



Call for applications for 1 Doctoral study and 1 Postdoc fellowship in the area of infectious diseases

1. Background

The University of Rwanda (UR) with its partnering Swedish Universities offers opportunity to complete one doctoral degree (PhD) in infectious diseases areas, in the new partnership of five years (2021-2026) funded by the Swedish International Development Agency (SIDA). Infectious diseases constitute a heavy burden for Rwanda and other developing countries. In particular, improvements in the prevention, diagnosis and management of viral diseases are warranted. The objectives of the proposed projects for PhD research in sandwich mode within the infectious diseases sub-programme of the UR-Sweden Programme for Research are to conduct epidemiological studies on challenging infectious diseases in Rwanda, along with drug development and optimization for treatment of infectious diseases and propose solutions to alleviate the infectious burden in the country. **1 PhD and 1 Postdoc fellowship are open in this call.**

2. The PhD programme

Programme description: *Optimization of drug treatment by metabolic enzyme genotyping in patients with malaria and cervical cancer in the Rwandan population*

Africa has the greatest genetic diversity of all continents but there is also a large genetic variability within different countries in Africa. Genetic diversity leads to differences in the metabolism of drugs including antimalarials and chemotherapy, which could lead to worse clinical efficacy but also to more adverse effects.

In Rwanda, the incidence of malaria has increased four-fold since 2014. However, mortality from malaria has decreased due to efficacious artemisinin-based combination therapy. There are, however, worrying reports of resistance development in this region (Zeile et al., 2012; Tacoli et al., 2016). This means that optimized treatment to avoid underexposure is vitally important to prevent further resistance development.

Different treatment modalities are used in the treatment of cervical cancer including surgery, radiation and chemotherapy. At the Butaro Cancer Centre of Excellence in Rwanda paclitaxel is used against different cancer forms including cervical cancer. Paclitaxel is, however, associated with adverse effects including anaphylaxis, neutropenia and neuropathy. Neuropathy may in many cases become chronic leading to significant morbidity in gynaecological cancer patients. The research question of interest is whether the degree of toxic effects of paclitaxel in different patients can be explained by different genotypes encoding for CYP2C8 polymorphism? The overall aim of the study is to individualize dose regimens for cervical cancer treatment with paclitaxel by genotype and thereby minimizing adverse drug effects.



The PhD student will be enrolled in a PhD sandwich program: He/She will make yearly visits to Sweden. The planning of these visits will take into account the needs of the PhD student's education as well as the requirements of the UR Sweden program management. The PhD student will attend the PhD courses at Gothenburg University including the compulsory set of PhD courses, as well as elective PhD courses of interest. The Swedish supervisors are Sofia Birgersson, and Magnus Gisslén (UGOT), and Rwandan supervisors are Emile Bienvenu, Egide Kayitare

3. Funding

The PhD and postdoc will be fully funded, and they will be supported by SIDA through UR Sweden Program for research, higher education and institutional advancement. PhD is expected to last for 4-5 years and Postdoc fellowship 2-3 years.

Candidates are invited to submit their applications according to the process described below.

4. Role of the PhD student

The PhD student will work on the *Optimization of drug treatment by metabolic enzyme genotyping in patients with malaria and cervical cancer in the Rwandan population.*

Aim. To optimize standard treatment in Rwandan patients based on different metabolic enzyme genotype, focusing on patients treated for malaria and cervical cancer.

Work plan. A Rwandan PhD-student will plan and coordinate clinical studies in patients treated with standard treatment for malaria or cervical cancer. Plasma samples will be quantified for drug exposure and blood samples will be collected for genotyping. A population pharmacokinetic model will be developed to simulate improved dosing schedules.

The PhD student will have a significant role in implementing the research in the field, as well as provide support to health professionals. She/He will primarily be collaborating with other existing PhD position in Infectious diseases, where part of his/her PhD studies will be allocated to the cancer treatment.

5. The Postdoc programme

Programme description: *Aspects of infection and development of hematopoietic cancer in Rwanda*

This postdoc project revolves around the hypothesis that certain types of infections may predispose to the development of acute leukemia. Our research group has, during the previous phase of the SIDA-funded collaboration with the University of Rwanda, collected leukemic samples from more than 100 cases of newly diagnosed acute leukemia in Rwanda. Since the Rwandan population is exposed to a high degree of infections, including malaria, this material provides a unique opportunity for studies of possible connection between infections and development of acute leukemia.



In initial analyses of this material, we have identified a subgroup of patients with acute lymphoblastic leukemia (ALL) showing signs of ongoing malaria infection. A large fraction of these patients also showed signs of active Epstein-Barrvirus (EBV)-infection. Previous studies demonstrate that malaria can inhibit immunity, which may allow expansion of EBV-transformed cells, resulting in Burkitt's lymphoma/leukemia (Moormann et al.,2016). Thus, malaria and EBV may act in synergy to cause ALL.

Our initial analysis of samples from Rwandan ALL patients with signs of ongoing malaria infection do however not show the characteristic Burkitt-related genetic changes or morphology. We therefore hypothesize that we may have found a new EBV-related subtype of ALL. In the planned postdoc project, we will aim to further characterize these leukemic cells. In addition, we will collect additional samples from patients with lymphoma and also screen the leukemia and lymphoma material for additional connections between infections and acute leukemia.

The selected postdoc will perform part of the project in Rwanda and part in Sweden, in the format of a sandwich postdoc project. The Swedish supervisors are Anna Martner and Kristoffer Hellstrand (UGOT), while Egide Kayitare and Ntaganda Fabien are the Rwandan supervisors.

6. Role of the Postdoc

The postdoc will take an active part in all aspects of the project.

Aim. To define if malaria and EBV infection constitute risk factors for hematopoietic malignancies other than traditional Burkitt's lymphoma/leukemia.

Work plan: The postdoc will be responsible for planning and organizing sample collection in Rwanda. He/she will also perform analysis of these samples in Sweden, including DNA-preparation, and sequencing analysis, and participate in writing the manuscripts. Sample analysis will be performed in collaboration with PhD-students, postdocs and bioinformaticians at the Sahlgrenska Center for Cancer Research, UGOT.

7. General eligibility criteria

The applicant must be:

- i. Permanent staff of the University of Rwanda
- ii. Citizen of Rwanda
- iii. Holding a Master degree of Medicine or Sciences in the area of health for PhD position/ holding a PhD degree of Medicine or Science in the area of health sciences for Postdoc.
- iv. Ready to spend a minimum of 7 months in Sweden in multiple visits
- v. Ready to continue working at the University of Rwanda after completion of
- vi. the PhD studies;
- vii. As per the policy, male applicants below the age of 40 years of age and female applicants below 45 years of age are given priority for PhD scholarships. Post-doctoral fellowships applicants should have completed their PhD studies within the preceding 5 years.



The candidates must be prepared to return back immediately after receiving a letter confirming satisfactory completion of the degree to serve in Rwanda. For PhD scholarships, the candidate should be prepared to work full time on the project and not in possession of another fellowship for PhD studies

8. Specific eligibility criteria

Essential criteria:

- i. The candidate should hold a master's degree in medical sciences or Pharmaceutical Sciences /PhD degree in Medical or pharmaceutical sciences
- ii. The candidate must be English proficient

Desired criteria:

For a PhD position, it is desirable, but not required, that the candidate has knowledge and experience in:

- i. pharmacokinetics,
- ii. bioanalysis and
- iii. clinical study conduct

For postdoc position it is desirable that the applicant has thorough knowledge in hematology and immunology, and methodological experience of molecular biology and flow cytometry. Note that the PhD candidate is expected to contribute to teaching at University of Rwanda. However, during the study period, the teaching load is maximum 20%. Other side activities, assignments, consultancies or employment are strongly discouraged. Female candidates are encouraged to apply and there is a gender equality component in the program that will provide some support for parents who travel with children.

9. How to apply

Interested applicants should submit the following:

- i. An application letter for the position, the subject should be **PhD/postdoc Infectious diseases** it must specify which of the positions the applicant is applying for.
- ii. A personal motivation statement for the programme of study. This statement should demonstrate commitment, motivation and reasons for interest in the programme (max 2 pages).
- iii. For both positions, two recommendation letters from people who can comment on the candidate's intellectual curiosity and academic ability to pursue research, leading to a PhD in the specified thematic area/continue as an independent researcher: one of the recommendation letters should be issued by a previous academic supervisor, preferably the Master's degree supervisor/PhD-supervisor.
- iv. Applicants from a College at UR need to inform the Principal about applying for this position; and attach a confirmatory letter from the Principal, who received this information.
- v. Applicants from collaborating government institutions must attach letter from employer ensuring the candidate gets study leave for the entire period if chosen for the scholarship;
- vi. Certified copy of the Master's degree for PhD applicants/ PhD degree for postdoc applicants.



- vii. Copies of valid identification card or passport
- viii. Copy of the Master dissertation/ PhD dissertation;
- ix. Current CV (maximum of 3 pages) with full name, e-mail, date of birth, sex, formal education at university, including full specification of the Masters' degree specialization, teaching experience, previous experience relevant to the programme, present position, scientific publications and/or any other academic experience that may be relevant.
- x. Concept note outlining problem statement, research question and research design, discuss/suggest some appropriate methodology for the topics as well as a few key references research methodology
- xi. A copy of published scientific papers, proceedings and similar (optional)
- xii. An electronic version of application should be sent to: ur-cpgscholarship@ur.ac.rw and copy to egide.kayitare@gmail.com, sofia.birgersson@gu.se,

Please name the application folder with your name and e.g: Egide Kayitare- Infectious diseases.

10. Submission deadline

The deadline for application is 08th October 2021

11. Recruitment process

Applications must be submitted by emails as specified above. The candidates will be notified if they are called for an interview.

The interviews are expected to take place at UR campus in Kigali on 08 November 2021.

The recruitment team includes senior staff from both UR and Swedish universities. Successful candidates will be notified on 29 November 2021 after the interview and expected to start on their new position on in February 2022.

12. Contact for more information

- UR-team leader email: egide.kayitare@gmail.com
- Sweden Team leader: sofia.birgersson@gu.se

Done at Kigali, September 16, 2021



Prof. Nosa O. EGIEBOR
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