BIOGRAPHICAL SKETCH

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NAME: NKYA, SIANA WATOKY

eRA COMMONS USER NAME (credential, e.g., agency login): SIANAMTATIRO

POSITION TITLE: Senior Lecturer

EDUCATION/TRAINING *(Begin with baccalaureate or other initial professional education, such as nursing, include postdoctoral training and residency training if applicable. Add/delete rows as necessary.)*

INSTITUTION AND LOCATION	DEGREE (if applicable)	END DATE MM/YYYY	FIELD OF STUDY
University of Dar es Salaam Dar es Salaam, Tanzania, Dar es Salaam	BS	06/2004	Microbiology and Chemistry
University of Dar es Salaam Dar es Salaam, Tanzania, Dar es Salaam	MS	09/2007	Molecular Biology
*Kings College London London, UK, London, London	PHD	12/2013	Human genetics
Muhimbili University of Health and Allied Sciences, Dar Es Salaam, Dar es Salaam	PHD	09/2016	Human genetics

A. Personal Statement

I am a female scientist and in the past ten years I have acquired skills in the fields of molecular biology and human genetics applied in malaria and sickle cell disease (SCD). As part of my MSc training, I conducted research in malaria focusing on molecular resistant markers of drug resistance in P. falciparum. For the PhD training, I have conducted research in Sickle Cell Disease (SCD). The primary focus of SCD research I have conducted has been on the genetic determinants of fetal haemoglobin and as part of this, we were able to establish a genetic database of more than 1700 individuals with SCD with well described SCD phenotypes. This data is available for investigation of genetic variants associated with SCD phenotypes, disease and intervention outcomes. I am passionate to build local capacity to conduct genetic research in Tanzania. During my training I have worked closely with the Molecular hematology department, King's college London led by Professor Thein, now based at NHLBI and the medical genetics group at Wellcome Trust Sanger Institute (WTSI). I have gathered basic knowledge and built networks that support SCD genetic studies in our country. In 2015 have also been a part of an initiative to establish newborn screening programme for sickle cell disease in Tanzania and I have gained experience in setting up a laboratory for screening of SCD. Although the newborn screening is a healthcare programme but it provides opportunities to study and set up preventive interventions including genetic diagnosis of SCD disease modifiers at birth. In 2016 I was awarded the Fogarty global health fellowship sponsored by NIH to conduct a follow up study on genetics of fetal haemoglobin in individuals with SCD. This was followed up by the Emerging Global Leader Award (K43, 2019-2024) to establish a birth cohort and study determinants of fetal hemoglobin decline. In 2018, I was awarded an American Society of Hematology Global Research Award to investigate the pharmacogenomics of hydroxyurea in individuals with SCD in Tanzania. This work has received support from Novartis Global Health (2022-2024) to expand to Ghana and Nigeria. I also received an Early Career Women Scientist award by the Organization for Women in Science for the Developing World (OWSD)(2018-2020),to develop a minION DNA diagnostic technology for hemoglobinopathies in collaboration with Professor Anna Schuh of the University of Oxford, UK. I am the founder and President of the Tanzania Human Genetics Organisation.

1. Nkya S, Mwita L, Mgaya J, Kumburu H, van Zwetselaar M, Menzel S, Mazandu G, Sangeda R, Chimusa E, Makani J. Identifying genetic variants and pathways associated with extreme levels of fetal hemoglobin in sickle cell disease in Tanzania. BMC Medical Genetics. 2020 June 05; 21(1):-. Available from: https://bmcmedgenet.biomedcentral.com/articles/10.1186/s12881-020-01059-1 DOI: 10.1186/s12881-020-01059-1
2. Ben Hamda C, Sangeda R, Mwita L, Meintjes A, Nkya S, Panji S, Mulder N, Guizani-Tabbane L, Benkahla A, Makani J, Ghedira K. A common molecular signature of patients with sickle cell disease

revealed by microarray meta-analysis and a genome-wide association study. PLOS ONE. 2018; 13(7):e0199461-. Available from: https://dx.plos.org/10.1371/journal.pone.0199461 DOI: 10.1371/journal.pone.0199461

3. Mtatiro S, Mgaya J, Singh T, Mariki H, Rooks H, Soka D, Mmbando B, Thein S, Barrett J, Makani J, Cox S, Menzel S. Genetic association of fetal-hemoglobin levels in individuals with sickle cell disease in Tanzania maps to conserved regulatory elements within the MYB core enhancer. BMC Medical Genetics. 2015; 16(1):-. Available from: http://bmcmedgenet.biomedcentral.com/articles/10.1186/s12881-015-0148-3 DOI: 10.1186/s12881-015-0148-3
4. Mtatiro S, Singh T, Rooks H, Mgaya J, Mariki H, Soka D, Mmbando B, Msaki E, Kolder I, Thein S, Menzel S, Cox S, Makani J, Barrett J. Genome Wide Association Study of Fetal Hemoglobin in Sickle Cell Anemia in Tanzania. PLoS ONE. 2014 November 5; 9(11):e111464-. Available from: https://dx.plos.org/10.1371/journal.pone.0111464 DOI: 10.1371/journal.pone.0111464

B. Positions, Scientific Appointments and Honors

Positions and Scientific Appointments

2022 -	Senior Lecturer, Muhimbili University of Health and Allied Sciences, Dar es Salaam
2021 -	Technical Research Lead, SickleInAfrica
2017 -	President, Tanzani Human Genetics Organisation, Dar es Salaam
2016 - 2022	Lecturer, Dar es Salaam University College of Education, Dar es Salaam
2015 - 2016	Laboratory manager, Newborn Screening Programme, Muhimbili University of Health and Allied Sciences, Dar es Salaam
2009 - 2010	Research Scientist , Muhimbili Wellcome Programme, Dar es Salaam
2008 - 2016	Assistant lecturer, Dar es Salaam University College of Education, Dar es Salaam
2008 - 2008	Intern, Kemri Wellcome Trust, Kilifi, Mombasa, Mombasa

Honors

2003 - 2004	Best Student in Microbiology, University of Dar es Salaam
2020	Oxford Innovation Award, Oxford University
2018	Women Career Scientists Award Tanzania, Next Einsten Forum
2004	Bachelor of Science with Honours, University of Dar es Salaam

C. Contribution to Science

1. Study of fetal haemoglobin and the genetic determinants of fetal haemoglobin in individuals with sickle cell disease

   As part of my PhD, I have studied fetal haemoglobin (HbF) and the genetic patterns that influence the existing HbF variation in individuals with SCD. During this period I was able to establish network with research teams at King's College of London through Professor Swee Lay Thein and Dr Stephan Menzel. I was also able to work with statistical genetics team at Wellcome Trust Sanger Institute (WTSI), Cambridge led by Dr Jeff Barret. Through these networks we conducted candidate gene studies, genome wide association study in SCD, the first in Tanzania and East Africa and next generation studies. This data is now available for further analysis of genetic determinants of SCD. This work has led to the following publications.

   a. Nkya S, Mwita L, Mgaya J, Kumburu H, van Zwetselaar M, Menzel S, Mazandu G, Sangeda R, Chimusa E, Makani J. Identifying genetic variants and pathways associated with extreme levels of fetal hemoglobin in sickle cell disease in Tanzania. BMC Medical Genetics. 2020 June 05; 21(1):-. Available from: https://bmcmedgenet.biomedcentral.com/articles/10.1186/s12881-020-01059-1 DOI: 10.1186/s12881-020-01059-1
   b. Mtatiro S, Mgaya J, Singh T, Mariki H, Rooks H, Soka D, Mmbando B, Thein S, Barrett J, Makani J, Cox S, Menzel S. Genetic association of fetal-hemoglobin levels in individuals with sickle cell disease

in Tanzania maps to conserved regulatory elements within the MYB core enhancer. BMC Medical Genetics. 2015; 16(1):-. Available from: http://bmcmedgenet.biomedcentral.com/articles/10.1186/s12881-015-0148-3 DOI: 10.1186/s12881-015-0148-3

c. Mtatiro S, Singh T, Rooks H, Mgaya J, Mariki H, Soka D, Mmbando B, Msaki E, Kolder I, Thein S, Menzel S, Cox S, Makani J, Barrett J. Genome Wide Association Study of Fetal Hemoglobin in Sickle Cell Anemia in Tanzania. PLoS ONE. 2014 November 5; 9(11):e111464-. Available from: https://dx.plos.org/10.1371/journal.pone.0111464 DOI: 10.1371/journal.pone.0111464

d. Makani J, Menzel S, Nkya S, Cox SE, Drasar E, Soka D, Komba AN, Mgaya J, Rooks H, Vasavda N, Fegan G, Newton CR, Farrall M, Thein SL. Genetics of fetal hemoglobin in Tanzanian and British patients with sickle cell anemia. Blood. 2011 Jan 27;117(4):1390-2. PubMed Central PMCID: PMC5555384.

2. Our genetic data has contributed to SCD genetic studies in other populations.

a. Ben Hamda C, Sangeda R, Mwita L, Meintjes A, Nkya S, Panji S, Mulder N, Guizani-Tabbane L, Benkahla A, Makani J, Ghedira K. A common molecular signature of patients with sickle cell disease revealed by microarray meta-analysis and a genome-wide association study. PLoS One. 2018;13(7):e0199461. PubMed Central PMCID: PMC6034806.

b. Gardner K, Fulford T, Silver N, Rooks H, Angelis N, Allman M, Nkya S, Makani J, Howard J, Kesse-Adu R, Rees DC, Stuart-Smith S, Yeghen T, Awogbade M, Sangeda RZ, Mgaya J, Patel H, Newhouse S, Menzel S, Thein SL. *g(HbF)*: a genetic model of fetal hemoglobin in sickle cell disease. Blood Adv. 2018 Feb 13;2(3):235-239. PubMed Central PMCID: PMC5812320.

c. Menzel S, Rooks H, Zelenika D, Mtatiro SN, Gnanakulasekaran A, Drasar E, Cox S, Liu L, Masood M, Silver N, Garner C, Vasavda N, Howard J, Makani J, Adekile A, Pace B, Spector T, Farrall M, Lathrop M, Thein SL. Global genetic architecture of an erythroid quantitative trait locus, HMIP-2. Ann Hum Genet. 2014 Nov;78(6):434-51. PubMed Central PMCID: PMC4303951.

3. I have also looked at the association of HbF with Oxygen saturation and I have contributed to investigation of HbF with malaria and the distribution of HbF per F cells.

a. Nkya S, Mgaya J, Urio F, Makubi A, Thein SL, Menzel S, Cox SE, Newton CR, Kirkham FJ, Mmbando BP, Makani J. Fetal Hemoglobin is Associated with Peripheral Oxygen Saturation in Sickle Cell Disease in Tanzania. EBioMedicine. 2017 Sep;23:146-149. PubMed Central PMCID: PMC5605324.

b. Urio F, Lyimo M, Mtatiro SN, Cox SE, Mmbando BP, Makani J. High prevalence of individuals with low concentration of fetal hemoglobin in F-cells in sickle cell anemia in Tanzania. Am J Hematol. 2016 Aug;91(8):E323-4. PubMed Central PMCID: PMC5612395.

c. Mmbando BP, Mgaya J, Cox SE, Mtatiro SN, Soka D, Rwezaula S, Meda E, Msaki E, Snow RW, Jeffries N, Geller NL, Makani J. Negative Epistasis between Sickle and Foetal Haemoglobin Suggests a Reduction in Protection against Malaria. PLoS One. 2015;10(5):e0125929. PubMed Central PMCID: PMC4428884.

4. Contributions to Symposia and compiled volumes: From 2013 to 2018, I have performed six presentations at international conferences including the One Million Genomes, 3rd Global Congress on SCD, 10th Anniversary Conference Academy for Sickle Cell and Thalassaemia, Human Genetics Research and Public Understanding in Africa, Annual Meeting, American Society of Human Genetics, and the Human Genome Organisation (HUGO)

• One million genomes: from discovery to health symposium (June 2018), Hannover, German: Poster presentation, Title: Genetic determinants of fetal hemoglobin in individuals with SCD in Tanzania.

• 3rd Global Congress on SCD (February 2017), Bhubaneswar, India: Oral presentation, Title: Sickle Cell Disease Programme in Tanzania

• 10th Anniversary Conference Academy for Sickle Cell and Thalassaemia, (October, 2017), London, United Kingdom: Oral presentation Title: Detailed Analysis of Genetic Determinants of Fetal Hemoglobin in individuals with SCD in Tanzania.

• Human genetics research and public understanding in Africa, (February 2016), Capetown, South Africa. Oral presentation Title: Developing genomic research in Tanzania: The case for sickle cell disease.

• Annual meeting, American Society of Human Genetics, Boston, United States of America (October, 2013), Oral presentation Title: Developing genomic research in Tanzania: The case for sickle cell disease.

• Human Genome Organisation (HUGO), (April 2013), Singapore. Oral presentation, Title: Description of Fetal Hemoglobin (HbF) and Genetic Association of 3 Principal Loci (BCL11A, HMIP and HBG) with HbF and Hb.

5. Title: Study of the efficacy of SP, SP+Artesunate and Coartem® against falciparum malaria and frequency of mutant genotypes in south-east tanzania.

   During the MSc training, I conducted a study on anti-malarials in Tanzania. At that time, Tanzania was changing the malaria treatment policy from SP as the first line treatment to artemisinin based treatment. The information from this study was utilised to inform the national malaria control program of the efficacy status so that the right decision could be made. This work was conducted together with IMPACT project at the Ifakara Health Institute (IHI)

Complete List of Published Work in My Bibliography:
https://www.ncbi.nlm.nih.gov/myncbi/siana.mtatiro.1/bibliography/public/