addition, AHRI is known as a hub for skill and technology transfer by providing competitive post graduate research training opportunities. Accordingly, the Bacterial & viral diseases research directorate (BVDD) of AHRI would like to recruit five MSc students for the following project.

1. Functional and molecular characterization of *Aeromonas* among diarrheal patients and healthy controls (MSc)

Aeromonas are emerging gastrointestinal pathogens involved in many food-borne disease outbreaks. Gastrointestinal illnesses associated with *Aeromonas* infections include acute watery diarrhea, dysenteric diarrhea, chronic diarrhea, and traveler's diarrhea. More severe gastroenteritis caused by *Aeromonas* resembles the symptoms of shigellosis. The pathogenicity of *Aeromonas* species is complex and involves a series of virulence factors, toxins, and adhesins. Pathogenic *Aeromonas* strains have a wide range of toxin virulence genes. The rapid increase of antibiotic resistance in *Aeromonas* species is another concerning feature of this group of bacteria, especially against carbapenems and β -lactams. *Aeromonas*-related gastroenteritis outbreaks have been reported from different parts of the world. However, in Ethiopia, there is no report of *Aeromonas*-associated diarrhea despite frequent diarrheal outbreaks. This could be due to poor isolation and identification techniques for *Aeromonas* species, or no attention was given to this group of bacteria. Therefore, isolation and characterization of *Aeromonas* in diarrheal cases is crucial for better management and control of diarrheal diseases. This study aims to investigate functional and molecular features of *Aeromonas* among diarrheic patients and healthy controls.

2. Carbapenemase and ESBL producing bacterial pathogens in Health Care Associated Infections /catheter-associated urinary tract infections.

Healthcare-associated infections (HAIs) caused by antibiotic-resistant pathogens among hospitalized patient is a public health concern, especially in resource-limited areas where there is no effective antibiotic stewardship program and poor infrastructures. Infections due to resistant pathogens in a hospitalized patient are a serious risk to the safety and quality care service delivery and resulted in a high mortality rate and lengthy hospital stay and associated costs. Because of inappropriate use of antibiotics and poor infection control strategy in health care facilities emergence and spread of antibiotic-resistant microbes steadily increasing. Carbapenem antibiotics are an important treatment option for life-threatening infections. However, it is threatened by the emergence of carbapenem-resistant pathogens. In Ethiopia, the burden of HAIs due to resistant pathogens is a major public health concern, and there is a need of assessing resistance spread, especially resistance to carbapenem and β -lactam. Catheter-associated infection is one of the most common HAIs and introducing high rates of resistance. Long indwelling catheters serve as a reservoir of carbapenem and extended-spectrum β -lactam resistant bacterial pathogens. Therefore, monitoring antimicrobial resistance associated with catheterization is vital to effectively controlling and treating of HAIs. The aim of this study is to investigate carbapenemase and ESBL mediated resistance among catheterized patients.

3. Development of low cost, rapid point-of-care molecular test for the detection of *Neisseria meningitidis* in the blood sample.

Bacterial meningitis is a serious infectious disease that can be fatal in children and in adults and remain an important health problem world-wide. *Neisseria meningitidis* (Nm or meningococcus) is the etiologic agent of epidemic bacterial meningitis and rapidly fatal sepsis throughout the world. Isolation of Nm from cerebrospinal fluid (CSF) or



Abemseged Abdisa Lencho (PhD)
- Deputy Director General
Armauer Hansen Research Institute

30/8/2021

blood by culture is the gold standard for diagnosis of meningococci which typically requires 24-72 hours. Besides it has the long waiting period to obtain the test result and to prescribe appropriate antibiotics, culture method has limited diagnostic sensitivity, especially in cases with prior antibiotic treatment. Thus, only half the true cases of meningococci are identified by culture. Therefore, the objective of this project is to develop low cost, rapid point-of-care molecular test for the detection of *Neisseria meningitidis* in the blood sample.

4. Molecular characterization of *Vibrio cholera* responsible for cholera epidemics in Ethiopia.

Cholera, an acute diarrheal disease, essentially was eliminated in the western world many decades ago, but has continued to cause many deaths in sub-Saharan Africa, South America and Asia. Cholera diagnosis in most countries in sub-Saharan Africa, including Ethiopia, is by stool culture, serology and biochemical methods. These testing methods are unable to establish the genotype and virulence. Therefore, the main objective of this study is to determine the genotype and virulence of *V. cholerae* responsible for the various cholera outbreaks in Ethiopia using molecular techniques.

5. Molecular characterization of pharyngeal *Streptococcus pyogenes* isolates from febrile children.

Streptococcus pyogenes (group A Streptococcus [GAS]) is an important pathogen responsible for a broad spectrum of infections ranging from pharyngitis and impetigo to invasive necrotizing fasciitis, streptococcal toxic shock syndrome, puerperal fever, pneumonia, and bacteremia. GAS has various virulence factors that are important for successful host invasion. Detection of virulence factors produced by GAS strains can be used to either determine pathogenic potential of the strain or as a rapid screening and typing method. Infection with antibiotic-resistant bacteria often leads to chronic immune-mediated disorders such as acute rheumatic fever and glomerulonephritis. The project aims to apply molecular tools in order to characterize the major virulence factors, to perform typing and identify antibiotic resistance genes of *S. pyogenes* strains which have already been isolated from febrile children in Adama and Sodo.

MSc Student Requirements: A competent candidate for the studentship should fulfill the following criteria:

1. Should top 10% his BSc level training in biomedical sciences
2. Should have adequate experience involving microbiology and an exposure to molecular techniques.
3. Should be an MSc student in biomedical sciences registered at public universities in Ethiopia and completed the required first year course work in their MSc program.
4. Should be ready to dedicate 100% of her/his time for the project.

Study Site: Addis Ababa

Duration: Maximum 2 years

Value of Studentship: This position/studentship covers full research costs for the whole duration of the MSc project. It does not provide stipend for students.

How to Apply: Applicants should submit the following documents to AHRI, Research Training Directorate, (research.training@ahri.gov.et)

- A cover letter and their CV, including full contact details of two referees;
- Copies of their BSc certificate and transcripts and (number of publication if any)
- Copy of transcript reflecting first year MSc courses.

Note: - Please make sure you mention the project titles in the application (motivation letter)
-Female candidates are strongly encouraged to apply.

Application closing date: Ten working days after the date of advertisement.

