

Form B-2
(FY2022)
Must be typed

Date (日付)

(Date/Month/Year: 23 日/12 月 2022/年)

Activity Report -Science Dialogue Program-
(サイエンス・ダイアログ事業 実施報告書)

- Fellow's name (講師氏名): Dr. Martin Wekesa SIFUNA (ID No. P22047)

- Name and title of the lecture assistant (講義補助者の職・氏名)

Taichi YOKOYAMA

- Participating school (学校名): Yakuendai High School

- Date (実施日時): _____ (Date/Month/Year: 23 日/12 月 2022/年)

- Lecture title (講義題目): Malaria diagnosis in resource limited settings

- Lecture format (講義形式):

◆ Onsite ・ Online (Please choose one.)(対面 ・ オンライン(どちらか選択ください。))

◆ Lecture time (講義時間) 54min (分), Q&A time (質疑応答時間) 6min (分)

◆ Lecture style (ex.: used projector, conducted experiments)

(講義方法 (例: プロジェクター使用による講義、実験・実習の有無など))

I used a projector and powerpoint slides

- Lecture summary (講義概要): Please summarize your lecture within 200-500 words.

I began my lecture by giving a brief introduction of my County Kenya. Then I talk briefly again about the importance of learning, understanding and using English based on the large number of countries using English as the main language of communication. I followed this with the main topic of the day, malaria diagnosis in resource limited settings. Malaria is a major globally health burden. In 2020, about 229 million cases and over 500,000 malaria related deaths were reported, majorly in the resource-limited sub-Saharan Africa. Early diagnosis is key to the treatment of malaria. The world health organization (WHO) set affordability, sensitivity, specificity, user-friendliness, robustness rapidness, equipment-free and deliverability (ASSURED) as a criterion to determine suitability of diagnostic tools for malaria in resource-limited settings. Most present approaches, however, fall short of many elements of the criterion hence the need to develop better methods. Our research team proposes electrical impedance spectroscopy as a possible method that can be used to improve malaria diagnosis in resource limited settings. This is based on the assumption that entry of the malaria parasite into a normal red blood cell (RBC) causes a number of effects; 1; it introduces a nuclear-like structure in the RBC that then increases the RBCs impedance to electrical conductivity. 2; The parasite also induces formation of pore which

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makes RBC membrane more conductive and less capacitive compared to normal cells. 3; it causes formation of positively charged knobs which are meant to hide and prevent the parasite from going to the spleen where they can be destroyed. The knobs however make the membranes more conductive. 4. The parasites increase production of Na⁺ and lactic acid into RBC cytoplasm making it more conductive while 5. The parasite membrane makes RBC cytoplasm more capacitive and less conductive. 6. The parasite knobs on the surface of infected RBC affect charge interaction on the surface of the RBC therefore affecting the way RBC aggregate and sediment during surgical procedure involving patients with malaria. Each of the said changes are studied by electrical impedance spectroscopy (EIS) as objectives towards improved diagnosis of malaria. In my presentation, I centred on determining an optimal electrical parameter for measuring the rate of sedimentation of RBC also called erythrocyte sedimentation rate (ESR).

◆Other noteworthy information (その他特筆すべき事項):

We arrived on time and had enough time to prepare for the lecture so all was OK

- Impressions and comments from the lecture assistant (講義補助者の方から、本事業に対する意見・感想等がありましたら、お願いいたします。):

The lecture assistant introduced the research topic briefly before handing over to me and all the process was smooth.