

## **PROFILE: PROFESSOR S. FIIFI OFORI-ACQUAH**

Professor Solomon Fiifi Ofori-Acquah is the first Professor of Medical Laboratory Sciences in the University of Ghana, the Founding Director of the West African Genetic Medicine Centre and former Dean of the School of Biomedical and Allied Health Sciences.

### **FAMILY**

Professor Ofori-Acquah was born to Obaapanyin Esi Kyinsaaba/Mrs. Esther Quansah of blessed memory and Mr. Charles Ofori-Acquah Snr on Friday 15th March 1963 at the Cape Coast Regional Hospital in the Central Region. His family is descended from Obaapanyin Araba Kraba Panyin, a member of the Royal Ebiradze family of Fikesim, Cape Coast. He has three living siblings in the family Charles Ofori-Acquah Jnr, Robert Quansah and Marjorie Quansah. He has two older children Araba Ofori-Acquah and Jake Ofori-Acquah with his first wife Nadia Mensah. Professor Ofori-Acquah is married to Mariam Sidiki, and they live with their son Solomon Ofori-Acquah Jnr.

### **EDUCATION**

Professor Ofori-Acquah started his primary school education at Aggrey Memorial in Abum, Cape Coast, and continued at Adinturom and Sempe 1 both in Accra. He attended middle school at Chiringa Barracks, Burma Camp, Accra. He had his Ordinary Level Secondary Education at Adisadel College (Adisco), Cape Coast from 1977 to 1982, and returned to Adisco for his Advanced Level General Education which he completed in 1984. He attended Bromley College of Technology, Kent, England graduating with a Higher National Certificate in Medical Laboratory Sciences in 1989, and Part I of the Fellowship of the UK's Institute of Biomedical Science in 1990. He enrolled in Birkbeck College, University of London to read Bio-molecular Organization and graduated with a Master of Science degree in 1992. He completed formal education at King's College School of Medicine and Dentistry, University of London in 2000 with a PhD in Molecular Genetics. He obtained a Certificate in Leadership in 2012 at Emory University, Atlanta, Georgia, USA.

### **PROFESSION**

Professor Ofori-Acquah's career started as a trainee Medical Laboratory Scientific Officer in Haematology and Blood Transfusion in 1987 at Farnborough General Hospital, Kent, England. He became certified to practice clinical laboratory haematology and blood transfusion by the UK's

Council for Professions Supplementary to Medicine in 1989. He switched to a research career at the Department of Haematological Medicine, King's College Hospital, London in 1994, and parleyed his project a year later into a PhD thesis. After completion of his PhD, he took a postdoctoral scientist position at the University of South Alabama, Mobile, Alabama, USA in 2000. He was appointed Scholar of the Comprehensive Sickle Cell Centre in 2001 and promoted to Assistant Professor of Cell Biology and Neuroscience in 2002 at the University of South Alabama. He joined Emory University as Assistant Professor of Paediatrics in 2008. During his employment at Emory, he joined the University of Ghana briefly as Associate Professor in the Department of Medical Laboratory Sciences from 2011 to 2012. He moved to the University of Pittsburgh, Pittsburgh, USA in 2013 as Associate Professor of Medicine, and Human Genetics, and currently holds that position as a part-time faculty. He assumed office as Dean of the School of Biomedical and Allied Health Sciences in the University of Ghana in March 2017; his term ended in July 2022. In August 2022, he was appointed Director of the West African Genetic Medicine Centre (WAGMC), which was established initially as an African Centre of Excellence in January 2019 with him as the Centre Leader.

## **TEACHING AND MENTORING**

Professor Ofori-Acquah has developed many educational and training programmes and taught and mentored students across the academic spectrum in multiple institutions in Ghana, Europe, and the USA. For over ten years, he was both a Career and a Research Mentor of the Minority Medical Student Award Programme of the American Society of Haematology. He served as Mentor for junior faculty in the Summer Institute Programme to Increase Diversity and the Programme to Increase Diversity for Individuals Engaged in Health-Related Research in the USA. He designed the Pittsburgh Undergraduate Research Diversity Programme, and the Pittsburgh Intensive Training in Hematology to promote hematology research among junior investigators. He secured funding under the R25 Training Grant mechanism of the National Institutes of Health (NIH), USA to start both training programmes in the University of Pittsburgh. As a Visiting Lecturer in the West African Centre for Cell Biology of Infectious Pathogens, he designed and taught a graduate genetics course of the Centre. More recently he designed and is the Coordinator of the MSc Genetic Counselling Programme offered by WAGMC. He has designed two new graduate programmes MPhil, and PhD in Medical Molecular Genetics, currently under review to be offered by WAGMC. Professor Ofori-Acquah has served on the examination boards and juries of multiple master's and PhD theses in universities in Belgium, England, France, South Africa, and USA. He was

recipient of the Outstanding Postdoc Mentor award at Emory University in 2012.

## **RESEARCH AND SCHOLARSHIP**

Professor Ofori-Acquah has conducted research principally in four areas namely genomics, vascular biology, breast cancer and sickle cell disease (SCD) over a career spanning nearly thirty years. His research in the late 1990s in genomics defined DNA sequence variation that influence levels of foetal haemoglobin among SCD patients. As a postdoctoral scientist in the early 2000s, he helped to establish how multiple transcription factors and drugs control foetal haemoglobin production in SCD. He begun independent research in his own laboratory in the mid-2000s with a million-dollar grant from the NIH. He was focused on the role and mechanism of activated leukocyte cell adhesion molecule (ALCAM/CD166) in tethering endothelial cells together in blood vessels, and how this same molecule controls movement of blood cells across blood vessels. Leveraging this work, he ventured into cancer research, and this led to his team first defining ALCAM/CD166 as a prognostic marker of breast cancer.

Professor Ofori-Acquah's work in endothelial cell biology and vascular permeability catalysed his most impactful research to date. He developed the novel idea that during sickle cell crisis, patients generate excess haem in their blood that disrupts the blood vessels in the lungs to cause acute chest syndrome, a fatal lung complication. His laboratory performed experiments using many different mouse models to ultimately prove this theory and establish a new scientific paradigm. This work produced the first mouse model of the acute chest syndrome of SCD and defined extracellular heme as a danger associated molecular pattern (DAMP) molecule. It was published in the prestigious Journal of Clinical Investigations in 2013 and has received over 230 citations to date. Professor Ofori-Acquah has expanded his research on extracellular haem to develop five separate multi-million-dollar projects to date, all funded by the NIH. Three of the projects namely, a) mechanisms of endothelial barrier phenotypes in sickle cell disease, b) cellular and molecular mechanism of acute lung injury in sickle cell disease and c) role of erythroid DAMP molecules in the pathogenesis of vascular injury in sepsis, have all been successfully completed. The other two projects d) sickle cell disease genomics of Africa (SickleGenAfrica) network and e) therapeutic targets of acute chest syndrome, are among the current research work of the Ofori-Acquah laboratory.

Professor Ofori-Acquah assembled a multidisciplinary team of more than thirty researchers in Ghana, Nigeria, Tanzania, South Africa, and USA to

work on the SickleGenAfrica project. This team has already chalked up important milestones including conducting the largest cohort study of SCD in the world with enrolment of over 7,000 patients and collecting the largest SCD Echocardiogram Datasets on 1,000 adult patients. The team has completed whole genome genotyping for 2,300 Ghanaian SCD patients on the Illumina H3Africa Genotyping Chip. This data is currently undergoing quality control checks to prepare for whole genome association studies on five plasma proteins that mitigate haem-mediated tissue injury in SCD. The fifth project involves laboratory studies and whole genome DNA sequencing for five hundred children with SCD. The sequencing data will be interrogated to search for regions of DNA that influence expression of haem oxygenase 1, the key enzyme in degrading haem to nullify its deleterious effects in SCD. Professor Ofori-Acquah is leveraging his whole genome sequencing project to build capacity in all aspects of genomics at WAGMC in collaboration with a major US academic partner. In addition, he has recently designed a new project in partnership with a multi-national pharmaceutical company on gene-based cures for SCD. This research will initially investigate ethical issues related to SCD gene therapy among key stakeholders in Ghana and Nigeria and test the immunological response of SCD patients' serum to viral gene therapy vectors. Other areas of current research involving several of his MSc genetic counselling student mentees are focused on defining societal, policy and infrastructural barriers to integration of genomic medicine into clinical practice in Ghana. Professor Ofori-Acquah has authored over 80 research papers, reviews, and book chapters.

## **LEADERSHIP, INSTITUTIONAL BUILDING AND RESEARCH NETWORKS**

Professor Ofori-Acquah acquired competencies in governance and administration through formal training in an Executive Leadership programme at Emory University. He obtained experience in leadership as Director of the Centre for Endothelial Cell Biology, Emory University, Director of the Centre for Translational and International Hematology, University of Pittsburgh, Dean of the School of Biomedical and Allied Health Sciences, and most recently as Director of WAGMC. Since May 2022, he has been the President and Chief Executive Officer of the Sickle Cell Foundation of Ghana. He was Vice-Chair of the American Society of Haematology's Committee for Promoting Diversity. He is on the Editorial Board of Blood Advances, a journal of the American Society of Hematology. He served as Guest Editor for Frontiers in Genetics and has reviewed manuscripts for over 30 scientific journals. He is a Founding Executive Member of the Ghana Biomedical Convention, and was Vice-President, and President of the organization. He received an Appreciation Award in 2016 for his role in founding the Ghana Biomedical Convention. Professor Ofori-Acquah has

presented in over 100 conferences, workshops, and scientific retreats across the world.

### **BOARDS/COMMITTEES, AND CONSULTATIONS**

Professor Ofori-Acquah has served on multiple national and international committees and boards. He was Member of the National Technical Advisory Committee for Newborn Screening, and the African Health Diagnostic Platform Technical Committees, both under the Ghana Ministry of Health. He has served on three NIH Standing committees namely the Respiratory Integrative Biology and Translational Medicine, Molecular and Cellular Hematology, and the Hemostasis, Transfusion Blood Cells, and Thrombosis study sections, as well as grant review committees for the Wellcome Trust, American Society of Hematology, American Heart Association, and the UK Lottery. He has consulted for the Foundation for Research Development, Federal University of Minas Gerias, Belo Horizonte, Minas Gerais, Brazil, the USA Centres for Disease Control and Prevention (CDC)'s New-born Screening Quality Assurance Programme, and Oasis Healthcare & Health Service, Kenya. Professor Ofori-Acquah is a Member of the Board of Directors of the University of Ghana Medical Centre, and the Sickle Cell Foundation of Ghana.