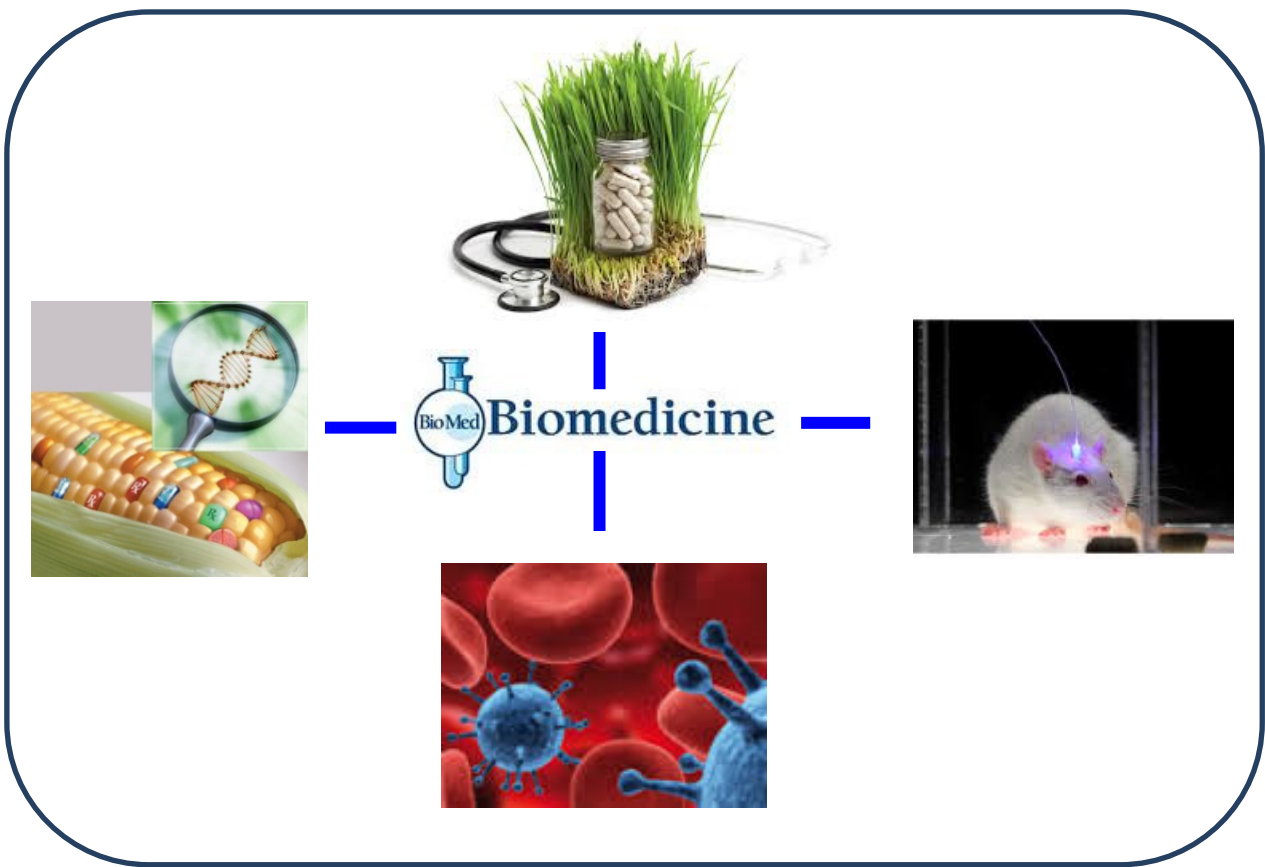


7th Ghana Biomed 2014



**From Laboratory to Community,
Biomedical Science for all Ghana**

**Faculty of Education Lecture Theatre Auditorium
University of Cape Coast
30th July – 1st August 2014**

*The Seventh Ghana Biomedical
Convention
Biomed - 2014*

*From Laboratory to Community, Biomedical
Science for all Ghana*



*Faculty of Education Lecture Theatre (FELT)
University of Cape Coast
Cape Coast, Ghana*

30th JULY – 1st AUGUST 2014

Meeting Schedule

DAY 1 WEDNESDAY 30th JULY 2014

6.30 –	Registration and Poster Set-up
9.00 – 9.30am	Opening Ceremony
9.30 – 10.30am	Keynote Address: Professor Solomon Ofori-Acquah
10.30 – 11.15pm	Break
11.15 – 11.45am	Plenary Talk 1: Ama DeGraft-Aikins
11.45 – 12.45pm	Session I – Short talks
12.45 – 1.45pm	Lunch
1.45 – 2.45pm	Poster Viewing
2.45 – 4.15pm	Poster Review - Interactive
4.15 – 4.30pm	Break
4.30 – 5.00pm	Vendor Talk
5.00 – 8.00pm	Mentoring Workshop

DAY 2 THURSDAY 31st JULY 2014

7.30 –	Registration
8.50 – 9.00am	Announcements
9.00 – 10.00am	Keynote Address: Dr. Gordon Awandere
10.00 – 11.00am	Break
11.00 – 11.30am	Plenary Talk 2: George Acquah-Mensah
11.30 – 12.00pm	Plenary Talk 3: Christa Hasenkopf
12.00 – 12.20pm	Session II – Short talk
12.30 – 1.30pm	Lunch
1.30 – 2.30pm	Poster Viewing
2.30 – 4.00pm	Poster Review - Interactive
4.00 – 4.15pm	Break
4.15 – 6.00pm	Business Meeting
6.30pm	Social Event – 1 st Floor, Senior Clubhouse

DAY 3 FRIDAY 1st AUGUST 2014

8.00 –	Registration
8.50 – 9.00am	Announcements
9.00 – 10.00am	Presidential Symposium
10.00 – 11.00am	Break
11.00 – 11.30am	Plenary Talk 4: William Ampofo
11.30 – 12.30pm	Session III – Short talks
12.30 – 1.30pm	Lunch
1.30 – 2.30pm	Science Outreach
2.30 – 3.30pm	Personalized Medicine
3.30 – 4.00pm	Closing Ceremony
4.00 – 6.00pm	Board Meeting



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Acknowledgements



The Ghana Biomedical Convention (GBC) gratefully acknowledges the University of Cape Coast (UCC), the School of Medical Sciences, the School of Biological Sciences and the Faculty of Education, UCC for generous use of facilities and equipment.

The Ghana Biomedical Convention (GBC) sincerely thanks Inqaba Biotec and the American Society for Microbiology for their financial contribution. These grants are designed to support conferences organized by the GBC for the promotion of Science and the development of scientific infrastructure in Ghana and beyond.

GBC also acknowledges the Program Committee of the President, the President Elect, the Scientific Committee and Local Organizing Chairman for putting up this program.

GBC further acknowledge all who in diverse ways contributed to the successful hosting of the years convention. We wish to thank all Board Members, Scientific Committee Members and more especially the UCC LOC members who went all the way to ensure the success of this year's meeting.

Last but not the least, to all participants and observers who will join us this year, let's take this opportunity to interact and share scientific ideas, Let all relationships establish here go a long way to promote science in Ghana and beyond.



*Akwasi Anyanful, PhD
Chairman, LOC*

On behalf of the Local Organizing Committee (LOC), it is my pleasure and privilege to welcome you once again to the University of Choice and to Biomed 2014. GBC has now become a multidisciplinary and multiprofessional organization in all aspects of biomedicine and public health and we hope this year's meeting will provide the necessary platform for effective networking among all delegates.

To the Vice Chancellor, Pro-Vice Chancellor, the Registrar and Deans of Biological Sciences, Education and Medical School, we thank you for your support and encouragement.

This year's theme is an affirmation of who we are, what we've achieved, and what we aspire to accomplish as we bring the lab and the community together.

The LOC assures you of an enjoyable time in Cape Coast as they have sacrificed time, effort and money to ensure that the convention is not only successful, but memorable. Welcome to UCC.

LOC Members

Akwasi Anyanful, PhD

Department of Medical Biochemistry
UCCSMS, Cape Coast,

Paul Nsiah, PhD

Department of Chemical Pathology
UCCSMS, Cape Coast

Emmanuel Plas Otwe, PhD

Department of Molecular Biology and Biotechnology
UCCSBS, Cape Coast

Frank Gharthey Jr., PhD

Department of Chemical Pathology
UCCSMS, Cape Coast

Johnson Boampong, PhD

Department of Biomedical and Forensic Science
UCCSBS, Cape Coast

Mohammed Adamu, MSc

Department of Chemical Pathology
UCCSMS, Cape Coast

Justice Sarfo, PhD

Department of Biochemistry
UCCSBS, Cape Coast

Latif Adams, BSc

Department of Microbiology
UCCSMS, Cape Coast

Richmond Afoakwah, PhD

Department of Biomedical and Forensic Science
UCCSBS, Cape Coast

Vincent Gyande Kangah, BSc

Department of Medical Biochemistry
UCCSMS, Cape Coast

Martins Ekor, PhD

Department of Pharmacology
UCCSMS, Cape Coast

Harold Ayetey, MD, PhD

Department of Internal Medicine and Medical
Biochemistry
UCCSMS, Cape Coast



*Karen Duca, MBA, PhD
President, GBC*

Akwaaba, thank you for joining us at Ghana Biomed 2014, we are very happy to see you! On behalf of the Board of Directors, I welcome you to the Seventh Annual Scientific Meeting of the Ghana Biomedical Convention (GBC), with the theme "From Lab to Community: Biomedical Research for all Ghana". The venue for this year's meeting, *Cape Coast* is endowed with a rich legacy of learning and an interesting history that I urge you all to embrace. I acknowledge members of the Board of Directors of GBC, the Scientific and Local Organizing Committees, and the leadership of the University of Cape Coast, for working together as one, to make this meeting a reality. I salute the dignitaries who have honoured us with their presence, and applaud the generosity and scholarship of our esteemed keynote and plenary speakers. I am grateful to our sponsors Inqaba Biotec and American Society for Microbiology for supporting this meeting.

This year, we have exciting plans to grow the GBC and serve you, its membership, in deeper and more meaningful ways. We have incorporated more workshops into the conference that will introduce you to new ideas and help you grow as a professional. Our mentoring programme begins in earnest this year under the capable leadership of Prof. Helen Kwanashie. We hope to host different events throughout the year in different locations around Ghana and reinvigorate the local student chapters. These activities will move us closer towards our most treasured goal of putting Ghana on the map as an important regional and continental contributor to capacity building in public health. GhanaBiomed 2014 provides a unique opportunity for career development in biomedicine for professionals and students, networking and a chance to review outstanding research in the biomedical sciences. I wish you a very successful meeting and I encourage you to enjoy the beauty and rich history of Cape Coast, its many attractions, as well as the hospitality of Oguaa. Once again, you are very welcome and among friends.

Board of Directors

Karen Duca, PhD, MBA
Kwame Nkrumah University of Science and
Technology, Kumasi, Ghana, USAID

Winfried Amoaku, FRCS, FRCOphth, PhD
Faculty of Medicine and Health Sciences
University of Nottingham, UK

Cherie McCown, MSc
Community Directed Development Foundation –
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Sacramento, USA

Patrick Kobina Arthur, PhD
Dept. of Biochemistry, Cell and Molecular
Biology
University of Ghana

David Azanu, MPhil.
Director - Student Members
Kwame Nkrumah University of Science and
Technology, Kumasi, Ghana

Myron Williams, PhD
Dept. of Chemistry
Clark Atlanta University
Atlanta, USA

Solomon Ofori-Acquah, PhD
Vascular Medicine Institute
University of Pittsburgh, USA

Linda Amoah, PhD
Immunology Unit
Noguchi Memorial Institute for Medical Research
Accra, Ghana

Mitsuko Suzuki, PhD
Parasitology Unit
Noguchi Memorial Institute for Medical Research
Accra, Ghana

Mohamed Mutocheluh, PhD, MSc, MSc, MIBMS.
Department of Clinical Microbiology
Kwame Nkrumah University of Science and
Technology, Kumasi, Ghana



*Solomon Ofori-Acquah, PhD
Chair, Scientific Committee*

Scientific Committee Members

Solomon Ofori-Acquah, PhD (Chair)
 Kofi Anie, PhD
 Mitsuko Suzuki, PhD
 Patrick Amoateng, PhD
 George Acquaaah-Mensah, PhD
 Emmanuel Adabor, PhD
 Elvis Tiburu, PhD
 William Ampofo, MBBS, PhD
 Mohamed Mutocheluh, PhD
 Ibok Oduro, PhD
 Jacob Agbenorhevi, PhD
 Myron Williams, PhD
 Godfred Darko, PhD
 Joslin Dogbe, PhD
 Kofi Sarpong-Boachie, PhD

This year's scientific program highlights major biomedical accomplishments in Africa, and unveils an interactive poster presentation session that is designed to enhance the educational experience for all attendees towards the fulfillment of our convention theme: *"From lab to community, biomedical research for all Ghana"*. Two keynote lectures will focus on the scientific quest to decode the human genome and malaria, and the emerging central role African scientists are playing in the international collaborations that are being set up to investigate these questions, which also have capacity building at their core. Topics in the plenary lectures are diverse and timely. Speakers will provide the latest scientific and public health assessment of the Ebola outbreak in West Africa, and discuss the social psychological perspective of disease burdens in Africa, the growth of pollution as a global crisis, and the role of microRNA regulation in human disease. Attendees will have two opportunities on the Wednesday and Thursday to attend thematic poster presentations and discussions to be held in four parallel sessions: a) Clinical Research and Public Health, b) Nutrition and Disability, c) Bioengineering, Bioinformatics, Genomics, Molecular Biology and Cellular Pathology, and d) Plant Medicine, Toxicology, Chemistry and Biochemistry. These sessions have been organized from a record number of abstracts that were submitted to GhanaBiomed 2014. Join me in saluting members of the Scientific Committee who volunteered their time and expertise to review the abstracts. Together, we believe the scientific dissemination from the various presentation platforms will converge on a harmony of ideas that will be shared during the convention and beyond.



Prof. Solomon Ofori-Acquah

Dr. Solomon Ofori-Acquah is a molecular geneticist and hematology scientist. He is a member of the H3 Africa Consortium. His keynote address will focus on the consortium, which is aimed at enabling African scientists to engage fully in the genomic revolution, highlighting the continent's unique leverage to shape future genomic advancements in the *first molecular disease in man*.

A native of Cape Coast, Dr. Ofori-Acquah received primary education at the Aggrey and Zion elementary schools in Abom. After a brief period in Accra, he returned to Cape Coast to continue his education in Adisadel College or Adisco, where he left his mark as one of the College's most revered Cadets. As Lance Corporal, he led Adisco to reclaim the coveted championship of the Independence Day School March competition at Sedu Park. A year later, he led the Cadets, as Sargent Major, to a memorable Speech Day Parade Presentation in which the Guest of Honor was an Army Colonel. It was a big surprise to most Santaclausians in the early 80s that *Amacus*, as he was affectionately known, did not enroll in the Ghana Military Academy to pursue a career in the Armed Forces.

He migrated to England to pursue a career in biomedical science. This decision was not surprising to his "A"-level biology classmates and teacher, Professor Money, who knew of his love for genetics! While in England, he started his career as a trainee technician in Hematology and Blood Transfusion, Farnborough General Hospital, in Kent. Through a day-release program, he obtained a Higher National Certificate in Biomedical Science at Bromley College of Technology in 1989. Thereafter, he completed a Masters degree in Bio-molecular Organization at the University of London's Birkbeck College in 1992, while maintaining full-time employment as a medical laboratory technician. Two years later, while continuing with his laboratory hematology work, as an on-call technician, he enrolled in a PhD program in Molecular Genetics at the University of London's Kings College School of Medicine and Dentistry. He completed his thesis in 1999 and relocated to the United States in 2000 to pursue postdoctoral training in gene regulation at the University of South Alabama. After less than one year in this position, he was awarded a junior faculty training position as Scholar of a Center Program in sickle cell disease, with a research project focused on anti-sense RNA molecules, which was sponsored by the NIH.

In 2002, Dr. Ofori-Acquah received his first tenure-track appointment as Assistant Professor of Cell Biology at the University of South Alabama, in Mobile, Alabama. He taught first-year medical students Developmental Embryology, and Histology, and was Section Head of the Graduate Program in Basic Medical Science. In 2007, he moved to Emory University, where he founded the Center for Endothelial Biology, which he led for two years, and helped that institution to secure its first NIH Center grant in sickle cell disease. Currently, he is Associate Professor of Medicine at the University of Pittsburgh, and Director, Center for Translational and International Hematology. In the last ten years, Dr. Ofori-Acquah has consistently being funded by the NIH with grants totaling nearly \$15 million US dollars, as Principal Investigator of Research, Center and Training grants. He currently serves on an NIH Study Section, and on Scientific, Standing and Advisory Committees for many organizations including the American Society of Hematology. He was the immediate Past President of the Ghana Biomedical Convention. He has published nearly 100 research articles, book chapters, reviews and meeting proceedings, and given over forty invited lectures, seminars and presentations.



Dr. Gordon Awandere

Dr. Gordon Awandere is an Immunologist with additional expertise in genetics, microbiology and molecular biology. His keynote address will focus on research and capacity building towards a better understanding of malarial pathogenesis and vaccine development.

Gordon was born in 1974 and is a native of Kandiga in the Upper East Region. He attended several Elementary Schools in Bolgatanga and Bawku, eventually graduating from the Bolga Presby Primary, where he was the Senior Prefect. He then proceeded to study at Notre Dame Seminary Secondary School in Navrongo from 1986 to 1991, where he obtained his O' Level Certificate.

Due to his keen interest in Science he continued his education at the Presbyterian Boys' Secondary School, Legon, from 1991-1993, where he studied Chemistry, Physics, Mathematics, and Statistics for his A' Level Certificate. During his days in secondary school, Gordon was an active member of the Debating and Drama clubs, and he was popular for playing the female roles in the all-boys drama club in Notre Dame. Gordon also played in the Notre Dame Basketball team at Inter-Schools competitions.

Gordon enrolled at the University of Ghana in 1994 and graduated with BSc Biochemistry in 1998 and MPhil Biochemistry in 2002. He then worked as a Principal Research Assistant at the Noguchi Memorial Institute for Medical Research until 2003 when he joined the Department of Biochemistry, Cell and Molecular Biology as a Lecturer. After one year of service at Legon, Gordon obtained admission for a PhD program at the University of Pittsburgh Graduate School of Public Health on a scholarship from the Fogarty International Center's Global Training in Infectious Diseases Research Program. In 2007, Gordon was awarded a PhD in Infectious Diseases and Microbiology, together with the Outstanding student award for the best dissertation in his graduating group. After a short post-doctoral fellowship at the University of Pittsburgh, Dr. Awandere, took up a new challenge as postdoctoral fellow at the Division of Malaria Vaccine Development at the Walter Reed Army Institute of Research, MD, USA, where he worked for three years before returning to the University of Ghana in 2010.

Dr. Awandere's significant academic achievements include his role in the discovery of Complement Receptor 1 as a red cell invasion receptor for *Plasmodium falciparum*, and leading a grant application that won an \$8M grant from the World Bank's African Centers of Excellence Project. He has also won highly competitive grants from the National Institutes of Health, USA and the Royal Society-Leverhulme, UK. Dr. Gordon A. Awandere is currently the Head of the Department of Biochemistry, Cell and Molecular Biology, the Center Leader for the West African Center for Cell Biology of Infectious Pathogens (WACCBIP), Legon.

6.30 – Registration and poster setup

9:00 – 9.30 am **OPENING SESSION**

Chairs

Karen Duca and Akwasi Anyanful

WELCOME AND INTRODUCTIONS

Professor Karen Duca
President, Ghana Biomedical Convention
KNUST and USAID

Professor Gladys Amponsah
Vice Dean, School of Medical Sciences
University of Cape Coast

Professor J. N. Buah
Pro-Vice-Chancellor
University of Cape Coast

Osaabarima Kwesi Atta II
Omanhene of Oguaa Traditional Area

Mr. J. K. Nyan
Registrar,
University of Cape Coast

Professor Isaac Galyuon
Dean, School of Biological Sciences

Professor Paa Kobina Turkson
Dean, School of Agriculture

KEYNOTE ADDRESS

9.30 – 10.30am Solomon Ofori-Acquah
Vascular Medicine Institute, University of Pittsburgh, USA
***Engaging Africa Fully in the Global Genomic Revolution: A Rare
Leverage From Within the Continent [1]***

10.30 – 11.15am Break

11.15 – 12.45am **Plenary I & Short talks**

Chairs: Linda Amoah and Richmond Afoakwah

- 11.15 – 11.45am Ama DeGraft-Aikins
Centre for Social Policy Studies/Regional Institute for Population Studies, University of Ghana, Accra, Ghana
Addressing the psychosocial dimensions of Africa's chronic non-communicable disease burden: a social psychological perspective [4]
- 11.45 – 12.05pm Akwasi Anyanful
Department of Medical Biochemistry, University of Cape Coast School of Medical Sciences, Cape Coast, Ghana
Descriptive epidemiological survey of the prevalence of neoplastic breast lesions in five regions of Ghana - A pilot study [8]
- 12.05 – 12.25pm Benjamin Arko-Boham
School of Allied Health Sciences, College of Health Sciences, University of Ghana, Accra, Ghana
PRP19 upregulated expression augments p21/p53 pathway to mitigate cancer cell aggression in lung adenocarcinomas [9]
- 12.25 – 12.45pm Du-Bois Asante
Department of Pathology, University of Ghana Medical School, College of Health Sciences, Accra, Ghana
Detection of Epstein-barr virus and Human Papilloma Virus DNAs in nasopharyngeal carcinomas at the Korle-bu Teaching Hospital, Accra [10]
- 12.45 – 1.45pm **Lunch Break**
- 1.45 – 4.15pm **POSTER VIEWING AND INTERACTIVE POSTER DISCUSSION**
- POSTER ASSIGNED ROOMS AND MODERATORS
- Room 1 – **Disbaility and Nutrition** – J. K. Agbenorhevi, Ibok Oduro, Kofi Sarpong-Boachie, Isaac Owusu
- Room 2 – **Clinical Research and Public Health** – Winfried Amoaku, Solomon Ofori-Acquah, Mohamed Mutocheluh, Karen Duca
- Room 3 – **Toxicology and Plant Medicine** – George Acquah Mensah, Martins Ekor, Mitsuko Suzuki, Helen Kwanashie
- Room 4 – **Bioengineering, Bioinformatics and Molecular Biology** – Elvis Tiburu, Sam Kwofie, Patrick Arthur, Myron Williams
- 4.15 – 4.30pm **Break**
- 4.30 – 5.00pm **VENDOR TALK**
- Inqaba Biotec

5:00 – 8.00pm

WORKSHOP

Helen O. Kwanashie, Dept of Pharmacology & Therapeutics, Ahmadu Bello University, Zaria, Nigeria

Workshop for Mentors and Mentees

7.30 –	Registration
8.50 – 9.00am	Announcements
	KEYNOTE ADDRESS
	Chair: Solomon Ofori-Acquah
9.00 – 10.00am	<u>Gordon Awandere</u> Dept of Biochemistry, Cell and Molecular Biology, University of Ghana <i>Malaria Parasites in the Blood: Red Cell Invasion and Innate Immune Responses [2]</i>
10.00 – 11.00am	Break
11.00 – 12.30am	Plenary II, III & Short talk
	Chair: Myron Williams & David Azanu
11.00 – 11.30am	<u>George Acquah-Mensah</u> MCPHS University, Worcester MA 01608 USA <i>Linking miRNA Regulation, Carbohydrate Metabolism and Tumourigenesis [5]</i>
11.30 – 12.00pm	<u>Christa Hasenkopf</u> Global Development Lab, USAID, Washington, DC USA <i>Air Pollution: A Growing Crisis World-Wide and Local-Level Ways Forward [6]</i>
12.00 – 12.20pm	<u>David Azanu</u> Department of Chemistry, Kwame Nkrumah University of Science and Technology (KNUST), Kumasi, Ghana <i>Heavy metals (Pb, Hg, Cd, Cu, Cr, and Zn) levels in water, sediment and fish from sewage treatment plants in Kumasi, Ghana [11]</i>
12.20 – 1.30pm	Lunch Break
1.30 – 4.00pm	POSTER VIEWING AND INTERACTIVE POSTER DISCUSSION
	POSTER ASSIGNED ROOMS AND MODERATORS
	Room 1 – Disbaility and Nutrition – J. K. Agbenorhevi, Ibok Oduro, Kofi Sarpong-Boachie, Isaac Owusu
	Room 2 – Clinical Research and Public Health – Winfried Amoaku, Solomon Ofori-Acquah, Mohamed Mutocheluh, Karen Duca
	Room 3 – Toxicology and Plant Medicine – George Acquah Mensah, Martins Ekor, Mitsuko Suzuki, Helen Kwanashie

Room 4 – **Bioengineering, Bioinformatics and Molecular Biology-**
Elvis Tiburu, Sam Kwofie, Patrick Arthur, Myron Williams

4.00 – 4.15pm	Break
4.15 – 6.00pm	Business Meeting
6.30pm	Social Event

7.30 –	Registration
8.50 – 9.00am	Announcements
	PRESIDENTIAL SYMPOSIUM
	Chair: Winfried Amoaku
9.00 – 10.00am	<u>Karen Duca</u> KNUST, Kumasi, Ghana and USAID, Washington, DC <i>i. US Government Programmes for Funding African Science</i> <i>ii. GBC Vision 2021 - The Next Seven Years [3]</i>
10.00 – 11.00am	Break
11.00 – 12:30pm	Plenary IV & Short talks Chairs: Elvis Tiburu & Mitsuko Suzuki
11.00 – 11.30am	<u>William Ampofo</u> Virology Unit, Noguchi Memorial Institute for Medical Research, University of Ghana, Accra, Ghana <i>Recent investigations for ebola viral disease in Ghana and linkages with global health [7]</i>
11.30 – 11.50am	<u>J. K. Agbenorhevi</u> Department of Food Science and Technology, KNUST, Kumasi <i>Watermelon seeds as food: Nutrient Composition, Phytochemicals and Antioxidant Activity [12]</i>
11.50 – 12.10am	<u>Marian Nkansah</u> Department of Chemistry, KNUST, Kumasi, Ghana <i>Removal of phosphorus from water using sawdust and groundnut pod as adsorbents [13]</i>
12.10 – 12.30am	<u>P. K. Atchoglo</u> Clinical Pathology Unit, Noguchi Memorial Institute for Medical Research, Accra, Ghana <i>Cytotoxicity and antioxidant activity of some Ghanaian medicinal plants used as antiviral and antiparasitic agents [14]</i>
12.30 – 1.30pm	Lunch Break

1.30 – 3.30pm

AFTERNOON SESSION

Chairs: Patrick Arthur & Ama de-Graft Aikins

1.30 – 2.30pm

Science Outreach

1.30 – 2.30pm

Personalized Medicine

3.30 – 4.00pm

CLOSING CEREMONY AND FAREWELL

Outgoing and Incoming Presidents

Official End of Conference

4.00pm –

Board Meeting

Keynote 1 [1]**Engaging Africa Fully in the Global Genomic Revolution: A Rare Leverage From Within the Continent****Solomon Ofori-Acquah**

Center for Translational and International Hematology, Heart, Lung and Blood Vascular Medicine Institute, University of Pittsburgh, USA

A discovery in 1949 of the altered electrophoretic mobility of hemoglobin in individuals with sickle cell anemia gave birth to molecular medicine. Forty years later, the human genome project was launched to read the entire human DNA sequence with a goal to revolutionize modern medicine. African scientists have assumed center stage in the quest for fundamental knowledge in human genetic variation to fulfill a 21st century aspiration of personalizing medicine. The Human Hereditary and Health in Africa (H3Africa) initiative is aimed to “facilitate a contemporary research approach to the study of genomics and environmental determinants of common diseases with the goal of improving the health of African populations”. Over 20 collaborative centers and research projects with a footprint in 24 African countries are charged to lead this effort. Variations in the human genome will be interrogated in a diversity of disorders, including type II diabetes, stroke, schizophrenia and rheumatic heart disease. However, H3Africa research findings will have impact beyond the continent to advance improvement in the care of individuals afflicted with many common diseases. The Nrf2 transcription pathway controls the expression of a variety of proteins including detoxifying enzymes, scavenger molecules and anti-oxidants; collectively these proteins protect the body against the hazards of both communicable and non-communicable diseases. Variation of this pathway, and its impact on the incidence, pathobiology and outcome of human disorders, and the leverage African scientist hold to advancing our understanding of these phenomena, will be discussed in the context of the first human molecular disease.

Keynote 2 [2]**Malaria parasites in the blood: red cell invasion and innate immune responses****Gordon Awandere**

Department of Biochemistry, Cell and Molecular Biology, University of Ghana, Legon

As a result of concerted efforts towards malaria control, the incidence of severe life-threatening malaria has reduced significantly in Ghana over the last decade. However, the development of an effective deployable vaccine remains the optimal strategy for solving the menace of malaria. Research at the Department of Biochemistry, Cell and Molecular Biology over the years has encompassed various aspects of disease, including immune response mechanisms, drug resistance, disease pathogenesis, genetics, and parasite biology. This presentation will focus on two complementary aspects of malaria pathogenesis: the mechanisms by which the parasite infects and propagates itself in red blood cells, and the natural defense mechanisms that the infection elicits. This overview will describe the highlights of some of the most significant research findings resulting from work conducted in collaboration with partners locally and internationally, including the Noguchi Memorial Institute for Medical Research, Legon, Navrongo and Kintampo Health Research Centers, the University of Pittsburgh, Pennsylvania, the Walter Reed Army Institute of Research, Maryland, and the London School of Hygiene and Tropical Medicine. Data from our investigations will be presented in the context of the current state of knowledge, and the potential impact of our findings on the broader efforts at developing effective strategies for combating malaria will be discussed.

Presidential Symposium [3]

Part I:

US Government Programmes for Funding African Science**Prof. Karen Duca¹ & Dr. Christa Hasenkopf²**¹KNUST, Kumasi and USAID, Washington, DC and ²USAID, Washington, DC

We will describe various programmes sponsored by US government agencies that provide graduate training and research funding that is available to African scientists. You will learn about mechanisms offered by the US State Department, i.e., the Young African Leaders Initiative, as well as USAID, i.e., BHEARD (graduate training in various fields), LEAP (one-year of graduate training), DIV (innovative ideas for development that might be commercialized, with a tiered funding structure), and HESN (higher education institutions uniting to solve problems). Of particular interest is the 'Partnerships for Enhanced Engagement in Research' (PEER) programme. The PEER Programme funds developing country scientists engaging in scientific or biomedical research with overlapping international development objectives to work in collaboration with US-funded researchers on projects of mutual interest. We will outline the programme mission, current grantees, including in Ghana, and also describe the application process for the next submission cycle in September. PEER is housed in the newly-formed US Global Development Lab. We will also introduce the MasterCard MS degree programme at Michigan State University. Be ready to ask questions and learn about opportunities.

Part II:

GBC Vision 2021 - The Next Seven Years

The outgoing GBC President, Prof. Karen Duca, will share her vision for what GBC might become in its next phase of growth, exploring opportunities and challenges.

Abstracts for Plenary and Oral Short Presentations
Wednesday, 30th July 2014 – Friday 1st August 2014
In order of Presentation
Abstracts # 4 - 14

[5] Linking miRNA Regulation, Carbohydrate Metabolism and Tumorigenesis

George Acquah-Mensah

MCPHS University, Worcester MA 01608 USA

Deregulated nuclear factor erythroid-2–related factor 2 (NRF2) and kelch-like ECH-associated protein 1 (KEAP1) signaling promotes cellular proliferation and tumorigenesis. However, the mechanisms remain largely unresolved. We use an integrated genomics and ¹³C-based targeted tracer fate association study to further explore the mechanisms involved. The results indicate that NRF2 regulates miR-1 and miR-206 to direct carbon flux toward the pentose phosphate pathway (PPP) and the tricarboxylic acid (TCA) cycle, reprogramming glucose metabolism. Sustained activation of NRF2 signaling in cancer cells attenuated miR-1 and miR-206 expression, leading to enhanced expression of PPP genes. Conversely, overexpression of miR-1 and miR-206 decreased the expression of metabolic genes and dramatically impaired NADPH production, ribose synthesis, and *in vivo* tumor growth in mice. Loss of NRF2 decreased the expression of the redox-sensitive histone deacetylase, HDAC4, resulting in increased expression of miR-1 and miR-206. Thus, it not only inhibited PPP expression and activity but functioned in a regulatory feedback loop that repressed HDAC4 expression. In primary tumor samples, the expression of miR-1 and miR-206 was inversely correlated with PPP gene expression. In addition, increased expression of NRF2-dependent genes was associated with poor prognosis. Our results demonstrate that microRNA-dependent (miRNA-dependent) regulation of the PPP via NRF2 and HDAC4 represents a novel link between miRNA regulation, glucose metabolism, and reactive oxygen species (ROS) homeostasis in cancer cells.

[6] Air Pollution: A Growing Crisis World-Wide and Local-Level Ways Forward**Christa Hasenkopf**Global Development Lab, USAID, Washington, DC USA
christa.hasenkopf@gmail.com

Since 2008, and for the first time in history, we live in a world where over half of the population resides in urban areas. The urbanization rate is highest in developing nations, in which over three-quarters of humanity lives. This shift, coupled with overall increased populations and improved economic development, has led to increased energy demands in developing countries that are often met with inexpensive energy sources that produce large amounts of air pollutants. These pollutants compromise the quality of the air breathed by—and the health of—billions of people. The World Health Organization estimates that air pollution is accountable for more than 7 million deaths per year worldwide or, more startling, one out of every eight deaths in the world. Despite the major health risks, economic losses, and threats to our environment that high air pollution levels pose to developing nations, outdoor pollution is vastly under-monitored and under-researched in the regions where those efforts are most needed. This presentation will discuss particulate matter (PM) pollution levels around the world, their health impacts, especially in the context of developing countries, including Ghana, and how local-level initiatives to monitor and improve air quality can have country-level impact. Examples from China, Mongolia, and other countries will be shared.

[7] Recent investigations for Ebola viral disease in Ghana and linkages with global health

William Ampofo & Kofi Bonney

Virology Department, Noguchi Memorial Institute for Medical Research, College of Health Sciences, University of Ghana, Legon.

Ebola haemorrhagic fever first appeared in Africa in 1976 and previously, large Ebola virus disease outbreaks with significant mortality have occurred in East/Central Africa. The World Health Organization (WHO) has described an ongoing Ebola outbreak in West Africa as unprecedented with reports of 844 cases and 518 deaths in Guinea, Sierra Leone and Liberia since March 2014. This outbreak has the highest caseload, deaths and geographic spread, ever, across three countries. The Ministry of Health / Ghana Health Service has accordingly established an Ebola Virus Disease national preparedness and response plan. Since April 2014, the Noguchi Memorial Institute for Medical Research, University of Ghana, has in conjunction with the Ghana Health Service, conducted laboratory investigations for hemorrhagic fever viruses in suspected cases of Ebola virus disease in Ghana. These investigations will be presented to highlight the issues involved in surveillance, infection control, logistics, data management and risk communication in this era of global health.

[8] Descriptive epidemiological survey of the prevalence of neoplastic breast lesions in five regions of Ghana - A pilot study**F. N. Gharthey Jnr¹, A. Anyanful², S. Eliason³, A. S. Mohammed¹, S. A. Debrah⁴**¹Department of Chemical Pathology, ²Department of Medical Biochemistry,³Department of Community Medicine, ⁴Department of Surgery, School of Medical Sciences, University of Cape Coast, Cape Coast.aanyanf@gmail.com, a.anyanful@uccsms.edu.gh

Breast cancer is an increasing public health problem and the most common cancer among women in Ghana. A study showed an increase from 11.8% - 20.4% in all cancers reported from 1974 – 1991. Since specialized breast cancer detection centres are located in larger cities coupled with lack of breast education, most cases presented are late-stage with limited treatment success. To date, there has been limited research about prevalence of breast cancer in Ghana taking into consideration standard aetiological factors. The aim of this pilot study was to determine the descriptive epidemiology of the disease, focusing on five regions – Greater Accra, Ashanti, Brong Ahafo, Western and Volta. Observations from screening 3000 women are discussed in the context of etiological factors including regional distribution, age, menarche, marital status and parity. 851 patients (28.4%) had aberrations of normal development and involutions (ANDI) and 194 (6.5%) had suspicious lumps. Of the 851 ANDI patients, 51% were premenopausal (<45 years). Surprisingly, 74% of the 194 patients with lumps were premenopausal, a higher value than previously reported. Among pre-menopausal patients with lumps, the most common age range at detection was between 25 - 34 years (64.5%). Greater Accra comparatively had the highest percentage of lumps (37.9%). These pilot results show that lump formation occurs early in a lot of Ghanaian women and therefore the need for a breast cancer registration data in all regions to accurately assess and understand the pattern of breast cancer distribution in Ghana. This will help channel our scarce resources efficiently in breast cancer awareness campaigns and test for early detection and treatment.

[11] Heavy Metals (Pb, Thg, Cd, Cu, Cr and Zn) Levels in Water, Sediment And Fish From Sewage Treatment Plants In Kumasi, Ghana

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Thirty (30) fish samples, five (5) water samples, and five (5) sediment samples were collected from Chirapatre sewage treatment ponds (which comprises of an Anaerobic pond, four facultative pond and a maturation pond). Thirteen (13) fish samples, four (4) water samples, and four (4) sediment samples were collected from Ahensan sewage treatment ponds (which comprises of an Anaerobic pond, two facultative pond and a maturation pond). The fish samples were caught from the maturation pond at the various sewage treatment plants. Lead (Pb), cadmium (Cd), chromium (Cr), zinc (Zn) and copper (Cu) levels were analysed using the Atomic Absorption Spectrophotometer (Spectra AA 220 FAAS). Automatic Mercury Analyzer Model HG-5000 was used to determine the total mercury (THg) concentration. All the samples from Ahensan and 96.67% of the samples from Chirapatre had their Pb levels above the Turkish Food Codex maximum levels of lead for human consumption. The THg, Cu and Zn levels in the fish samples were lower than the Turkish Food Codex maximum level, except for Cd, which recorded higher levels in all fish samples analysed. Apart from Cu and Cr which exceeded the US EPA guidelines thresholds only for long term use, levels of heavy metals in wastewater exceeded US EPA guidelines thresholds for both short and long term uses. There is no significant difference between the heavy metals in water from Ahensan site and that of Chirapatre site. Higher levels of Pb could pose health effects on human if unchecked.

[12] Watermelon seeds as food: Nutrient Composition, Phytochemicals and Antioxidant Activity

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Watermelon (*Citrullus lanatus*) seeds are often discarded while the fruit is eaten. In this study, seeds of three (3) varieties of watermelons (Charleston gray, Crimson sweet and Black diamond) were analysed for their proximate, minerals, phytochemicals, total phenols content and antioxidant activity. The proximate analysis and phytochemicals screening were performed using standard procedures whereas minerals content was determined by atomic absorption spectrophotometry. DPPH free radical scavenging activity and Folin-ciocalteau assays were used to determine antioxidant activity and total phenol content, respectively. The results indicated that the watermelon seeds had moisture content in the range of 7.40 - 8.50 %; fat, 26.50 - 27.83 %; protein, 16.33 - 17.75 %; fiber, 39.09 - 43.28 %; ash, 2.00 - 3.00 %; carbohydrate, 9.55 - 15.32 % and energy value of 354.05 - 369.11 kcal/100g. The seeds also contained appreciable minerals (Ca, P, Mg, Na, K and Zn) with K (3.40 – 3.85 mg/100g) being the highest while Na (0.07 - 0.08 mg/100g) was the least. DPPH % inhibition varied between 59.88-94.46% inhibition with trolox equivalent of 82.59-130.29 $\mu\text{M/g}$ depending on the variety. Saponins, tannins, triterpenoids glycosides and alkaloids were present in all samples. Crimson sweet seeds had the highest total phenol content (5416 mgGAE/100g), followed by Black diamond (3949 mg GAE/100g) and the least, Charleston gray (1494 mg GAE/100g). Similarly, Crimson sweet possessed the highest antioxidant activity, followed by Black diamond and lastly, Charleston gray. The present findings suggest watermelon seeds as considerable source of nutrients in the diet and may have medicinal/health and economic benefits due to its antioxidant activity, phytochemicals and total phenols content.

[13] Removal Of Phosphorus From Water Using Sawdust And Groundnut Pod As Adsorbents

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Phosphorus is one of the key nutrients that contribute to eutrophication and excess algae growth in rivers and lakes and other water bodies which affect the life of aquatic organisms especially fishes. Also algal blooms on the water's surface block the sunlight from reaching the plants on the sea bed, which prevents photosynthesis and stunts plant growth. Sawdust and groundnut pod were used as the adsorbents in the removal of phosphorus from aqueous solutions in this study. The adsorption characteristics of phosphorus on the adsorbents were investigated, including the effects of adsorbent dosage, initial concentration of phosphorus and contact time on removal of phosphorus by conducting a series of batch adsorption experiments. The results showed that 81.35% and 54.54% of phosphorus ions were respectively removed by sawdust and groundnut pod at adsorbate concentration of 10 mg/l (P) for a period of 180 minutes at adsorbent dosage of 0.4 g. It was also found that the saturation level of phosphorus ions onto the sawdust occurred at 0.4 g dose while that of groundnut pod was 0.6 g. The equilibrium adsorption capacity of adsorbent used for phosphorus was measured for concentrations 2 mg/l to 10 mg/l and extrapolated using linear Freundlich, Langmuir isotherms and the experimental data were found to fit the Freundlich isotherm model. Sawdust was found to have better adsorption capacity for phosphorus ions than that of groundnut pod.

Keywords: Phosphorous, adsorption, water, sawdust, groundnut pod

[14] Cytotoxicity and Antioxidant Activity of some Ghanaian Medicinal Plants used as Antiviral and Antiparasitic Agents

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Screening of drug candidates for safety during the early stages of drug development is crucial. Cytotoxicity of potential therapeutic agents to human cell lines is a key safety evaluation approach often used to disqualify a candidate compound for new drug development. Another essential property of drug candidates is their antioxidant property. The latter are agents responsible for the scavenging of free radicals in the human system. In Ghana there are several medicinal plants used by Traditional Medicine Practitioners to manage diseases, however scientific investigations on the toxicity of most of these medicines have not yet been done. In the present study, cytotoxicity and antioxidant activity of Ghanaian medicinal plants used for managing/treating HIV and trypanosomiasis were assessed using the tetrazolium-based colorimetric (MTT) Assay. The total phenolic content and SOD activity of the extracts were determined using the Folin-Denis and Superoxide Dismutase assays respectively. One hundred and thirteen (113) hydroethanolic extracts of the plants were evaluated for their toxicity to leukemia cell lines (Jurkat and CEM) using *in vitro* culture system. Antioxidant activities of the extracts were also determined. The results obtained indicated that 96% and 93% of the extracts were toxic to the Jurkat and CEM cells, respectively. Thirty percent of extracts were toxic to Jurkat cells (compared to 18% CEM cells) were toxic at concentrations <100µg/ml. Results from the antioxidant assays indicate promising scavenging activity of the extracts as compared to the standard control. These results have shown useful concentration ranges for the bioassays as well as antioxidant activities of the extracts. Further toxicity studies are warranted.

POSTER SESSION

Disability and Nutrition (Abstract # 15 – 28)

Clinical Research and Public Health (Abstract # 29 – 71)

Toxicology and Plant Medicine (Abstract # 72 – 106)

Bioengineering, Bioinformatics and Molecular Biology

(Abstract # 107 – 126)

Listed alphabetically under each group

Disability and Nutrition

[15] Development of Yam-Baobab-Tamarind Based Snack Extrudates

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Six formulations of yam-based snacks were prepared (F1-F6) with various ratios of yam, baobab and tamarind. This project is aimed at utilizing the high energy root crops such as less consumed yam, high nutrient and vitamin crops such as tamarind and baobab, for the development of new products and furthermore to establish their organoleptic properties, nutritional acceptability and shelf life qualities. Extruded products were obtained using a co-rotating twin screw extruder under operating conditions of 300 rpm feed speed, temperature range of 120-200°C and screw speed range of (1000-1200rpm). Other physical analyses performed on samples were expansion ratio, bulk density, swelling index, moisture and pH. The product samples showing best physical properties composed of (60% yam: 40% tamarind) and (60% yam: 10% baobab: 30% tamarind) which were coded F2 and F5 respectively. Samples exhibited an expansion ratio (ER) of 3.45 and 4.15, bulk density (B.D) of 166.67 g/L and 238g/L for F2 and F5 respectively. Sensory evaluation revealed that F2 (60% Y:40% T) had the highest scores for colour, aroma, puffiness and aftertaste. Samples with high baobab substitution F3 (60% Y: 40% B) and F4 (60% Y: 30% B: 10% T) were least preferred in terms of after taste. However, F1 (100% yam) and F6 (60% Yam: 20% baobab: 20% tamarind) had the least values for overall acceptability using the nine point hedonic scale. Understanding the effects of extrusion parameters on the blends will help in the optimization of the most desirable product for the consumers.

Key word: co-rotating twin screw extrusion, yam, tamarind, baobab, physical characteristics

[16] Assessing the Dietary Intake of Anti-Oxidant Micronutrients and Recovery rate of Burn Patients

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Burn injury results in emotional stress affecting dietary intake and anti-oxidant micronutrient intake, which is known to have effects on recovery outcomes. The study aimed to assess dietary intake of anti-oxidant micronutrients and recovery outcomes of burn patients. Secondary data of 487 patients was taken from the Burns Intensive Care Unit (BICU) at Komfo Anokye Teaching Hospital (KATH) for a period of 4 years (May 1, 2009 – April 30, 2013). Questionnaires were administered to 40 burn patients at KATH from January 1, 2014 – April 30, 2014 (4 months). The secondary data indicated that the average length of stay and Total Burns Surface Area (TBSA) was 7 days and 28.6% respectively with 229 (47.1 %) females and 258 (52.9%) males; 244 (49.7%) patients were discharged from the BICU, 151 (30.9%) transferred to other wards; 92 (19.4%) died. Cross sectional study for 40 patients revealed an average TBSA of 31.4%; where 70.0%, 35%, 75%, 52.5%, 12.5% and 32.5% patients were deficient in Vitamin A, C, E, Zinc, Copper and Selenium respectively. Patients with adequate amounts of zinc had a lower rate of infection, 26.3% as compared with those with inadequate amounts 33.33%. About 25% of patients with adequate amounts of Vitamin A had wound infections as compared to 32% with inadequate amounts. With Vitamin C, 26.9% patients with adequate amounts had infections as compared with 35.7% with inadequate amounts. Also 76.9% of patients with adequate amounts of Vitamin C showed progress in wound healing. The adequacy of anti-oxidants resulted in positive wound healing outcomes. The prevalence of burn injury is high; hence there should be public education to prevent it. Also, most burn patients did not meet their dietary requirements for anti-oxidant micronutrient and this may be due to meals not tailored to suit individual requirements, hence the need for planned and well balanced meals.

[17] The use of UV Irradiation to sanitize Vegetables sampled from Asafo Market in the Kumasi Metropolis

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There is the prevalence of adverse health risks such as food poisoning, diarrhoea and other health complications that result from the consumption of vegetables in Ghana, even after they have been sanitized. This has therefore triggered scientists to generate interventions that remove or kill pathogens from fresh vegetable produce. This study aimed at sanitizing vegetables sold on the Asafo market in the Kumasi Metropolis using ultra-violet (UV) irradiation. Carrots, cucumber and lettuce which were randomly sampled from Asafo market, were subjected to UV irradiation and their microbial loads were assessed in the laboratory using microbial techniques and polymerase chain reaction (PCR). Total Viable Count (TVC) and Faecal Coliform Count (FCC) of microbes on vegetables were determined to quantify gram negative bacteria and enteric pathogens present in the vegetables. The level of microbial load reduction was also monitored in order to assess the effectiveness of UV irradiation. Also, selective sub-culturing was carried out to determine the presence of *Salmonella* and *Shigella* and *E.coli* spp. The samples were subjected to UV irradiation at varied exposure times of one (1) hour, five (5) hours and ten (10) hours. The results obtained were compared with vegetable samples that were treated with vinegar as the control. The raw untreated vegetable samples showed high microbial loads and tested positive for all microbial assays. The vinegar treated vegetables (control) showed significant reduction in microbes as compared to the raw untreated vegetables. There was significant decrease ($p\text{-value} < 0.05$) of microbial loads after vegetable samples were exposed to UV irradiation at one (1), five (5) and ten (10) hours, eliminating almost all potential pathogenic micro-organisms as compared to the control (vinegar) treatment. This was due to the fact that UV irradiation had maximum bactericidal effect on the samples consequently inactivating microbes and ceasing reproduction with no significant difference between UV treated samples. PCR was run for the vegetables, but could not be used to assess the effectiveness of UV irradiation. This is due to the formation of DNA smears and primer dimers. UV irradiation is an effective and convenient approach to tackling vegetable contamination in Ghana based on microbial assays. Commercialization of UV irradiation in food sanitization will bring about large improvements in microbiological quality and safety of fresh and fresh-cut vegetables and even fruits.

Key words: UV irradiation, food sanitization, vegetable contamination, vinegar, *Shigella* spp., *Salmonella* spp., *E.coli* spp., bactericidal effect, pathogen inactivation, Polymerase Chain Reaction (PCR), microbiological quality and safety, commercialization.

[20] Ackee (*Blighia sapida*) Fruit Arils: Nutritional, Phytochemicals and Antioxidant Properties

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Ackee (*Blighia sapida*) is an underutilized fruit tree with edible arils when the fruit is ripe and self opened. It is inherent of West Africa but with limited information on its health and nutritional benefits. This study aimed to investigate the nutrient composition, total phenols, antioxidant activity and phytochemical constituents of freeze-dried and oven-dried ackee arils. Proximate and phytochemical analyses were performed using standard protocols whereas antioxidant activity and total phenol content were determined using the DPPH and Folin-Ciocalteu methods, respectively. The minerals content was determined by means of atomic absorption spectrophotometry. The moisture, crude fat, crude protein, crude fibre, ash, carbohydrate and energy content were in the range of 4.83-5.20%, 51.60-56.66%, 10.94-11.67%, 3.03-3.88%, 8.01-8.56%, 14.41-20.62% and 590.67-614.26 kcal/100g, respectively. The flours also contained appreciable minerals (Ca, P, Mg, Na, K and Zn) with K (425.38-439.88 mg/100g) being the highest while Zn (1.89-1.99 mg/100g) was the least mineral. The phytochemicals present were tannins, saponins and glycosides. The total phenolic content was 5175.38±178.46 mg gallic acid equivalent (GAE)/100g and 5235.04±178.46 mg GAE/100g; vitamin C content 35.72±1.34 mg/100g and 29.611±0.39 mg/100g, and antioxidant activity was 29.40±0.41, 65.95±6.84 and 30.65 % DPPH inhibition with the trolox equivalent (TE) concentration of 40.55±0.57 µM TE/g and 90.97±9.43 µM TE/g, in freeze-dried and oven-dried samples, respectively. Thus, drying method had effect on the phytochemicals, vitamin C and antioxidant activity of the ackee fruit arils. The findings, however, suggest that ackee arils had considerable nutrients, total phenols content and antioxidant activity which implies that utilization could give nutritional value and antioxidant benefits in a product or in the diet.

[22] Development of a Nutritious Snack Product from Sweet potato for the Ghanaian Consumer

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Sweet potato (*Ipomoea batatas* L.) is a climate-friendly, nutrient-packed food crop that grows easily in all parts of Ghana. Due to its impressive nutritional profile compared with other root and tuber crops it has been recognized for its potential in the sustainable alleviation of certain nutritional deficiencies in vulnerable low-income groups, especially women and children. Sweetpotato has a broad diversity and in this study the quality of crispy fried chips from six varieties was investigated. Effect of varietal difference, crop maturity and storage history on the taste and texture of chips were assessed using a Sensory Evaluation Panel and a Texture Analyzer. Near Infra-Red Reflectance Spectroscopy (NIRS) analysis of the varieties showed that protein contents ranged from 4.81% – 7.25% while zinc and iron contents were 1.25–1.71 and 1.91–2.78 mg/100g respectively (dry weight basis). Overall acceptability was more correlated with textural attributes than flavor or sweetness intensity. Recommendations for the fine-tuning and sustained production of sweetpotato crispy fried chips for the Ghanaian industry are discussed.

[23] Does Disability Matter? Disability in Sexual and Reproductive Health Policies and Research in Ghana

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Sexual Reproductive Health (SRH) is a major public health concern in Ghana, but little is known about the SRH status of the disabled community. This is because major national SRH studies do not have data on persons with disabilities. However, since disabled persons encounter significant social, economic, and institutional barriers that hinder their access to mainstream society, they are also more likely to be confronted with more SRH problems than the non-disabled population. This paper discusses the extent to which national policies and research on SRH have included the concerns of disabled persons. The aim is to identify gaps in the SRH policies and research in terms of attention given to issues relating to disability and then find ways to redirect policies to include the concerns of the disabled population in Ghana. Seven documents were reviewed for policy or practice statements relevant to disability to determine if and how they addressed the SRH concerns of persons with disabilities. These include policies and research from government sources and non-governmental organizations. The documents were selected based on their relevance to the subject and coverage. The findings from the review indicated that while policies have been formulated to address SRH problems, and research conducted to identify groups at high risk, attention given to disabled persons has been cursory and often focused on the negatives. The study points to the need for more attention on disability issues in SRH policies and research in order to make the needs of disabled persons visible and to provide a framework to guide the provision of disability-friendly services.

[24] The Social Construction of Disability: Implications for Biomedicine

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Biomedicine has no doubt contributed significantly towards the enhancement of human life. It has played a crucial role in determining social opportunities but has also been the source of social exclusion and oppression. By virtue of its robust explanatory power, biomedicine has shaped our understanding about being. Biomedicine is also assigned to watch, identify, diagnose, label, confine, and ensure that deviance within the population is limited. However, while it may be desirable to engage in these activities in order to distinguish and understand human behaviours and experiences, the manner in which some of these activities are done may discredit, increase surveillance and create conditions for controlling targeted individuals. My aim in this paper is to challenge some biomedical assumptions and practices that have contributed to the marginalization, social exclusion and oppression of sections of the population. In particular, I will critique the biomedical conceptualization of disability as “pathology”, a “defect” or a “problem” residing within the individual disabled persons. I will argue that some of the underlining assumptions of biomedical practices are devaluing and fits well in prejudices and self-perceptions of social elites and professionals who want to enforce a certain social order and to control groups perceived as a threat. By so doing, my aim is to urge biomedical practitioners to critically re-examine some of their assumptions about being. In other words, I will suggest that for biomedicine to make a successful trip from the laboratory to the community, it must redefine some of its assumptions and conventional approaches to defining, understanding, and explaining human behaviours, expectations, and experiences.

[25] Investigating the Impact of Educational Attainments of Disabled Men on their Urban-Living Experiences

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The social model of disability attributes the unfavourable situations experienced by people with different forms of impairment to barriers resulting from socio-economic and structural arrangements. These barriers have been known to be prevalent in urban environments where mobility, access and opportunities for disabled people are characterised by systematic exclusion from the social and institutional mainstream resulting in situations where disabled persons in cities go through their daily lives faced with social and institutional arrangements that work against their abilities and potentials. This study was therefore aimed at investigating the experiences of disabled men in cities and the impact of educational attainments on their lives as urban dwellers.

Six disabled men from Kumasi, with varied forms of impairment and educational backgrounds, were purposively selected and interviewed. Participants responded to questions based on predetermined set of topics and their answers further probed and explored to obtain in-depth perspectives and experiences.

The study established that inaccessible environments in cities have conspired to deny disabled men of quality educational and employment opportunities and have served as the basis of exclusionary and discriminatory practices perpetuated against them.

Findings of the study show that disabled men who have been able to withstand socio-cultural and economic challenges in urban areas, and managed to attain higher education (post-secondary), have been able to secure useful employment; built stable families; have access to assistive devices and achieved a respectable level of inclusion in society.

[26] Helminth Infections And Nutritional Status Of Non-Enrolled School-Age Children In Irrigated Farming Communities In Bongo District, Ghana.

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Helminths infections are a leading cause of diseases among young people and adults in the world today. Heavy parasitic infections interfere with the process of intestinal absorption of nutrients and also compete with the human host for nutrients, thus resulting in under nutrition. The present study was conducted to assess the nutritional status (anthropometry, anaemia and diet history) and prevalence of helminths infection and to ascertain any association between them among non-enrolled (cases) and enrolled (controls) school-age children in the Bongo District, Ghana. A randomized case-control study was conducted in three elementary schools and their corresponding communities. Children between the ages of 5 and 18 were assessed by simple rapid assessment methods, dietary, urine, stool and blood analysis using standard parasitological methods. A total of 329 children were recruited for the study. 181 (55.02%) were enrolled in schools, whilst 148 (44.98%) were not enrolled. A statistically significant number, 46 (31.72%) of the non-enrolled children (N=145) were infected more with *Schistosomamansoni* than their enrolled counterparts (163), 9 (5.52%) $p=0.000$. There was no significant difference between the gender and age-group infections and enrolment status ($p>0.05$). The rate of anaemia was higher among the non-enrolled (N=148), 82 (55.41%) than the enrolled children (N=169), 87 (51.48%). The mean nutrient intake of vitamin C was significantly higher (102.1 ± 33.8) among the non-enrolled children when compared to that of the enrolled children (76.4 ± 24.2), $p=0.000$. A significantly higher number, ($p<0.05$) of the non-enrolled met their Dietary Reference Intakes (DRIs) of protein and Vitamin C as compared to the enrolled children. Out of 169 enrolled children, a significantly higher number of them, 159 (94.08%) were benefiting from the Ghana National Deworming Program (GNDP) as compared to the non-enrolled children (N=147), 58 (39.46%) ($p<0.001$). Deworming programs should be extended to cover non-enrolled children.

[27] Starch And Glucose Evolution Upon Enzymatic Hydrolysis In Tigernut Milk To Increase Sweetness

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Tigernut milk has been proposed as a potential plant-based substitute to cow milk. A major constraint to its use however is the relatively high starch content which adversely affects the sensory qualities of the milk necessitating the need to investigate ways of reducing the starch content while maintaining the nutritional and sensorial quality of the milk. This study therefore investigated the effect of enzymatic hydrolysis (of two enzymes) on the starch and glucose content of tigernut milk. Tigernut milk was extracted by standard methods and starch hydrolysis done using α -amylase and glucoamylase in ratios of 1:0, 0.8:0.2, 0.5:0.5, 0.2:0.8 and 0:1, respectively at 47 - 50°C for four hours. Aliquots of each hydrolysis were taken after every hour for analysis. There was an average decrease of 7.32% in starch content upon four hours hydrolysis with enzyme ratio 1:0 having the least starch concentration. The average glucose increase was 1.37% with enzyme ratio 0.8:0.2 having the highest glucose concentration. There was a significant difference between starch hydrolysis using only α -amylase and the hydrolysis using a combination of the two. In terms of glucose yield, the results showed a significant difference between times that are not consecutive. There was a positive, strong and significant correlation between °Brix and glucose content. Thus, the higher the α -amylase concentration, the higher the rate of starch hydrolysis while the presence of glucoamylase enhanced the glucose levels of the hydrolysed milk. The higher the glucose, the higher the °Brix, means more sweetness. The results therefore indicate the potential of an effective hydrolysis of tigernut milk starch and a simultaneous increase in glucose content of the milk for various food uses upon using a blend of the two enzymes.

[28] Proximate Composition, Minerals and Functional Properties of five Lima Bean Accessions

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In order to combat food insecurity, efforts are being made by the Crops Research Institute, Kumasi, to produce new bean varieties with improved characteristics such as high yield, disease resistance and high nutritional value. Some of the new lima bean (*Phaseolus lunatus*) accessions collected from farmers include: Koloenu white, Koloenu brown, Nsawam black and white, Ohwam Mampong and Koloenu small black and white. The objective of the present work was to evaluate the proximate composition, minerals content and functional properties of flour from these five lima bean accessions. The proximate and functional properties were determined using standard procedures whereas minerals content by atomic absorption spectrophotometry. The crude protein content was in the range of 20.69–23.08 %, crude fat 0.59–1.14 %, crude fibre 4.06–6.86 %, ash 4.39–5.61%, moisture 9.19-11.83 %, carbohydrate 54.31-59.64 % and energy content of 313.28-328.10 kcal/100 g. The minerals (K, Ca, Fe, and P) content were in the range of 2.45–172.77 mg/100g with iron the lowest value and phosphorous the highest value. The functional properties of the flours: foaming capacity, solubility capacity, bulk density, swelling index, water adsorption capacity, and emulsion capacity were in the range of 18.00-22.13%, 17.00-21.01%, 0.66 g/mL, 0.98-1.64, 0.88-1.41 g/g, and 49.63-59.99, respectively. The results indicate that these lima bean accessions are rich in protein and have appreciable functional properties that could be exploited in food formulations such as koose, sauces and stews. The lima bean flours could also be used to fortify conventional flours which are low in protein and fiber.

Clinical Research and Public Health

[29] Prevalence And Risk Factors Of Hepatitis B Virus Infection Among Pregnant Women Attending Antenatal Care In Aowin District, Enchi, Ghana

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Vertical transmission from mother to baby is significant route of transmission for hepatitis B virus infection. Neonates who contract hepatitis B will have almost 90% risk of developing chronic HBsAg carriage and chronic liver disease. Neonatal immunization interrupts this vertical transmission. The study was to determine the sero-prevalence of HBsAg and to identify potential risk factors associated with the infection among pregnant women attending antenatal care. A cross-sectional study was conducted from December, 2012 to March, 2013 among 200 pregnant women attending antenatal care at the Enchi Government Hospital and Presbyterian Hospital, two large hospitals in Aowin District, Western Region, Ghana. Blood was collected from each woman and tested for the presence of HBsAg using Accu-Tell test Strip (ACON, Laboratory, USA), a qualitative, solid phase two-site sandwich immunoassay. A pre-structured questionnaire was used to collect socio-demographic data and to identify significant risk factors associated with HBV in the district. The overall prevalence of HBsAg was 41 (20.5%); and slightly higher at Enchi government hospital. Among the socio-demographic characteristics, a higher proportion of HBsAg positivity 25 (19.8%) was associated with pregnant women between 20-30years and lowest among the rest of the age groups. The average age of the participants was ± 26.5 . For the risk factors investigated, pregnant women who had not been vaccinated, had multiple sex partners were not significant (P -value > 0.05) but subjects who had no knowledge about HBV were significantly at higher risk of HbsAg (P -value < 0.05). The prevalence of HBsAg carrier state among pregnant women in the district was higher than WHO's average and can be considered endemic. Immunization against HB and routine antenatal screening should become a policy in the district. The main route of HBV transmission could be either through sexual contact or from mother to child. Further studies are required to confirm these modes of transmission

[35] Oxidative Stress and Haematological Indices Relationship in Diabetic and Non Diabetic Ghanaian Population

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Diabetes Mellitus (DM) is marked by hyperglycaemia due to either absolute insulin deficiency or reduced tissue response to insulin or both. During prolonged diabetes; persistent hyperglycaemia causes increased production of free radicals, especially reactive oxygen species (ROS), from mainly glucose auto-oxidation and protein glycosylation. ROS have been implicated in the damage mechanism of red cells in diabetic patients, resulting in the development of haematological complications consisting mainly of functional, morphological and metabolic abnormalities of erythrocytes, leukocytes and platelets. In this study we investigated oxidative stress levels using superoxide dismutase activity levels in a diabetic and non-diabetic Ghanaian population in relation to their haematological indices. The study was a case-control one with a total population of 110 comprising of 66 diabetic subjects from National Diabetes Management and Research Centre (NDMRC), Korle-Bu, Accra and 44 control subjects from the general population in Accra, Ghana. Blood samples were obtained from study participants with consent. We determined oxidative stress levels using a commercial kit for superoxide dismutase activity and the haematological profiles of the study participants. Red blood cells count, haemoglobin concentration and haematocrit levels were lower in the diabetic participants ($4.48 \pm 0.60 \times 10^6/\mu\text{L}$, $12.29 \pm 1.50\text{g/dL}$ and $38.77 \pm 5.01\%$ respectively) than in the control participants ($4.57 \pm 0.54 \times 10^6/\mu\text{L}$, $12.60 \pm 1.30\text{g/dL}$ and $39.32 \pm 3.29\%$ respectively). Platelet count was high in the cases ($233.89 \pm 62.81 \times 10^3/\mu\text{L}$) compared to controls ($221.05 \pm 59.62 \times 10^3/\mu\text{L}$). White blood cells count were high ($5.87 \pm 1.76 \times 10^3/\mu\text{L}$) in the cases as compared to controls ($5.25 \pm 1.05 \times 10^3/\mu\text{L}$). SOD activity was lower in the diabetic subjects ($285.44 \pm 114.36\text{U/mL}$) compared to the controls ($319.79 \pm 126.12\text{U/mL}$). In conclusion, there was lower SOD activity in the diabetic cases than in control subjects and the

difference could explain the differences in the haematological indices observed in the Ghanaian population studied.

[36] Oxidative Stress and Micronutrient Levels in Paediatric Cerebral Palsy Patients in Accra, Ghana

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Cerebral palsy (CP) is a disorder of the central nervous system. Due to oxygen not reaching some part of the brain, cerebral palsy patients have higher concentration of oxygen circulating the body and if not metabolized well could increase reactive oxygen species intermediates which if not be detoxified efficiently would leading to high oxidative stress situations in the CP patient. In this study we investigated the oxidative stress status and essential micronutrients levels in Ghanaian CP patients. The study was carried out at Korle-Bu Teaching Hospital, in Accra. Blood samples were collected from paediatric CP patients (n=29) from Korle-Bu Teaching hospital and compared with the healthy subjects (n=17). The oxidative stress of the samples were analysed using Superoxide Dismutase (SOD) assay commercial kit. The micronutrients status of the patients (copper, selenium and zinc ions concentrations in plasma of patients) was analyzed using Graphite Furnace Flame Atomic Absorption Spectrophotometer. The SOD activity of the cases were 459.22 ± 125.77 U/mL (for ages 0-5 years), 355 ± 50.82 U/mL (ages 6-8 years), 293.36 ± 71.91 U/mL (ages >9 years). SOD activity values for controls were 493 ± 25.77 U/mL (ages 0-5years), 453.26 ± 126.7 U/mL (for ages 6-8 years), 560.51 U/mL (ages >9 years) respectively. Copper ion concentrations were 0.57 ± 0.82 mg/L (0-5 years), 0.16 ± 0.279 mg/L (6-8 years), 0.76 ± 1.056 mg/L g/L for the cases and 1.13 ± 0.78 mg/L (0-5 years), 0.70 ± 0.38 mg/L (6-8 years), 1.490 mg/L (>9 years) respectively for controls,. Selenium concentrations were 3.31 ± 1.09 mg/L (0-5years), 4.06 ± 1.995 mg/L (6-8 years), 4.89 ± 0.59 mg/L (>9years) for cases and 3.31 ± 0.195 mg/L (0-5years), 2.48 ± 0.92 mg/L (6-8years), 3.44 mg/l (>9years) for controls. The zinc concentration were 3.30 ± 1.09 mg/L (0-5years), 6.73 ± 2.78 mg/L (6-8 years), 5.88 ± 3.33 mg/L (>9years) for cases and 6.42 ± 0.22 (0-5years), 5.38 ± 2.28 (6-8years), 6.99 (>9 years) for controls. $p=0.038$ for copper ion concentration in the 6-8 years category comparing cases and controls. In conclusion there was increased oxidative stress using SOD activity with respect to increasing age range in CP and low copper ion concentrations as compared to healthy subjects.

[37] The Prevalence and Clinical Significance of Sexually Transmitted Infections at the Suntreso Government Hospital, Kumasi Metropolis

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Sexually transmitted infections (STIs) remain an important cause of morbidity and mortality in women in their reproductive age. In many developing countries, diagnosis and treatment is based on simple syndromic approach that potentially may not target pathogenic organisms needing treatment. The aim of this study therefore was to determine the prevalence of some STIs using Anyplex™ II Assay by Real time (RT) - PCR that targets a panel of seven pathogenic bacteria in an STI clinic in an urban setting in Kumasi. The study employed a cross-sectional design of a random selection of 200 consenting women reporting at the STI clinic at the Suntreso Hospital. From all consenting women endocervical swabs were collected, DNA extracted and multiplex RT-PCR assays performed using Anyplex™ II STI-7 Assay. The mean age of study participants was 29.3 ± 8.2 (Range: 11 min-68 max) years. Among the 200 women, 175 (87.5%) had a positive result for at least one microorganism, 49 (24.5%) had a single species, 77(38.5%) had two different species, 37 (18.5%) had three different species, and 12(6%) women had four different species. The prevalence rates of *Chlamydia trachomatis*, *Neisseria gonorrhoeae*, *Mycoplasma genitalium*, *Ureaplasma urealyticum*, *Ureaplasma parvum*, *Mycoplasma hominis*, and *Trichomonas vaginalis* infection were 3% (6/200), 7.5% (15/200), 5% (10/200), 32.5% (65/200), 63% (126/200), 66.5% (133/200) and 0.5% (1/200), respectively. These prevalence rates are clinically significant in the management of STIs in clinic settings. Effective treatment of STI should therefore take into consideration the contributing organisms by performing culture and sensitivity tests and not by syndromic approach that has the potential to miss such organisms.

[38] The Recent Trend Of HIV-1/HIV-2 Dual Infection Among PLWHA In Koforidua, Eastern Region

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HIV Type 2 (HIV-2) which is serologically and genetically distinct from HIV-1 is endemic in West Africa. HIV-2 in this area was relatively high in early 1990s compared with HIV-1, but currently, HIV-1 overwhelmingly predominates. Consequently, dual infection of HIV-1 and HIV-2 has become one of the key issues from a therapeutic viewpoint regarding drug choice and diagnosis. The purpose of this study was to clarify the recent trend of HIV-2 infection including HIV-1/2 dual infection in Koforidua. 498 people living with HIV/AIDS (PLWHA) and visiting the Koforidua Regional Hospital from 2010-2012 constituted our subjects in the study. Blood samples were collected, CD3/CD4 cells measured and separated into plasma and PBMCs. Plasma samples were subjected to serological screening by rapid immuno-chromatogram tests (First Response Test kit 1-2.O and OraQuick). The specimens that were HIV-2 reactive were confirmed by two different Western Blotting kits (Lavblot I/II and INNO-LIA HIV I/II). Total RNA was extracted from plasma and the viral load quantified using an in-house qRT-PCR methodology. Viral nucleic acids extracted from plasma or PBMCs were sequenced for genotyping. Out of 498 cases, 14 (2.8 %) were judged as dual infection of HIV-1 and HIV-2 by Lavblot I/II. Of the 14, 3 cases showing very weak reaction in HIV-2 Env proteins (gp140/gp110) were judged as HIV-1 single infection by INNO-LIA HIV I/II. Only one case (0.2 %) was HIV-2 single infection by both Western blotting kits. The rest (483,96%) were HIV-1 single infection. As far as mean CD4 cell count and HIV-1 viral load is concerned, these patients seemed to be treated well by the first-line ART regimen. The case of HIV-2 single infection was genetically confirmed by the presence of HIV-2 sequence, and its phylogenetic position was closely related to GH1, a prototype HIV-2 strain isolated in Ghana. Two different Western blotting kits gave basically the same results and we have found that the prevalence of HIV-2 is relatively low but it is still actively circulating in this region. Continuous surveillance for both HIV-1/2 will be necessary to know the future prevalence of HIV-2 as this will be relevant in diagnosis and treatment.

[39] *Lysinibacillus Sphaericus* Biolarvicide, An Efficacious Tool In The Control Of *Anopheles Gambiae* In Kumasi, Ghana

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Malaria vector control measures in Ghana is confined to insecticides. Malaria vectors are becoming increasingly resistant to insecticides hence the interest for alternatives. *Lysinibacillus sphaericus* (*Bs*) has been used as a larvicide to control mosquitoes in various countries. *Bs* as a larvicide of *Anopheles gambiae* mosquitoes has not yet been studied in Ghana. There have been conflicting reports on the ability of *Bs* to persist in treated habitats. The study was conducted to determine the optimum concentration of *Bs* against *Anopheles* larvae under laboratory conditions (LC₉₅), the optimum concentration of *Bs* against *Anopheles* larvae under controlled field conditions and its residual effect. The data for LC₉₅ were analysed using the Simple Logistic Regression Model in SPSS version 16.0. All comparison were done with non parametric Mann-Whitney test and parametric unpaired t test. All comparison test were carried out using the GraphPad Prism 5. The percentage reductions for the mean numbers were calculated using the formula of Mulla *et al.*, 1996. It was shown that *Anopheles gambiae* complex larvae were susceptible to the biolarvicide with LC₉₅ of 0.0086 mg/l after 24 hours exposure in the laboratory. The 50 fold concentration of the LC₉₅ achieved 100% larval mortality within 24 hours post-application for up to 10 (dry season) to 12 days (rainy season) under field conditions. This study confirms the effectiveness of *Bs* against *Anopheles* larvae. Based on its 10 to 12 days residual effect, reapplication should be done every 10 to 12 days. Low concentrations of *Bs* are required to control *Anopheles* larvae population in the field.

[40] A Survey On The Use Of Painkillers Among The Students Of Kwame Nkrumah University Of Science And Technology In Ghana

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Pain is a common and rising problem in our societies today. The easy availability of a wide range of painkillers can promote self-medication which can result in drug abuse. The hectic life styles of students make them prone to the use and abuse of painkillers which can result in side effects that can affect the health of the student. A cross sectional survey was conducted at KNUST in Ghana to investigate the use of painkillers among the university students. Three hundred and fifty six (356) students partook in the survey. From the results, almost all the participants (96%) used painkillers with the exception of (4%) that do not use painkillers. The most commonly used painkiller was paracetamol (54%), followed by NSAIDs and some narcotic painkillers. The use of painkillers between males and females and among the different levels of the students was statistically significant ($p < 0.05$). Majority of the students (54%) indicated headache as the major reason for taking painkillers. Other reasons included general body pains (22%), stomach pains (14%), and menstrual pains (12%) with swelling being the least (2%). A considerable number of the students (41%) take 1-2 tablets once a day and 77% never exceed the maximum dose of the painkillers they take. Majority of the students (65%) indicated that they practice self-medication. Side effects experienced by the students included dizziness, nausea, drowsiness and weakness. Although a high percentage of the students use painkillers there is no evidence of abuse but there is indication of minor side effects among the users and more awareness should be made concerning the side effects to the students.

[42] Antibiotics Resistance and Serotype Distribution of *S. Pneumoniae* in Rural Ghana

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Streptococcus pneumoniae is known to cause several invasive infections in both children and the elderly. Adequate information on serotype prevalence and pattern is important for implementing any control strategy including vaccine design. In this study we assessed the presence or otherwise and the different serogroup/types of *S. pneumoniae* in nasopharynx and to ascertain the possibility of mother to child transmission. We collected nasopharyngeal swabs samples after written informed consent and assent from mothers and children between February and April 2013 at the Out Patients Department of the Agogo Presbyterian Hospital (APH), Ghana. In all cases, antibiotic susceptibility testing was done using the Kirby-Bauer disk diffusion method and by measuring Minimum Inhibition Concentration (E-test) using the CLSI guidelines. Serotyping was performed using Pneumotest plus kit (Statens Serum Institut). The kit is designed for serogroup/types included in the 23PCV. Of the total number of 376 children and 359 mothers, 207 (55.05%) and 26 (7.24%) *S. pneumoniae* were isolated respectively. The risk colonization of mother and child by similar or related groups of bacteria was statistically significant ($p=0.024$). Serogroups 19 and 6 were found to be predominant in both groups. Serotypes 1 and 17 were isolated once while 43(18.45%) of all isolates were Non Typeable. The prevalence of isolates resistance to the antibiotics tested were 8.29%, 90.73% and 5.31% to erythromycin, cotrimoxazole and penicillin respectively. Of the total number of isolates from mothers, 84.62% and 3.85% were resistant to cotrimoxazole and penicillin respectively. No resistance to erythromycin was reported among mothers. Serogroup 19 reported resistance to all antibiotics except ampicillin/sulbactam. The 23PCV and 13PCV covered 76.85% and 60.86% of the identified serogroups from children. We observed diverse serotype distribution and drug resistance among serogroup/types of *S. pneumoniae* among the study population. Control measures should factor into the specific serotypes present.

[44] Haptoglobin Genotype Polymorphism and Type Two Diabetes In Accra, Ghana**Charles Brown^{1*}, Benedicta Awisi¹, Richard Asmah¹, Batholomew Dzudzor², Anita Ghansah³**

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Polymorphism of the haptoglobin (Hp) gene, characterized by alleles Hp1 and Hp2, gives rise to structurally and functionally distinct Hp protein phenotypes: Hp1-1, Hp2-1, and Hp2-2. The corresponding proteins have structural and functional differences that have influence on a particular disease. For example, Hp genotype is an independent risk factor for diabetic complications. In urban Ghana, type two diabetes mellitus (T2DM) affects at least 6% of adults. The aim of this study was to assess the association between Hp genotype polymorphism in T2DM patients in Accra. The study was a case control one. A total of 100 participants, 50 T2DM patients attending the Diabetes Clinic (Korle-Bu Teaching Hospital) and 50 healthy non-diabetic controls, were involved. Plasma glucose concentration was measured by the glucose-oxidase method. Fasting blood glucose was performed on all subjects except for the individuals with a history of T2DM. Hp genotype was determined by allele specific polymerase chain reaction (PCR). PCR produced Hp genotype-specific bands for the Hp1F, Hp1S, and Hp2 alleles. Statistical analyses revealed a significant difference in the Hp genotype distribution between diabetics and non-diabetics ($\chi^2 = 7.84$, $df = 2$, $p = 0.0198$). Hp1-1 was the most frequent genotype among non-diabetics (58%) whilst Hp2-2 (38%) was most frequent genotype among diabetics. Majority of the diabetics were found in the Hp1S-1F and Hp2-2 genotype groups for diastolic BP (mmHg), systolic BP (mmHg) and FBG (mM). There was a strong association between DM and Hp2-2 genotype, followed by Hp2-1 (Hp1F-2 > Hp1S- 2) with the least being Hp1-1 (Hp1F-1F, Hp1S-1F, Hp1S-1S). The risk of developing diabetes among people with Hp2-2 and Hp1F-2 genotypes was high. They can therefore be used as markers for an individual developing DM.

[45] Variations In IL-6 And TNF- A Levels Associated With Type 2 Diabetes Mellitus And Hypertension In Rural And Urban Settings

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Elevated levels of pro-inflammatory biomarkers are associated with type-2-diabetes mellitus (T2DM) and hypertension; however, data on variations in levels of biomarkers from T2DM patients in different settings of the same geographical area are lacking. This study was to determine variations in levels of IL-6 and TNF- α in T2DM patients with or without hypertension from rural and urban settings. A nested case-control design using participants aged 25 - 70 years consisting of 100 T2DM with or without hypertension patients and 168 controls were matched for age and sex in the Ashanti Region. Fasting blood sugar was determined using glucose dehydrogenase method while both IL-6 and TNF- α were measured using sandwich ELISA method. Overall median age for cases was 51 (27 - 70) years and 50 (25 - 70) years for controls with no statistical difference ($p= 0.7735$). There was however, significant difference ($p< 0.0001$) in fasting blood sugar (mmol/L) between cases, 7.6 (7.0 – 25.0) and controls, 6.0 (4.6 – 6.9). Urban [7.6 (7.0 – 18.8)] and rural [7.6 (7.0 – 25.0)] cases had significantly higher fasting blood sugar than their controls of 5.7 (4.7 – 6.6) and 6.1 (4.6 – 6.9) respectively with $p< 0.0001$. Rural cases showed significantly higher levels of IL-6 (pg/mL) [108.4 (25.98 – 478.0)] compared to urban cases, 38.67 (12.31 – 129.30) with $p< 0.0001$. Inversely, TNF- α (pg/mL) levels were significantly higher ($p= 0.0424$) in urban cases; 258.5 (32.44 – 514.50) than rural cases; 188.0 (0.0 – 412.0). There was no statistical difference in IL-6 and TNF- α levels between T2DM with and T2DM without hypertension. These results suggest there are variations in IL-6 and TNF- α levels in T2DM patients from rural and urban settings and could be due to co-inflammatory conditions including infections and metabolic syndrome. Moreover, co-morbidity of T2DM and hypertension has no significant cumulative effect on IL-6 and TNF- α levels.

[53] Microbial Loads On Door Handles At Lecture Rooms And Some Selected Lecturers Offices At Biological Sciences Department KNUST, Kumasi – Ghana.

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Technologically door handles create the luxury of opening doors of rooms and offices by serving as fulcrum for entry or exit. However, the negligence of cleaning door handles of rooms, offices and halls during cleanup activities makes door handle serve as reservoir for microorganisms leading to contamination and cross contamination. Door handles also serve as vehicles for transfer of pathogenic microorganisms if kept unclean. Hence this study aims at determining loads of microorganisms and level of contamination of door handles of lecture rooms and offices at The Theoretical and Applied Biology Department. Door handles were swabbed using moisten cotton gauze and place in a 25mm sterilized bottle containing peptone solution. The bottle was shaken vigorously to dislodge the microorganism in the peptone solution. Buffered peptone water (BPW) washing of the cotton gauze were inoculated into MacConkey broth to test for presence of bacteria. Content of positive tubes were inoculated into Modified Lauryl Sulphate Tryptose Broth with MUG and Tryptophan (ISO) to test for presence of thermotolerant (faecal) coliform. An indole test was conducted to confirm the presence of *Escherichia coli* in positive test tubes. The study reveals a mean of 3.410^7 MPN/100ml and 1.5×10^8 MPN/100ml on door handles for lecture rooms and offices respectively as bacterial contamination in March. April revealed 1.3×10^7 MPN/100ml on door handles of lecture rooms and 1.5×10^7 MPN/100ml on door handles for offices. 6.3×10^6 MPN/100ml and 1.1×10^6 MPN/100ml of thermotolerant (faecal) coliform were found on door handles for lecture rooms and offices respectively in March. April revealed 3.7×10^5 MPN/100ml for door handles of lecture rooms and 2.7×10^5 MPN/100ml for door handles of offices. The enumerations of *Escherichia coli* present were same for both lecture rooms and offices as 4.5×10^5 MPN/100ml in March. Offices recorded 1.5×10^5 MPN/100ml of *Escherichia coli* on door handles whilst lecture rooms recorded 5.5×10^4 MPN/100ml. In summary, this study reveals that door handles of lecture rooms and offices in the Theoretical and Applied biology are contaminated with loads of microorganisms. Strains of *E. coli* bacteria (such as a strain called O157:H7) causes diarrhoea and kidney failure which could be fatal therefore personal hygiene must be thought and practice as well as cleaning of the door handles to curb the problem.

[54] Ocular Morbidity among Fire Service Personnel in the Brong Ahafo Region, Ghana

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Most occupations are invariably associated with ocular health problems. This study was an attempt to determine the prevalence and distribution of ocular morbidity among fire service personnel in the Brong Ahafo Region. The sample size for the study was 200. Duayaw Nkwanta in the Asunafo South District, Sunyani in the Sunyani Municipality, Berekum in the Berekum District and Japekrom in the Jaman South District were conveniently chosen. Participants filled structured questionnaires and also went through distance and near Snellen visual acuity measurements, external ocular examination and direct ophthalmoscopy. Data was analyzed with Statistical Package for the Social Sciences (SPSS) version 17.0 employing the descriptive statistics tool. Chi-squared tests were done at a confidence level of 95% to assess statistical significance of associations obtained. One hundred and sixty (160) workers aged 21-60 years with mean age of 38.50 ± 9.96 years took part in the study (80% participatory rate); 71.9% were males and 28.1% were females. The total prevalence of ocular morbidity among the fire service personnel was 59.38%; 51.88% in males and 7.50% in females ($p < 0.05$). Morbidity also increased with age. The distribution of the conditions was as follows: pterygium (20.0%), conjunctivitis (16.25%), pingueculum (13.75%), corneal opacity (3.13%), corneal arcus (1.87%) and cataract (4.38%). Pterygium was dominant among the workers whose duties were basically outdoor than those indoors ($p < 0.05$). Generally, the prevalence of ocular morbidity increased with non-use of ocular protection devices 76.8%:23.2%, ($p < 0.05$). Ocular morbidity was commoner among males, outdoor workers, workers without eye protection and also increased with age.

[55] Ocular Morbidity Among Small Scale Miners In Ashanti Region

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Objectives: To assess the level of protection especially with respect to the eye, to determine the common ocular conditions among miners, to determine the distribution of ocular conditions among miners, to assess the knowledge of miners on impact of ocular health on work and assess the frequency at which miners visit eye clinics.

Materials and methods: The participants of this study were small scale miners who were conveniently and purposively selected from the communities of Atuntuma, Mpatuom and Akrokerry in the Ashanti region. Questionnaires were used to obtain the occupational and ocular history of the participants. Participants were also taken through various procedures including visual acuity measurement and ophthalmoscopy. Diagnoses were made on the presence of an ocular condition in at least one eye.

Results: The mean age of the 160 participants was 30.9 years, significant ocular conditions were found in 134(83.8%) of participants with the top five conditions being: conjunctivitis (45.5%), dry eye (11.2%), pinguecula (9.7%), pterygium (8.2%) and cataract (6.7%).

Conclusion: a total of 134 (83.3%) of participants had one or more ocular condition which required professional attention.

[56] Understanding Clinical Relevance Alarm: A Case Study Involving Nurses In Selected Hospitals In Accra

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Clinical alarm is the alertness elicited from monitoring devices to report an adverse condition of a patient to a nurse or caregiver. Despite its functions, challenges such as volume control, acoustic overloads, audibility, clinical irrelevant alarms, alarm prioritisation, transmission failures and nuisance alarms are associated with transmission of clinical alarms. Currently, studies involving the impact of clinical relevant alarms on patient healthcare are increasingly gaining attention. This research focused on the use of clinical alarms and their impact on the healthcare delivery in Ghana in relation to alarm priority, nuisance alarm and clinical relevant alarms. Closed-ended questionnaires were administered to 134 nurses from five departments in three major hospitals. The results indicated that nurses working in anaesthesia and neonatal intensive care units considered nuisance alarm, prioritisation of alarm and efficient identification of clinical relevant alarms as the major challenge that they encounter. The results pinpoints the need to urgently train nurses and other relevant health practitioners to accurately identify alarms that may require therapeutic interventions

[57] Public Perception of Males in the Nursing Profession**C.B.Kwanin¹ and H.K.Belany¹**¹Dept. of Nursing, KNUST, Kumasi
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Males form part of the predominantly active segments of our population yet continue to be extremely under-represented in the nursing work force in Ghana. Male nurses are perceived by Ghanaian society as misfits because they perform 'women's roles'. It is widely recognized that Ghanaians prefer service from female nurses even though male nurses have undergone the same training as their female colleagues. The main objective was to investigate the prevailing perceptions by the public on male nurses and to what extent age, sex, level of education and ethnicity affect these opinions and influence their choices in receiving care from male nurses. The study was conducted in two different areas in Ghana; Kumasi and Wa using a questionnaire composed of both open and closed ended questions on a sample size of 200 respondents equally represented from the two study sites using a convenience sampling method. Male nurses are generally perceived by the public as very patient, kind and comforting men providing care to people who need it but are often denied access to some professional areas because they are males. Younger respondents preferred female nurses whilst older respondents preferred males. As much as females preferred female nurses to take care of them, males preferred to be cared for by a male nurse. The higher ones' level of education, the more likely they are to develop interest in male nurses. Respondents' ethnicity was revealed to be very strongly related to what perceptions are kept. There is therefore the need for further research to be conducted into the activities of male nurses so that they can improve upon the quality of health care delivery attained and also maintain the positive perceptions the public has about them.

[58] The Scope of Non Traumatic Lower Limb Amputations at the Komfo Anokye Teaching Hospital (KATH) Kumasi

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Lower limb amputation has a significant impact on the quality of life of an affected individual and relatives. Non traumatic-amputations are the result of neglected public health conditions like complications of Diabetes mellitus, arterial disease and malignancy. The incidence of non-traumatic amputation is increasing in Ghana mainly because of the increase in incidence of non communicable diseases namely Diabetes mellitus and peripheral arterial disease. These have been attributed to the rapid westernization of lifestyles in developing countries. A prospective cross sectional study was carried out at the General Surgery Unit of the KATH. Respondents who had undergone lower limb amputations for non-trauma indications were interviewed and their folders assessed for clinical information over a 12 month period. A total of 104 amputations were done in KATH over the study period. Of these, 60(57.7%) were for non-trauma indications while 44 (42.3%) were done following trauma. Of the 60 amputations done for non-trauma indications, the M: F ratio was 1.6: 1. The mean age of the respondents was 65years. Majority (62.1%) of amputations done was above knee. The commonest indication (53.3%) for non-trauma amputations was as a result of complications of Diabetes mellitus. The use of herbs accounted for the majority (41.6%) of delays in seeking medical care. The average length of stay in the hospital following amputation was 9 – 19 days. The majority of amputations done at the KATH were for non-trauma indications. Complications of Diabetes affecting males above 60 years remain the commonest indication for lower limb amputations in KATH. Improvement in diabetic foot care and education on early intervention in hospital will reduce amputations for non-trauma indications.

[59] Epidemiology And Treatment Patterns Of Intestinal Obstruction From Post Operative Adhesions At Komfo Anokye Teaching Hospital, Kumasi

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Intestinal obstruction is a leading cause of admission to surgical units worldwide. In the developing world, strangulated external hernias remain the leading cause of intestinal obstruction followed by post operative adhesions, which have been documented to be on the rise. This study set out to describe the epidemiology, treatment patterns and outcomes of intestinal obstruction from post-operative adhesions. A total of 235 patients presented with intestinal obstruction to KATH during the period of study. A prospective cross sectional study using purposive sampling was done with 67 respondents presenting with intestinal obstruction from post-operative adhesions. They were followed up until discharge or death. Data was collected using questionnaires and analysed with EPI INFO software. Intestinal obstruction from post-operative adhesions accounted for 28.5%. The mean age was 44.1 years with a male to female ratio of 1:1.5. Appendectomy (23.9%) and laparotomy for typhoid perforation (16.4%) were single leading contributors. Obstetric and Gynaecological surgeries together formed 43.2%. Other surgeries contributed 16.5%. Surgical treatment to relieve obstruction was done in 74.8% of cases. Majority (47.8%) spent 8 –14 days in hospital with 11.9% mortality. The mean age of patients was close to mid-forties with higher proportions being female. Appendectomy and repair of typhoid perforation were the single most important contributors while gynaecological and obstetric surgeries were important findings. Surgery was treatment of choice with most patients spending between 1 to 2 weeks in hospital. Mortality was 11.9%. Efforts should be made to introduce minimally invasive procedures which are known to have a lower rate of adhesion formation following abdominal surgeries.

[60] Ocular Complications in HIV Positive Patients on Antiretroviral Therapy in Ghana

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Patients infected with human immunodeficiency virus (HIV) usually develop some form of ocular complication in the different segments of the eye due to immune deficiency. In Ghana, data regarding ocular complications among HIV/AIDS patients is scarce. This study investigated the occurrence of ocular complications in HIV infected patients undergoing antiretroviral therapy at the Agogo Presbyterian Hospital in the Ashanti Region of Ghana. Blood samples were taken from 100 HIV infected patients. The CD4+ T cell count and WHO clinical staging were determined. The patients were taken through thorough ophthalmic assessments to determine any ocular complications. Fifty-seven patients (57%) had at least one ocular complication. These complications occurred more frequently among those with CD4 counts less than 200cells/ μ l. Maculopathy and Conjunctivitis each occurred in 7% of patients while Retinopathy and Conjunctival growth each occurred in 6%. All the patients studied were on first-line antiretroviral therapy, 68% were females and 72% were in the Stage III of the WHO Clinical Staging. This study showed that ocular complications were prevalent among HIV patients undergoing antiretroviral therapy at the Agogo Presbyterian Hospital in the Ashanti Region of Ghana and that low CD4⁺ T cell count was a predisposing factor.

[61] The Usefulness of Non-Hdl Cholesterol in less Resourced Countries**P. Nsiah¹, E.F. Laing² and B.A. Eghan³**

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Background: Common characteristic features of diabetic dyslipidemia are the elevation of plasma triglycerides and triglyceride-rich VLDL cholesterol, reduced HDL cholesterol, and an increased number of small dense LDL cholesterol particles. Although LDL cholesterol is not typically elevated in patients with diabetes, the changes in LDL cholesterol composition that can accompany the disease make the LDL cholesterol exceptionally atherogenic. **Aim:** This study primarily aims to determine and compare the power and influence of non-HDL cholesterol and LDL cholesterol, in predicting coronary heart disease among diabetic versus non-diabetic adult Ghanaians. **Methods:** A cross-sectional study was performed on 302 subjects who consisted of 154 previously diagnosed diabetes patients and 148 non-diabetics. BMI, WC, blood pressure (BP), total cholesterol, high-density lipoprotein cholesterol (HDL), low-density lipoprotein cholesterol (LDL), triglycerides (TG), fasting glucose, high-sensitivity C-reactive protein (hs-CRP), adiponectin and resistin were measured. Sponsorship **Results:** The mean age was 52.2 (± 8.7). There was a higher (negative) correlation between adiponectin and non-HDL cholesterol ($r = -0.5756$; $p < 0.0001$) than adiponectin and LDL cholesterol ($r = -0.5152$; $p < 0.0001$). Higher positive correlation was observed with resistin and non-HDL cholesterol ($r = 0.5756$; $p < 0.0001$) than resistin and LDL cholesterol ($r = 0.5494$; $p < 0.0001$). Similar patterns of correlation were observed with hs-CRP, blood pressure and 10 year cardiovascular disease risk. **Conclusion:** This study contributes to the existing body of literature by suggesting that easily calculated non-HDL cholesterol is superior to LDL cholesterol in cardiovascular disease risk assessment. The use of non-HDL would also be more practical and reliable target for lipid lowering therapy in less resourced country like Ghana

[62] Effectiveness of Intermittent Preventive Treatment With Sulphadoxine-Pyrimethamine Against Submicroscopic *Falciparum* Malaria In Pregnancy

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Malaria infections undetectable by microscopy but detectable by PCR is common in endemic areas like Ghana. In this cross-sectional study 872 consenting pregnant women (≥ 20 weeks gestation) were recruited from 8 hospitals in Central Region, Ghana, between June and December 2009. Malaria infection was detected by microscopy and PCR. Majority of the women 454 (66%) were IPTp-SP users while 234 (34%) were non-users. Parasitemia was found in 20.9% (182/872) while 9.7% (67/688) of microscopy negative women had submicroscopic malaria. IPTp-SP usage significantly ($p = 0.015$) reduced the prevalence of submicroscopic malaria. Intermittent Preventive Treatment with Sulphadoxine-pyrimethamine is effective in the reduction of submicroscopic malaria in pregnancy.

[63] Insecticide Susceptibility And The Transmission Risk Of Viral Hemorrhagic Fevers In University Of Ghana Campus In Southern Ghana

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The control of viral hemorrhagic fever (VHF), such as dengue requires efficient control of *Aedes* mosquitoes. The pre-adult and adult stages of the *Aedes* mosquitoes would therefore have to be sample for studies that would help control these mosquitoes. This necessitated conducting entomological surveys to understand the species composition of the *Aedes* mosquitoes collected from the University of Ghana, Legon Campus, their susceptibility status and resistance profile to insecticides currently used to manage mosquito populations. A total of 170 households were surveyed. Nine hundred and eighty five (985) adult *Aedes* mosquitoes were obtained from rearing to the adult stage, the hatched eggs harvested from the ovitraps; the aquatic or developmental stages of the *Aedes* mosquitoes collected during the larval surveys; and adult *Aedes* mosquitoes collected using the human landing catches technique. The adult mosquitoes were then morphologically identified. *Aedes aegypti*, and *Ae. vittatus* formed 75.5% and 23.9 % respectively with the rest being *Ae. albopictus* and *Ae. granti*. This is the second report of *Ae. albopictus* in Ghana. Using WHO criteria, the data for the WHO Susceptibility Test and the risk of VHF transmission was analysed. The mortalities recorded from this test was 88%, 94%, 80% and 99% for DDT (4%), deltamethrin (0.05%), lambdacyhalothrin (0.05%) and permethrin (0.75%) were respectively. From the larval surveys, household index, breteau index, and container index were calculated as 8.2%, 11.2% and 10.3% respectively. The man-vector contact rate was 0.42. From this survey, the density of *Aedes* mosquitoes was considered to be sufficient to promote an outbreak of Viral Hemorrhagic Fevers. *Aedes* mosquitoes were revealed to be resistant to DDT, but susceptible to permethrin.

[64] Studies on Seasonal Variation of Abiotic and Biotic Factors and their Influence on Schistosomiasis Intermediate Hosts Abundance and Infection Status.

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Schistosomiasis is a Neglected Tropical Disease of public health significance and two intermediate hosts- *Biomphalaria* and *Bulinus* spp. are known to be responsible for the disease transmission in Ghana. Intermediate hosts abundance have been reported to be influenced by abiotic and biotic factors which either directly or indirectly affect its schistosome infection status. We therefore set out to investigate the influence of these factors on intermediate hosts' abundance and parasite infection status. Intermediate hosts were sampled at monthly intervals from June to October, 2013 (wet season) and January to March, 2014 (dry season) in Tomefa, a schistosomiasis endemic community along the Weija dam. Monthly abiotic and biotic factors were also recorded during each snail collection. Snails collected were individually exposed to artificial source of light for cercariae shedding twice per week for eight weeks. A total of 2,612 snails, consisting of 1,367 (767 live and 600 dead snails/empty shells) *Biomphalaria pfeferi*; and 1,245 (1106 live and 139 dead snails/empty shells) *Bulinus* spp. were collected. Exposure of the 1,873 live snails from the two species collected revealed 10.36% shedding cercariae. Snail abundance varied seasonally, peaking in October (wet season) for both species with the lowest schistosome infection status also recorded in this month. TDS, turbidity, temperature and aquatic plants present were identified to affect seasonal distribution of intermediate hosts whereas TDS, temperature and conductivity affected snail infection status. This suggests that some abiotic and biotic factors impact on the snail abundance and their infection status in the study area. Therefore properly monitoring the seasonal variations throughout the year using monthly biotic and abiotic data collection and snail-parasite relationship information obtained will go a long way to address the best times to carry out mass drug administration for effective control of schistosomiasis.

[65] Serum Calcium Levels Of Diabetics In Kumasi – Ghana**M. Owusu-Bempah¹ and P. Nsiah²**¹Dept of Human Biology, School of Biological Sciences, University of Cape Coast,
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Background: Calcium ion homeostasis has been described in diabetes but the most common finding is an increase in serum calcium levels. Calcium ion plays an important role in glycemic control by affecting the biosynthesis and release of insulin from the beta cells of the pancreas and helping insulin open cells to glucose.

Aim: The purpose of this study was to evaluate the serum level of calcium in type 2 diabetes mellitus (T2DM) subjects in and to determine whether there is an association between high normal serum calcium levels and diabetes.

Methodology: A total of 100 subjects participated in the study and were distributed equally into two groups as non-diabetics and T2DM individuals. Statistical analysis was done using Statistical Package for Social Science (SPSS) and data was expressed as Mean \pm SD (standard deviation) and analyzed by Pearson's correlation.

Results: The mean levels of blood glucose and serum calcium were found to be significantly increased in the diabetes as compared to the non-diabetics. The means of the serum calcium level for the non-diabetic and diabetic groups were 2.42 ± 0.44 mmol/l and 2.50 ± 0.13 mmol/l respectively and in the Pearson's correlation analysis between serum calcium and fasting blood glucose for the diabetics, the r and p values were 0.781 and 0.046 respectively which is a very high positive correlation.

Conclusion: This study has indeed shown increased serum calcium levels in T2DM individuals and our results suggest that, high normal serum calcium levels is significantly and positively correlated with type 2 diabetes mellitus.

[66] Effects of Storage Conditions on some Physicochemical and Sensory Properties of *D.Rotundata* (*Asobayere*)

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Yam is an important source of carbohydrate for many people in the sub-Saharan region, and one of its most important species popularly consumed in Ghana is *Asobayere*. Farmers and producers incur a lot of postharvest losses due to a number of reasons which primarily includes improper storage of the yams. There is a need to assess the state of current yam storage strategies and develop improved strategies to ensure prolonged storage life and quality. The study sought to investigate the effect of three storage conditions and storage time on the physicochemical composition and sensory properties of the *Asobayere*. The yams were stored in a yam pit, yam barn and cold room for five months. The proximate, functional and sensory quality of the yams were monitored over the period for each of the storage facility. The type of storage facility was found to have an effect on the moisture, fibre, carbohydrate, water binding capacity and swelling power of the stored yams. The cold room recorded the highest fibre (0.65%), WBC (280%) and swelling power (14%). The yam pit retained the most moisture (60.5%) and the yam barn recorded the highest carbohydrate (36.9%). The storage time on the other hand had a significant effect on the dry matter, crude protein, fibre and bulk density of the stored yams. The highest crude protein (5.5%) was recorded in the first month. The dry matter content and fibre also recorded the highest values on the second month at 53.9% and 0.7% respectively. The fifth month recorded the highest bulk density (60.7%) for the stored yams. Sensory evaluation of the stored yams based on taste, wetness, softness and mealiness showed the preference of assessors for boiled yam samples. Boiled yam from the yam pit was most preferred in the first two months with consumers scoring high for taste and mealiness. Cooked yam from the yam pits were most preferred in the third month scoring high for taste and wetness. The fourth and fifth months recorded a high respondent preference for boiled yam stored in the cold room. The study showed that yams stored in the cold room retained most of its quality attributes over the five months study period.

[67] Detection Of *Trichomonas Vaginalis* Infection among Ghanaian Women living with HIV Using Polymerase Chain Reaction

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Trichomoniasis is the most common non-viral sexually transmitted infection (STI) worldwide, with particularly high prevalence in regions of human immunodeficiency virus (HIV) endemicity. Despite a number of serious health consequences including facilitation of HIV transmission, it remains an under recognized condition. Recent findings are that, *T. vaginalis* infection also increases susceptibility to infection with HIV. The aim of the study was to detect and characterize *Trichomonas vaginalis* in women living with HIV using PCR analysis. A prospective cross-sectional study was performed using women living with HIV (patients) who visit the Fevers Unit of the Korle - Bu Teaching Hospital (KBTH). A total of about 100 participants with confirmed HIV status were tested for *T. vaginalis* by direct microscopy and PCR analysis, using vaginal swab samples. Two vaginal swabs were taken from each patient, for detection and characterization of *T. vaginalis* using *Trichomonas* specific primers. *Trichomonas vaginalis* in women living with HIV that were not detected by wet mount examination were detected using PCR analysis. Using PCR analysis 16 positives were detected and 84 negatives, while all the 100 samples were negative using the wet mount examination. The prevalence of *T. vaginalis* infection in controls (20 samples) was 45% and the prevalence of *T. vaginalis* infection in the test samples (100) was 16%. PCR analysis which was the gold standard in this study is a good diagnostic tool for the detection of *T. vaginalis* infection.

[68] Endothelial Biomarkers and Pathogenesis of Cerebral Malaria.**H. Tetteh**^{1,2}, **B.K. Bentum**^{1,2}, **D. Oduro**^{1,2}, **E.K. Baffour**², **J. Tetteh**¹, **B. Gyan**²¹Department of Animal Biology and Conservation Science, University of Ghana,
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Cerebral malaria occurs due to abnormality in the function of the brain endothelium. Previous studies done in Ghana showed that children with cerebral malaria had higher levels of circulating endothelial progenitor cells (EPC) compared to uncomplicated malaria (Gyan et al., 2009). This signifies that the brain endothelium plays a crucial role in the outcome of malaria in children. Regulated balance between angiopoietin-1 and angiopoietin-2 is responsible for the control of normal endothelial cell function. The angiopoietin-Tie-2 system has been shown to regulate endothelial cell function and vascular integrity. Endothelial Protein C Receptor (EPCR) is a receptor on the endothelium and is required for the activated protein c cellular pathway which is known to have some cytoprotective effects. Elevated serum or plasma Thrombomodulin (TM) levels have been shown to be found in diseases associated with systemical or locally increased levels of inflammatory cytokines such as malaria. The elevated serum or plasma levels of TM have been suggested to be due to endothelial damage. The aim of this study was to investigate the relationship of and between the angiopoietin-Tie-2 system, EPCR and TM to the pathogenesis of *P. falciparum* malaria infection in children with uncomplicated and cerebral malaria. Children between the ages of 2 to 12 years were recruited from 5 hospitals in Accra. In addition to clinical and haematological determinations, levels of Ang-1, Ang-2, EPCR and TM in the plasma of all subjects were measured ELISA. Levels of these biomarkers were determined on day of recruitment, recovery, day 7 and 14 after recruitment for all subjects. Differences in mean levels of the measured biomarkers will be presented. Also an association between these markers and EPCs will be shown. The results that will be obtained will provide insights into mechanisms of endothelial cell activation in CM, UM.

[69] Immune Responses in Mice Immunized with *Plasmodium Falciparum* Antigens and Generation of Fusion Products against Inoculated Antigens

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Several control mechanisms have been employed in eliminating malaria due to the deaths and complications associated with this disease worldwide. However, further improvement of management and control of the disease require more field applicable and accurate diagnosis. This study aimed at producing anti-*Plasmodium falciparum* antibodies for possible development of a diagnostic tool which can detect antigen in the urine of infected individuals. To generate anti-*P. falciparum* antibodies, splenocytes from BALB/c mice immunized with extracted urinary proteins (UP2J) were fused with myeloma cells. The mother plate of cell fusion Pm0501 had 17/24 wells with multiple hybridoma colonies recognizing antigenic epitopes on both UP2J and in-vitro cultured *P. falciparum* crude antigen extract. Out of the 10/17 wells cloned, C4 had 12/96 wells having single hybridoma colonies. The production of anti-*Plasmodium falciparum* monoclonal antibodies presents the possibility of a urine-based diagnostic tool.

Key words: UP2J, hybridoma, *Plasmodium falciparum* crude antigen, anti-*Plasmodium falciparum* antibodies.

[71] From the Lab to the Local Communities: The Role of Students

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In Ghana, scientific research is mostly communicated through journal publications and presentations at research seminars. These media of communication exclusively appeals to only the scientific community and the literate. Local communities on the other hand remain scientifically illiterate due to research communication gap between the researcher and the local community. The objective of this project was to determine the role of students in bridging this gap. A team called Dynamic Research Access Media (DReAM) was formed by a group of students in September 2013 with the purpose of promoting health and science literacy through communication of research findings to local communities. Five (5) health outreaches on diabetes and cardiovascular disease were organized in the Kumasi Metropolis: one at Alaba, two at Ayeduase and two at Kotei communities. Local research findings on diabetes and cardiovascular disease were presented during these outreaches. Communication in the local languages, twi and hausa, were the key vehicles by which these communities were educated under this program. The impact of the health outreach was mainly assessed through follow up visits to the communities. At Ayeduase, a follow up visit shows that the community is now committed to weekly communal labor as means of physical exercise to prevent heart disease. Also at the Alaba community, outreach participants have embarked on fruits and vegetables campaign to prevent lipid disorders. The Kotei community has also initiated weekly physical training exercise. The initiative shows that community outreach is an effective strategy in bridging the gap between the researcher and the local community and the student can play a role as catalyst of change in this process. One of the challenges in this initiative was language barrier which will be greatly improved if scientific terms are translated into the local languages by the scientific community.

Toxicology and Plant Medicine

[72] Anti-Proliferative Effect of *Ficus Pumila* Linn. on Human Leukemic Cell Lines – A Preliminary Study

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Cancer is one of the many diseases of global concern due to its high mortality rate. It is characterized by abnormal growth and proliferation of cells. Though cancers can be treated, the various therapeutic methods employed are often expensive and may pose severe side effects. Drug resistance is also a major challenge to cancer therapy. These have propelled many cancer patients to seek alternative and complementary methods of treatment hence the need to explore natural products such as plant phytochemicals for their anticancer effects. *Ficus pumila* Linn. a creeping ornamental plant used in various parts of the world for medicinal purposes has been shown to contain a number of phytochemicals that account for its therapeutic effects. The objective for this study was therefore to determine the phytochemical and total phenolic content, antioxidant and anti-proliferative activity of the stem and leaf extracts (FPS and FPL) of *Ficus pumila* (L.) using standard methods. The aqueous ethanolic extracts of the leaves and stems were rich in tannins, general glycosides, saponins, terpenoids, alkaloids, flavanoids (leaves only) and sterols (stem only). The total phenolic content was significantly higher in the FPL (6.791 mg/ml \pm 0.126) and the FPS (5.977 mg/ml \pm 0.019) compared with standard garlic acid (5.014 mg/ml \pm 0.161). Using the DPPH assay, increase in total antioxidant activity was observed with increasing concentration of extracts for both the FPL (EC₅₀=0.07 mg/ml) and FPS (EC₅₀=0.089 mg/ml). Results from the MTT assay showed that all the crude extracts had anti-proliferative effect towards the 3 human leukemic cell lines tested (Jurkat, CEM, and HL-60) in a dose-dependent fashion. FPL gave IC₅₀ values of 130.97 μ g/ml (Jurkat), 56.31 μ g/ml (HL-60) and >1000 μ g/ml (CEM). These findings suggest that crude extracts of *Ficus pumila* Linn. stem and leaves have anti-proliferative effect on the leukemia cells. The antioxidant properties of the plant including phenolics may be responsible for the anti-proliferative activity. Further studies are required to establish anti-proliferative activity of the various chemical components of the plant.

Keywords: anti-proliferative, antioxidant, *Ficus pumila* Linn., phenolic, phytochemical.

[73] Toward the Isolation of New Antifungal Compounds from Wood Decaying Fungi

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Human systemic fungal infections has being increased in the past decade due to the dramatic raise in immunocompromised patients hence the emergence of resistant fungal strains. There is therefore an agent need for new antifungal compounds with novel mode of action. Our project was aimed at isolating and characterizing antifungal agents from wood decaying fungi (WDF). We screened 189 WDF collected in Ghana for their antifungal activity against *Candida albicans* and *Saccharomyce cerevisiae*. Based on their zones of inhibition, 33 of them were selected for further study. Their mycelia were isolated on agar plates and potato dextrose broth (PDB) to have an infinite inoculum source. The 33 selected WDF were grown again in PDB and their metabolites extract by cold ethyl acetate extraction. The extracts were tested against mutant *S. cerevisiae* strains. They were tested using a chemical phenotypic array with *C. albicans* and *S. cerevisiae* as the test organisms, in addition to mutant cell lines of *S. cerevisiae*. In the phenotypic array, the antifungal activity of each extract and standard antifungal drugs were greatly influenced by the different chemicals and the genetic mutations. The WDF-extracts display different pattern of activity against *C. albicans* and *S. cerevisiae* which was clearly distinct from the standard antifungals. Based on the above data, the best 6 WDF candidates were selected for large scale production. In addition, we also examined the growth conditions for maximum production of antifungal agents from WDF. We are making good progress in isolating antifungal WDF extracts on large scale by performing an activity-guided fractionation of each extract. We also hope to isolate pure antifungal compounds from these extracts and elucidate their structure. In addition to this, we will determine their mode of action.

[75] Antimicrobial And Anti-Inflammatory Activity Of *Baphia Nitida*

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Baphia nitida is used in various ethnomedicines for the treatment of pain, inflammatory diseases and wounds. The ethanol leaf and root extracts of *B. nitida* were investigated for anti-inflammatory, antioxidant and antimicrobial activities. Preliminary phytochemical screening was performed on the extracts and powdered material of *B. nitida*. The antimicrobial activity of the extracts was determined against *Escherichia coli* ATCC 25922, *Staphylococcus aureus* ATCC 25923, *Pseudomonas aeruginosa* ATCC 4853, *Bacillus subtilis* NTCC 10073 and *Candida albicans* (clinical strain) using agar well diffusion technique and broth-dilution methods. The antioxidant activity of the ethanol leaf and root extracts of *B. nitida* was determined using 2, 2-diphenyl-1-picryl-hydrazyl (DPPH) free radical scavenging method. The anti-inflammatory activity of the extract was evaluated using the carrageenan induced foot pad oedema model in seven day old chicks. The minimum inhibitory concentration (MIC) for ethanol leaf extract of *B. nitida* against *E. coli*, *S. aureus*, *P. aeruginosa*, *B. subtilis* and *C. albicans* was 50 mg/mL for each of them while the MIC of the ethanol root extract of *B. nitida* against these test organisms ranged from 50 to 200 mg/mL. The IC₅₀ for α -tocopherol (reference antioxidant) and the ethanol leaf and root extracts of *B. nitida* were 1.216, 279.4 and 4.656 μ g/mL respectively. The ethanol leaf (200-800 mg/kg body weight; p.o.) and root extracts (50-200 mg/kg; body weight p.o.) of *B. nitida* inhibited the increase in foot volume significantly ($p < 0.05$). Reduction in the increase in foot volume induced by injection of carrageenan was not dose dependent for both extracts. Phytochemical screening of the powdered plant materials revealed the presence of tannins, saponins, glycosides, flavonoids, and sterols in both the leaves and the roots. The activities exhibited by the extract in this study may be due to the secondary metabolites present. The study validates the traditional uses of the plant in the treatment of inflammation and infectious diseases.

[77] Synthesis and X-Ray Characterization of Zeolite from Kaolin for Adsorption of Volatile Organic Compounds

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Volatile organic compounds constitute hazardous emissions in biomedical laboratories. This study involved the application of zeolite minerals to ameliorate the effect of volatile organic compounds by using its adsorption characteristics. The zeolite mineral was prepared using a green synthesis approach, where kaolin was used as a starting material. Low silicate zeolite X (Na-LSX) was prepared by hydrothermally treating kaolin with sodium hydroxide. X-ray diffraction (XRD) analysis was performed to characterize the type of zeolite used. To determine the adsorption properties, slabs of zeolite mineral were exposed to volatile organic solvents in an air tight chamber. Adsorption was determined by gravimetric method and the parameters were fitted using the Langmuir model. The mean particle size of zeolite was found to be in the nanometer range, indicating that the zeolites would have a microporous structure. A maximum adsorption capacity of 14.39 mg/g, 10.13 mg/g and 10.81 mg/g was obtained for benzene, turpentine and xylene respectively. The adsorption parameters obtained indicate that zeolite has the potential to be used for the trapping and management of volatile organic compound emissions.

[78] The In Vitro Efficacy of Three Compounds isolated from a Medicinal Plant against *Trypanosome Brucei Sp.* and *Leishmania Spp.*

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Trypanosoma brucei sp. and *Leishmania spp.* are two parasitic protozoans that cause Trypanosomiasis and Leishmaniasis, respectively. Chemotherapy, the main form of control is challenged by undesirable side effects and emerging drug resistance. The use of traditional medicines to treat infections is very common in Africa. A medicinal plant coded CVP005B (for research purposes) is very popular in West Africa. Although there have been several reports on the anti-protozoan (e.g. Trypanosome and *Leishmania*) activity of CVP005B, no compound(s) have been assigned the responsibility for this activity. The aim of this study was to identify the compound(s) responsible for the anti-protozoan activity in CVP005B. Using bioassay-guided fractionation, three novel compounds, ML-2-2, ML-2-3 and ML-F52 with the same side chains but two of which have the same functional group (ML-2-2 and ML-F52) were found to be active against *Trypanosoma* parasites (GuTat3.1) with IC₅₀ values of 1.27 µM, 3.75 µM and 0.43 µM, respectively. Two of the three compounds, ML-2-2 and ML-F52, were found to have anti-*Leishmania* (Hertigi) activity with IC₅₀ values of 8.7 µM and 7.54 µM, respectively. ML-2-3 and ML-F52 were found to induce apoptosis in trypanosome parasites while ML-2-2 did not. ML-2-2 and ML-F52 however induced apoptosis in *Leishmania*. Immunohistochemistry and Western Blot results showed that ML-2-3 and ML-F52 suppressed the expression of flagellum marker protein, PFR-a in trypanosome, resulting in flagellum distortion. Our findings suggested that ML-2-2, ML-2-3 and ML-F52 can be good candidates for new drug(s) for both Trypanosomiasis and Leishmaniasis.

[79] Analysis Of The Low Oxygen Stress Response Of Plants Cells**Jerry Ampofo-Asiama^a, Francis Amoako Andoh^a, Maaarten Hertog^a, Annemie****Geeraerd^a, Bart Nicolai^a**^aDivision MeBioS, KU Leuven, Belgium

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Low oxygen stress in the root of plants can occur after rainfall or irrigation leading to impeded metabolism and growth of plants. Understanding the mechanisms plant utilise to survive prolong periods of low oxygen stress is important considering the crucial role plants play in the survival of man. Metabolomics can be used as tool to study the metabolism of plants when subjected to low oxygen conditions. To gain an insight into the response of plant cells to low oxygen stress, cell suspensions were incubated at different oxygen levels (21, 1 and 0 kPa) in bioreactor and the changes in the metabolome measured over time using GC-MS. ¹³C-glucose was also fed to the cells, with the distribution of ¹³C-label giving an indication of the flux through the various metabolic pathways under the different oxygen levels. Low oxygen stress altered the metabolome of the tomato cells with the accumulation of the intermediates of glycolysis, lactate and sugar alcohols along with a reduction in most organic and amino acids. The distribution of ¹³C-label showed an increase glycolytic flux as well as lactate production with reduction in fluxes towards organic and amino acids production. This shows that the activation of fermentative metabolism plays a crucial role in the low oxygen response of plants.

[80] A Natural Path to Discovering New Drugs against Tropical Diseases

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Malaria, Human African Trypanosomiasis (HAT), Leishmaniasis and Chagas Disease are just four examples of the many Tropical Diseases that have plagued the world's poorest continents for many years with Africa being the most affected continent. Current therapeutic interventions for these diseases are woefully inadequate, some are difficult to administer, others have toxic side effects and almost all have parasite resistance problems. There is an urgent need for innovation in finding lead compounds against these diseases. Most drug discovery strategies rely on high throughput screening (HTS) of synthetic chemical libraries using phenotypic and target-based approaches. Combinatorial chemistry libraries contain hundreds of thousands of compounds; however, they lack the structural diversity required to find entirely novel chemical entities with novel modes of action. Natural products, on the other hand, have a reserve of highly underexplored chemical diversities which can serve as templates for the synthesis of novel, biologically active molecules. This presentation reports on the development of a robust HTS platform with state-of-the-art analytical and structural elucidation capacity for the discovery of novel drugs from microbial extracts against tropical diseases. From a previous screening of about 22,000 microbial extracts from our library, we have discovered a potent novel family of anti-malaria compounds which are now undergoing further development. We also have promising results from using this platform to screen our library against HAT, Leishmaniasis and Chagas Disease. Currently our collection contains over 110,000 microbial strains used to generate 130,000 microbial extracts in diverse conditions to ensure a rich metabolite-producing spectrum. We keenly look forward to collaborations in order to expand this library with both microbial and plant extracts with the intent of broadening our capacity in drug discovery against tropical diseases.

[82] Safety (Chronic) Evaluation of “*Product X*”, an Herbal Preparation Used for the management of HIV/Aids, Hepatitis, Cancer, Chronic Diseases and Blood Related Diseases in Ghana.

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The safety of “*product X*”, an herbal medicine used for the management of HIV/AIDS, hepatitis, cancer, chronic diseases and blood related diseases and was investigated in male Sprague-Dawley rats (SDRs). A chronic toxicity study (daily oral administration for six months) of the *product X* was evaluated at the therapeutic (TP) dose (0.28 mg/kg), ten times the TP dose (2.8 mg/kg) and twenty times the TP dose (5.6 mg/kg). Growth rate together with serum biochemical, haematological and urine indices were determined following daily oral administration for a six-month period. Pentobarbital-induced sleeping time and histopathological analyses were determined at the termination of the study. The results showed significant reduction ($P < 0.05$) in body weight of the *product X*-treated (0.28 mg/kg and 2.8 mg/kg) animals compared to control. The mean organ weights of the treated animals did not show significant differences ($p > 0.05$) when compared to control animals. There were no significant differences ($P > 0.05$) between the test groups and control in urine and biochemical parameters determined. However, there were significant reduction ($p < 0.05$) in white blood cells (WBC's), and lymphocytes at 10 TP dose and 20 TP doses of *product X*-treated rats, compared to controls. A significantly high ($p < 0.05$) MCV at the 20 TP dose was also observed. The findings of the clinical chemistry and urine parameters correspond to the histopathological findings with no significant morphological changes in the liver, kidneys, lungs and the heart indicating the absence of microscopic damage to the cells of these organs. There was an insignificant decrease ($(P > 0.05)$) in the pentobarbital-induced sleeping time of *product X*-treated animals compared to controls. The product may be used at the TP dose. However, some parameters such as, the body weight, WBC's, lymphocytes and MCV should be monitored. Care must also be taken when used together with other herbs or drugs to prevent possible drug-herb, herb-herb and other drug interactions.

[84] A Mechanism-Based Fluorescent Transfer Assay for Examining Ketosynthase Substrate Selectivity

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The need for more drugs to curb the increasing rise in antibiotic resistant bacteria has spurred an increase in research to discover more antibiotic scaffolds. Polyketides are pharmacologically important natural products that can be manipulated to yield a structurally diverse library for drug discovery programs. Engineering strategies aimed towards the biosynthesis of “unnatural” polyketide scaffolds usually result in the formation of truncated intermediates or ridiculously low product yields primarily due to the inherent substrate specificities of polyketide enzymes and disruption of protein-protein interactions. To examine the tolerability of key polyketide enzymes towards a variety of substrates, a simple gel-based fluorescent assay has been developed. This assay was formulated based on a key step in the mechanism of polyketide assembly, i.e. the transfer of intermediates from the acyl carrier protein (ACP) domain to the ketosynthase (KS) domain. Using the module 6 of the deoxyerythronolide B synthase (DEBS) as a prototypical system, the substrate specificity of the KS 6 domain towards a variety of straight and branched chain acyl thioesters were examined. The DEBS KS6 domain displayed marked preference for long chain and α -branched acyl thioesters. These results are consistent with the fact that the natural substrate for the DEBS KS6 domain is an α -substituted hexaketide. Electronic effects were examined by making use of *p*-substituted aromatic substrates. Aromatic substrates with electron withdrawing substituents loaded the KS6 much better than their counterparts with electron donating substituents. Together, these results demonstrate the utility of this mechanism based fluorescent transfer assay as a tool for examining KS substrate selectivity.

[87] HIV-Stimulatory Effects of Selected Ghanaian Medicinal Plants in latently Infected Human T-Cells

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Acquired immunodeficiency syndrome (AIDS) caused by infection with human immunodeficiency virus type 1 (HIV-1) is now a manageable chronic infection with the use of anti-retroviral therapy (ART). However a functional HIV-1 cure has yet to be obtained due to the virus being able to establish reservoirs of latently infected cells. These infected cells contain integrated provirus that is replication-competent but transcriptionally silent and their reactivation serves as a major source of viral rebound upon treatment failure. There have been several approaches in attempting to reactivate latently infected cells by rendering them susceptible to viral cytopathic effects, an antiviral immune response, which kills the target cells. One of the aims of this study therefore is to screen herbal extracts from some selected Ghanaian medicinal plants for their ability to induce expression of the proviral genes in latently HIV-1-infected cells. Jurkat cells transduced to express Renilla luciferase gene are chronically infected with a laboratory strain of the HIV-1 virus which bears Firefly luciferase gene for simultaneous dual reporter gene expression. To mimic treatment response in the latent infection stage of HIV, the chronically infected cells are challenged with varied concentration of herbal extracts from Ghanaian medicinal plants. In the chronic infection assay system, ratiometric values of the herbal extracts comparable to that of PMA is an indication of stimulation of HIV replication in the chronically infected cells. As such these herbal extracts are considered to be effective stimulants. Ten potentially positive crude extracts for chronic infection have been obtained, one of which has been further purified into a pure compound. One such compound is Tc-1 which has been observed to have the ability of inducing proviral gene expression. The results obtained so far demonstrates that there are compounds purified from crude extracts that show promising activity on purging HIV-1 chronically infected Jurkat cells.

[89] Antibacterial Activity of Crude Extracts of *Cleome Viscosa*, *Tamarindus Indica* and *Euphorbia Hirta* and their Formulation in treating Wound Infection

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Aqueous, ethanol and methanol crude extracts of *Euphorbia hirta*, *Tamarindus indica* and *Cleome viscosa* and the crude extracts-Poly(ethylene glycol) ointment formulation of the plants were screened for antibacterial activity on clinical isolates; *Pseudomonas aeruginosa* and *Escherichia coli* which are associated with wound infection. Ethanolic crude extracts of *Euphorbia hirta* and its formulation showed no inhibition on *E. coli*. Crude extracts of *Tamarindus indica* showed potency against *Pseudomonas aeruginosa* at varying concentrations and was dose dependent recording a maximum zone of inhibition of 21 ± 0.15 mm at 200 mg L^{-1} and zone of inhibition of 12.50 ± 0.50 mm at 25 mg L^{-1} but its formulation was potent against *P. aeruginosa* for only the aqueous extract. Crude extracts of *Cleome viscosa* and its formulation were potent against both *P. aeruginosa* and *E. coli*, but was not significantly dose dependent at 95% confidence level with zone of inhibition of 24 ± 0.35 mm at 200 mg L^{-1} and 7.00 ± 0.50 at 25 mg L^{-1} concentrations of the crude extracts. Its formulation of both the aqueous and methanolic extracts showed an increased potency against *E. coli* that was highly significant with maximum zone of inhibition 14 ± 0.50 mm at 100 mg g^{-1} of *Cleome viscosa* crude extracts-PEG ointment formulation compared with tetracycline (positive control), *Cleome viscosa* crude extract-PEG ointment has therefore emerged a novel formulation against *E. coli* and *P. aeruginosa* hence suggesting their potential in treating *Pseudomonas* and *Escherichia* infections

[91] Anti-Proliferative Effect Of *Amarathus Viridis* Linn. On Human Leukemic Cell Lines – A Preliminary Study

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Cancer, a disease characterized by abnormal growth and proliferation of cells is a major public health burden due to its increased mortality rates in both developed and developing countries. Current treatment methods are expensive and in most cases expose patients to severe side effects and therefore most cancer patients seek alternative and complementary methods of treatment hence the need to explore natural products such as plant phytochemicals for their anticancer effects. The aim of this study was to evaluate the phytochemical and total phenolic content, the antioxidant and anti-proliferative effects of aqueous ethanolic extracts of leaves and stems of *Amaranthus viridis* Linn., an annual erect herb used as vegetable and for medicinal purposes in some communities, using standard methods. The aqueous ethanolic extracts from the stems and leaves were rich in tannins, saponins, general glycosides, alkaloids, and terpenoids. The leaf extract showed a significantly higher phenolic content (2.690 mg/ml \pm 0.356) compared to the stem extracts (0.10 mg/ml \pm 0.007). The leaf extract showed a significantly higher antioxidant activity (EC_{50} = 0.0721 mg/ml) while to the standard BHT had an EC_{50} value of 0.2731mM. From the MTT assay, it was observed that all the extracts had anti-proliferative activity against 3 human leukemic cell lines (Jurkat, CEM and HL-60). The AVL had IC_{50} values of 111.41 μ g/ml (JURKAT), 122.5 μ g/ml (HL-60) and >1000 μ g/ml (CEM). The AVS had comparatively lower anti-proliferative activity with IC_{50} values of 651.52 μ g/ml (JURKAT), 813.5 μ g/ml (HL-60) and >1000 μ g/ml (CEM). It was also observed that, both extracts also enhanced the proliferative effects of normal cells while the standard curcumin had an anti-proliferative effect on normal cells. It can be concluded that the AVL had better antioxidant and anti-proliferative effect and could further be explore as a novel source of cancer therapy.

Keywords: anti-proliferative, antioxidant, *Amaranthus viridis* Linn., phenolic, phytochemical.

[92] Anti-Nociceptive Effects of Ethanol Leaf Extract of *Paullinia Pinnata* Linn (Sapindaceae) in Mice

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The ethanol leaf extract of *Paullinia pinnata* at tested doses of 50, 100 and 200 mg/kg was evaluated for its analgesic activities on acetic acid-induced abdominal writhing and thermal induced test methods in mice. The extract at tested doses of 50, 100 and 200 mg/kg produces a dose dependent significant ($p < 0.001$) inhibition of abdominal constriction in mice (70.4, 80 and 82%) in the acetic acid-induced abdominal constriction model, compared with the control (normal saline) group. The extract of *Paullinia pinnata* increased reaction time of mice to thermal stimulation. A significant ($p < 0.05$) activity was observed (62.8, 60.99 and 63.6%) at all the tested doses of the extract 30 minutes after administration (50, 100 and 200 mg/kg). Morphine increased reaction time of mice to thermal stimulation by 93%. Preliminary phytochemical screening of the extract revealed the presence of flavonoids, tannins, saponins and steroids. The intraperitoneal LD₅₀ in mice was found to be 692.82 mg/kg. The results of this study indicate the presence of biologically active substances in the leaf extract of *Paullinia pinnata* which may be beneficial in the treatment of pain.

Key words: *Paullinia pinnata*, Analgesic, Acetic acid, Writhing, Phytochemical Screening

[94] Crude Extracts from Selected Ghanaian Medicinal Plants Suppress HIV-1 Infection in Human T-Cells

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Acquired immunodeficiency syndrome (AIDS) due to HIV Type 1 (HIV-1) is now considered a disease well managed with anti-retroviral therapy. However, HIV-1 therapies in general are plagued by challenges such as difficult treatment regimens, drug toxicity and the emergence and spread of drug resistant strains to single or multiple anti-retroviral agents. There is therefore the need to develop new anti-HIV-1 agents to confront the emergence of such strains and to reduce the various adverse effects associated with long-term use of antiretroviral therapy. In Ghana there is a long history of herbal medicine usage. However, there is limited scientific evidence of antiviral efficacies of such herbal medicines for treatment or management of patients. Scientific studies on these herbs could therefore serve as a potential source of novel anti HIV-1 compounds. The aim of this study is to screen herbal extracts from selected Ghanaian medicinal plants for their ability to inhibit HIV replication in HIV-1-infected T-cells. Jurkat human T-cells transduced to express *Renilla* luciferase gene were treated with varied concentrations of herbal extracts from Ghanaian medicinal plants. These cells were then infected with a laboratory strain of the HIV-1 virus which bears Firefly luciferase gene for simultaneous dual reporter gene expression. Herbal extracts which showed values comparable to that of a known anti-HIV drug AZT gave an indication of promising extracts with the ability of inhibiting HIV-1 replication. Out of 113 herbal crude extracts that have been screened, two have been observed to have the ability to inhibit HIV-1 replication in Jurkat cells. The results obtained so far demonstrate that there are herbal crude extracts that have the ability to inhibit HIV-1 replication in Jurkat cells. Further work will be done on the herbal extracts to obtain active compounds in these extracts.

[95] Determination Of Heavy Metals In Dust From Selected Nursery And Kindergarten Classrooms Within The Kumasi Metropolis

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Heavy Metals Are Potential Environmental Health Hazards And As Such, They Have Harmful Health Effects on Humans, Particularly To Young Children. Twenty (20) Schools Were Selected For The Study. The Aim Of This Research Was To Identify And Quantify The Concentrations Of Heavy Metals In The Dust From Nursery And Kindergarten Schools Within The Kumasi Metropolis. Metal Levels Were Determined With Atomic Absorption Spectrophotometry At The Respective Wavelengths For The Various Metals. The Results Of This Study Showed That Concentrations Were In The Range Of Below Detection (B/D) - 9.716119 $\mu\text{g}/\text{G}$ For Co, B/D - 929.2035 $\mu\text{g}/\text{G}$ For As, B/D - 33.29056 $\mu\text{g}/\text{G}$ For Cr, B/D For Cd B/D - 41.90929 $\mu\text{g}/\text{G}$ And B/D- 1.382759 $\mu\text{g}/\text{G}$. The General Trend Of Concentration Of Metals Was Of The Order Of As > Pb > Cr > Co > Hg > Cd. Since Most Of The Schools Studied Had Some Levels Of Metals In The Dust, It Could Be Said That The Children Are Exposed To The Effects Of These Metals.

Keywords: Heavy Metals, Health Hazard, Atomic Absorption Spectrophotometer

[97] Ceruloplasmin and Erythrocyte Sedimentation Rate as Potential Bioindicators of Waste Management Workers' Non-Compliance with Occupational Hygiene and Safety Practices

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Occupational health and safety have become increasingly regulated to minimize work-related risks among waste management workers (WMW). Data on the compliance of WMW with safety measures and its attendant effects on their health status are sparse. This study investigated the level of compliance with safety measures in relation to levels of inflammatory markers among WMW in Sagamu, South-West Nigeria. WMW comprising 30 cart users (CU) and 50 truck users (TU) were recruited alongside 45 people from the normal population as control. Data on compliance with occupational hygiene and safety practices were obtained from questionnaire survey. Inflammation was assessed by measuring serum ceruloplasmin (Cp), C-reactive protein (CRP), albumin and whole blood erythrocyte sedimentation rate (ESR). WMW exhibited systemic inflammation and poor compliance with health and safety measures. Significant ($p < 0.001$) differences were observed in the use of masks, hand gloves, protective clothing, and footwear between TU and CU. ESR, Cp, and CRP increased significantly ($p < 0.001$) by 145, 28.7, and 42.5% in TU and by 164, 50.5, and 74.3% in Cp, respectively, relative to control. Negative correlation was observed between use of mask ($r = -0.225$, $p < 0.01$), use of gloves ($r = -0.184$, $p < 0.05$), and Cp and between ESR and washing of hands with soap ($r = -0.185$, $p < 0.05$). The use of goggles ($r = +0.285$, $p < 0.001$), washing of hands with soap ($r = +0.203$; $p < 0.01$), use of masks ($r = +0.317$, $p < 0.001$), and use of gloves correlated positively in WMW. Elevated inflammatory markers in WMW were related to poor compliance with safety measures. ESR and Cp may be useful predictors of occupational hygiene and compliance with safety measures among Nigerian WMW.

[98] Veterinary Drug Residues in Milk and Dairy Products**K. Oppong¹ G. Darko²**¹Dept. of Chemistry, KNUST, Kumasi and ²Dept. of Chemistry, KNUST, Kumasi
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A high-performance liquid chromatographic method was developed for the determination of chloramphenicol, sulphathiazole, sulphamethoxazole, and oxytetracycline residues in milk and dairy products. Samples were macerated with a mixture of H₂O/CH₃CN (1:1) and purified using RP-8 Adsorbex SPE cartridges after centrifugation. Separation was achieved on an Inertsil C8 column. The mobile phase consisted of 85% acetonitrile, 15% sodium acetate buffer at a flow rate of 1.5 mL/min. Analytes were monitored on a UV detector at scanned wavelength of 256 and 270 nm. The procedure was validated according to the European Union Decision 2002/657/EC by means of selectivity, stability, detection capability, accuracy, and precision. Method's limits of quantification were 0.155 µg/kg for Chloramphenicol, 0.001 µg/kg for sulphathiazole, sulphamethoxazole, and oxytetracycline. The estimated daily intakes (EDIs) for antibiotics presented showed lower exposure levels than the fixed values of acceptable daily intakes (ADIs). This suggested that raw milk and dairy products in Kumasi central market and KNUST in Ghana contain very low levels of veterinary drug residues so that toxicological risk with regard to consuming of these products could not be considered as a public health problem.

Keywords: Veterinary drugs, residues, chloramphenicol, sulphathiazole, sulphamethoxazole and oxytetracycline.

[100] Toxicological Studies on Fractions and Compounds Isolated from Selected Ghanaian Medicinal Plants used as Antiviral and Antiparasitic Agents

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In recent years, the utilization of medicinal plants as therapeutic agents has drastically increased. Although there is a high demand for plant medicine, there are very few in-depth scientific studies on the medicinal properties of plants. However, traditional plant medicine is still prominent and is considered an important alternative to conventional medicine, particularly in developing countries. High-throughput evaluation of toxicity of potential therapeutic agents including plant extracts, fractions and compounds is necessary in order to save cost of further stages of drug development in the case of harmful drugs. The aim of this study is to determine the cytotoxicity of active fractions and compounds from these medicinal plants.

In the present study, cytotoxicity of fractions and compounds isolated from selected Ghanaian medicinal plants active against HIV and trypanosomiasis were assessed using the tetrazolium-based colorimetric (MTT) Assay.

Fifty-five (55) fractions and four (4) compounds have been screened for cytotoxicity using Jurkat cells. The results obtained indicate that about 53% of the fractions evaluated were toxic to the Jurkat cells. Out of these, 28% were toxic at concentrations <50µg/ml, while 72% recorded toxicity in the concentration range of 51-100µg/ml. On the other hand, all compounds were highly cytotoxic to Jurkat cells. Selective indices of samples must be determined in order to select samples for further drug development.

[102] Pesticide Residues in Honey

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The purpose of this work is to determine the residual concentrations of various pesticides used on agricultural fields. In all thirty honey samples were purposively collected from Ashanti, Brong Ahafo and Central regions of Ghana. QuEChERS method, a multiresidual method for analysis of pesticide residues in low –fat matrix was employed in the extraction procedure. Varian CP-3800 Gas Chromatograph with a CombiPAL Autosampler, equipped with electron capture detector for synthetic pyrethroids and Organochlorine pesticides while pulse flame photometric detector for organophosphate. Aldrin, β -HCH, cyfluthrin, cypermethrin, deltamethrin, endosulfan (sum of isomers), permethrin (cis/trans), methoxychlor, chlorpyrifos and γ -chlordane were detected at the following concentrations (<0.01, <0.01, <0.02, <0.02, <0.01, <0.05, <0.02, <0.01, <0.01, <0.01, mg/kg) respectively, in each of the pesticides. However, the pesticides detected were having values which were within maximum residue limit. All the residues detected were below the respective maximum residue limit. Hence honey samples analyzed do not pose any health risk to the consumer.

[105] *Albizia Zygia* Inhibits Proliferation Of T-Lymphoblast-Like Leukemia Cells By Inducing Apoptosis

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Albizia zygia (AZR) is a plant commonly used by Traditional Herbal practitioners to treat a myriad of diseases including ophthalmia, bronchial diseases, fever (including malaria), female sterility, constipation, diarrhoea and many others. However, evidence on its anticancer properties has not yet been reported. In this study, we investigated the effect of hydro-ethanolic root extract of AZR on Human T-Lymphoblast-like Leukemia (Jurkat) cells. AZR showed significant antiproliferative activity against Jurkat cells ($IC_{50}=3.37\mu\text{g/ml}$) as compared to Normal skin Fibroblast cells, NB1GBR ($IC_{50}=34.72\mu\text{g/ml}$). To determine the mechanism underlying the antiproliferative effect of AZR, we examined its effect on sequence of events, characteristic of apoptosis. AZR induced nuclear condensation, DNA fragmentation and loss of mitochondrion membrane potential ($\Delta\Psi_m$) in Jurkat cells. These and flow cytometric results obtained suggests that AZR induce antiproliferative activity against Jurkat cells via apoptosis. Further studies are required to elucidate the active compound(s) responsible for the anticancer potential of AZR.

[106] Biofuels in Africa and Their Impact on Health: A Case for Integrated STEM Education In Ghana

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High levels of per capita energy consumption are positively correlated with high standards of living, but most industrial energy is obtained from fossil fuels that are both finite in supply and known to cause climate change. Biofuels are mobile energy compounds or mixtures derived directly or indirectly from recently living organisms; as such there is enormous international interest in their potential to provide energy with decreased climate impact and less limited supply. Adaptations to greater supplies and use of biofuels are constrained by technological and economic parameters, but also have environmental and health implications that need to be considered. Production of 1st generation biofuels such as biodiesel in Ghana may be a green, sustainable and local alternative to petroleum diesel, especially in rural communities. We investigated building and running a community-scale biodiesel processor in a coastal village, and attempted to modify protocols used by small-scale US biodiesel enthusiasts to use local resources. Some of the broader effects of production and use of traditional and modern biofuels will be discussed, including impacts on human health, environment and food security. The basic science involved in generation and manipulation of biofuels are the same as that involved in biomedical research, yet academic training in these arenas is typically segregated. Educated citizens contribute to energy choices and effective strategies for economic development and improved public health should include informed, cross-disciplinary dialog which can be facilitated by ensuring that biomedical training includes energy and ecology education.

Bioengineering, Bioinformatics and Molecular Biology

[107] Assessing the Effect of Backpack Weight on Students: “A Case Study Using Schools in Accra”

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The daily usage of backpack with heavy loads could pose health problems to students. The purpose of this study was to measure the backpack and relative backpack weights, identify the methods of carriage, perceived pain and discomfort related to using a backpack. The study involved 337 Ghanaian students between the ages of 11 and 14 years. The average load carried by the students was 5.91 kg which represent 11.7% of the average student weight. This weight exceeds recommended guideline load limits set at 10%. Most of the students preferred backpacks with two straps. Carrying a backpack with one or two straps promotes a significant forward lean of the head and trunk. The prevalence of perceived pain/discomfort was very high among the study population. Multiple logistic regression models indicated that the method of carrying backpacks was significantly associated with perceived pain/discomfort. From the results of the study, students carrying less than the set limit reported the presence of perceived pain/discomfort. The study suggests that the current recommended weight limit of 10% may not be appropriate and as such needs to be re-evaluated. Also, the design of the backpack needs to take into account a wider distribution of load across the torso to avoid load concentration on shoulders.

[108] The Isolation and Evolutionary Characterization of The CENP-A Gene from A Sampling Of Darter Species

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The CenH3 gene is a histone 3 variant found in eukaryotes. It consists of two domains the N-terminal tail and the HFD. The function of the CenH3 gene also called CENP-A in primates is centromere targeting and this is made possible by the CATD of the HFD. Various studies in *Arabidopsis* and *Drosophila* support the notion of CATD of HFD to be the targeting functional unit of the gene. The N-terminal which assembles the proteins of CenH3 is also needed for mitotic and meiotic function. The two domains of CenH3 have been shown to be adaptively evolving identify the adaptively evolving regions in darters and characterize the evolution of this gene. We PCR amplified the gene, sequenced it and compared the sequences of each darter species sampled. The HFD of the CENP-A of the sampled darters were under purifying selection, but exon 1 of the N-terminal tail was adaptively evolving. Studies have shown that absence of the N-terminal tail of the native N-terminal tail could lead to sterility. As such, it is possible that the adaptively evolving N-terminal tail could create species barrier between the sampled fish by the production of sterile hybrids if these fish samples were to mate.

[109] Establishing Capacity for Biological Dosimetry in Ghana

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Radiation induced unstable chromosome aberration frequency in peripheral blood lymphocytes is a powerful tool for early biological dose assessment in cases of accidental overexposures, in occupational medicine and epidemiological studies. In Ghana, the volume of radiological related activities such as industrial radiology (mining and oil refinery), radiotherapy, medical radiology and military deployments has significantly increased in the last few years. Furthermore, Ghana aims at including nuclear power amongst its energy mix in the near future. In the light of the aforesaid, competence and techniques in biodosimetry for Ghana is necessary. It is important to estimate doses absorbed by exposed persons immediately after a planned or unplanned radiological incident in order to plan their therapy, and in the longer term to assess possible health consequences. In response to this, a dose calibration curve (0-8Gy) has been derived from chromosomal aberration frequency (dicentric + centric rings) in human blood lymphocytes exposed to graded doses of γ radiation. This is the first report of this kind in Ghana.

[110] Production and Characterisation of Pfs230, A Malaria Transmission Blocking Antigen

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Malaria still remains a public health issue and current approved interventions against the disease mainly involve vector control by the use on insecticides and parasite control through drugs. The control measures however, are being incapacitated by resistance of mosquitoes and plasmodium parasites, demanding the need for new control measures such as vaccines. This project aimed at investigating the expression, purification and characterization of a fragment (Pfs230-590) of transmission blocking vaccine candidate, Pfs230, in *Lactococcus lactis*, a bacterial expression system which is recognized as safe and allows large scale protein production. The protein was produced as a hexahistidine tagged recombinant protein by cloning the gene for Pfs230 and a vector in *E. coli* and final transformation of induction of protein in *L. lactis*. The protein was assessed by SDS-PAGE and coomassie blue staining which revealed a 17 kDa band which was confirmed to be the expected protein by western blotting, probing with both polyclonal anti Pfs230 antibodies (230C) and anti his (c-term)- hrp antibodies. Expression was bulked up and purified by affinity chromatography using histrap nickel columns and an AKTExpress purification system. 100 ml culture yielded 1.54 mg of Pfs230 protein. Natural levels of transmission blocking antibodies (anti-Pfs230) in archived sera of malaria positive individuals were assessed using our new antigen and very few individuals (3.6%) had high levels of antibodies. The antigen produce may be used as a tool for measuring malaria transmission and as basis for development of a transmission blocking vaccine.

[111] Enhanced Identification of Transcriptional Regulatory Relationships among Genes in Breast Cancer**E.S. Adabor¹, G. Acquah-Mensah², F.T. Oduro¹**

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Identification of functional causes and contributing mechanisms of disease is a pre-eminent aim in biomedical research. Cancer, like other diseases associated with organs, is not completely understood as it is characterized by complex genetic changes involving multiple mutated genes. In this work, we identify transcriptional regulatory relationships among genes for molecular insights into the etiology of breast cancer. We use a novel search approach: Simulated Annealing with a Greedy Algorithm (SAGA) structure learning in Bayesian Networks. A compendium of probe level microarray data from human breast epithelial cells of patients was subjected to the Robust Multiarray-Average (RMA) procedure for normalization and background correction. A subset of the resulting expression matrix comprising of the expression values of only relevant probe-set identifiers representing the genes of interest in the data were extracted with a Lisp code. This subset was supplied to a Bayesian Network inference learning algorithm in which SAGA was used to discover novel regulatory relationships from the data. The learning algorithm revealed 70 predictions of direct regulatory signaling relationships in breast cancer. Prominent among predicted signaling relationships include that between the cyclin-dependent kinases regulatory subunit 1 (CKS1B / CDC28) and tumor suppressor protein (P53) and also that between Cullin 1 (CUL1) and ring-box 1 (RBX1), E3 ubiquitin protein ligase. These transcriptional regulatory relationships involve genes that are directly involved in dysregulation of cell proliferation and cell cycle that are associated with cancers.

[112] Identification of HLA-1 restricted T cell epitopes in the *P. falciparum* antigens circumsporozoite protein (CSP) and apical membrane antigen 1(AMA-1)

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Sterile protection against pre-erythrocytic malaria has been observed in human experimental challenge studies (HECS) with malaria naïve volunteers vaccinated with modified/attenuated sporozoites. Parasite-specific IFN- γ expressing CD8+ T cells have been implicated as major mediators of protection in these studies. The targets of these parasite specific CD8+ T cell responses include leading malaria vaccine candidate antigens such as CSP and AMA-1. The identification of IFN- γ -inducing T cell epitopes in naturally exposed individuals will augment multi-epitope vaccine development efforts. Studies conducted at (NMIMR) identified 3 out of 29 volunteers with distinctly high IFN- γ responses to overlapping 15mer peptide pools of AMA-1 and suboptimal responses to similar CSP peptide pools. The aim of this study is therefore to assess 15mer peptide pools from AMA-1 and CSP as well as selected HLA-1 predicted epitopes from these pools for their ability to stimulate PBMCs from HLA-typed individuals with natural exposure to malaria.

Freshly isolated and recovered PBMCs from 13 HLA-typed volunteers were stimulated with 15mer overlapping CSP (2) and AMA-1 (10) peptide pools as well as 9-10mer HLA-1 predicted single epitopes (24 for CSP and 12 for AMA-1) in ELISpot assays. The source of IFN- γ responses was confirmed in ELISpot assays using CD4 depleted PBMC fractions. Four AMA-1 and two CSP peptide pools elicited responses in 4 volunteers. Also, 7 minimal HLA class1-restricted epitopes (6 for CSP and 1 for AMA-1) elicited responses in 5 volunteers with 3 of the CSP minimal epitopes showing evidence as targets of CD8+ T cells. One of these CSP epitopes was restricted by the HLA supertypes A01 and A03 while the other 2 were restricted by HLA supertypes A02 and B07 respectively. For all the single epitopes, positive responses were observed in frozen assays but not fresh assays.

This study identified three predicted epitopes in CSP and none in AMA1 as being CD8+ T cell dependent. Two of the CSP epitopes have previously been reported as HLA-1 restricted epitopes and the third to the best of our knowledge is a novel HLA-1 restricted epitope. The observation that single peptide epitopes elicit responses in frozen but not freshly isolated PBMCs however requires further investigation.

[115] Designing Of An Alternative Quality Control Audit In Some Selected Hospitals In The Kumasi Metropolis

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Standard quality control test tool are expensive and necessary device for optimal use of radiological equipment. Alternative quality control test tool were designed and constructed to measure the light/radiation field coincidence and congruence, optical density contrast, an indicator for optimal detection of lesion in a radiograph and resolution. Real times quality control test of KVp, mA, Half Value layer (HVL) and dose were carried out for each equipment. Accuracy, linearity and reproducibility of KVp, mA and exposure time in the hospital were within +/- 5%. Digital radiography technology showed a high quality in real time as compared to computer radiography and the film-screen radiography system.

[116] Guilty or Not Guilty? Making a Case for None Redundant Modulation of Ifn- γ by Mir-29a during Acute Pulmonary Tuberculosis.

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Until recently miR-29a had been implicated in a none redundant inhibition of IFN- γ during *M. tuberculosis* infection. Our study findings in Adults and Children with *M. tuberculosis* infection in Ghana and Germany respectively did prove otherwise although there was empirical evidence to suggest that miR-29a may be implicated in the immunopathogenesis of *M. tuberculosis* infection. Results of ex vivo miR-29a and in vitro IFN- γ analyses may be confounded by several factors. Therefore, to validate these experiments, we modulated miR-29a expression in primary human T cells.

PBMCs were seeded using CD3/CD28 Dynabeads for 16 hours at 37°C and 5%CO₂. Transfection of PBMCs with antagomir-29a and control antagomirs for miR-16, and *C. elegans* cel-miR-67 (Dharmacon) was performed following manufacturer's instructions.

Endogenous miR-29a expression was suppressed using specific antagomir assays after which PMA/Io was used for *in vitro* stimulation for 48 hours at 37°C and 5%CO₂. Both antagomirs against human miR-16 and miR-29a down-regulated respective targets (miR16, mean 70%; miR-29a, mean 58%) in CD4⁺T cells, whereas negative control *C. elegans* miR-67 had no effects. Notably decreased miR-29a expression did not affect the proportions of IFN- γ producing T cells. Also the cellular protein expression level of IFN- γ (determined by single cell median fluorescence analysis) was not influenced by miR-29a suppression.

We conclude that suppression of miR-29a did not affect IFN- γ expression in our assay and therefore miR-29a could not modulate IFN- γ expression during acute pulmonary tuberculosis.

[122] Discriminating Wavelength For Intraerythrocytic Life Cycle Stages Of *Plasmodium Falciparum* Parasite Infected And Uninfected Erythrocytes.

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Plasmodium falciparum digests haemoglobin in host red blood cells (RBCs) as a major source of nutrient in intraerythrocytic life cycle stages. This brings about changes in the morphology and functional characteristics of the RBCs. We investigate malaria infected RBCs and uninfected RBCs in the intraerythrocytic life cycle stages (ring, trophozoite and schizonts) using multispectral imaging and multivariate analysis techniques. Four spectral bands were found to be markers for identifying infected and uninfected RBCs: 435 nm and 660 nm were common markers for the three stages while 590 nm was marker for ring stage and 625 nm was a unique marker for both the trophozoite and the schizont stages. These four spectral bands may offer potential diagnostic markers for identifying infected and uninfected RBCs, as well as distinguishing ring, trophozoite and schizont stages.

[123] Automated Protocol for Counting Malaria Parasites (*P. Falciparum*) from Digital Microscopic Image Based on L*A*B* Colour Model and K-Means Clustering.

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Basis for malaria parasites diagnosis in most hospitals and clinics, especially in developing countries, which is manually done, is strenuous and time-consuming. In this paper, we present an automated protocol for counting malaria parasites (*P. falciparum*) from digital microscopic red blood cells (RBCs) images based on L*a*b* colour model and K-Means clustering algorithm using Matlab. This method is device-independent, perceptually uniform and approximates human vision. An image slide of size 300 x 300 x 3 pixels of RBCs with malaria parasites has been counted in less than 10 seconds using a computer with 64-bit Intel (R) Celeron (R) Central Processing Unit and processing speed of 2.20 GHz. The digital counts have a good correlation with the manual counts. This automated protocol has the potential of providing fast, accurate and objective detection information for proper clinical management of patients.

Workshops and Special Events

Pre-Conference workshop

Monday, 28 July 2014, TIME 9AM - 5PM with lunch break

Introduction to Bioinformatics and Genome-wide Association Studies

Facilitators: Dr. Sam Kwofie, Dept. of Biomedical Engineering, U. of Ghana, Legon and Dr. Anita Ghansah, NMIMR, U. of Ghana, Legon

Analyzing the increasing plethora of genomic data requires robust computational algorithms, cyber platforms and requisite expertise. The proposed workshop constitute part of the efforts geared towards training both students and researchers in bioinformatics and computational biology to augment bioscience research in Ghana. The workshop modules consist of introduction to bioinformatics and its application in biomedical research with emphasis on Genome-wide association studies (GWAS). Genome-wide association studies is the analysis of numerous genetic variants across the genome for association between the variants and well defined disease phenotypes or traits. A typical GWAS study constitutes the genotyping and analysis of disease associations between single nucleotide polymorphisms (SNPs) present in numerous genes across the genome and defined phenotypes. The analysis must account for multiple testing to remove background noise from true genetic associations. The participants will use various GWAS tools to analyze dataset pertaining to a group with specific disease phenotype and a similar group that lacks the phenotype. It is expected that the workshop participants will gain the essential skills and knowledge to perform GWAS analysis and also incorporate bioinformatics approaches in their current research.

You will need to bring your laptop, an external/flash drive and USB modem in order to link to the analysis web sites that we will use for the workshop. Space is limited, so please register by sending an e-mail to ghanabiomedicalconvention@gmail.com.

Target Audience: All with an interest in the topic and a basic understanding of molecular biology

Pre-conference Workshop

Monday, 28 July 2014, 12:30pm – 5pm with a lunch break

Grants Clinic: Get that Grant Funded This Time!

Facilitators: Prof. Karen Duca, KNUST, Kumasi and USAID, Washington, DC and Dr. Christa Hasenkopf, USAID, Washington, DC

Have you written a proposal that you think is good but you can't seem to get it funded? Do you have a concept note that you want to turn into a full proposal? It is possible that you are doing something that is getting you eliminated from consideration that you might easily fix. The doctors from the grants clinic will be in to review your grant and brainstorm with you on how to make your proposal more competitive, suggest alternative funding venues, or help you with the budget and/or activity plan. Whether you are a novice grant writer trying to get that first grant or an experienced investigator with a successful track record, having colleagues review your grant prior to submission and suggest ways to improve it is a good strategy for winning that funding. The grants clinic will provide one-on-one advice for you to help you reach your goals. It is open on Monday afternoon from 12:30 – 5PM and you schedule a time slot for a personal consultation.

Target audience: Anyone who wants to get funded. You should have a least a concept note written for evaluation. Please send an e-mail to ghanabiomedicalconvention@gmail.com in order to request a time slot.

Pre-conference Workshop

Monday, 28 July 2014, 12:30pm – 5pm with a lunch break

US Government Programmes for Funding African Science

Facilitators: Prof. Karen Duca, KNUST, Kumasi and USAID, Washington, DC and Dr. Christa Hasenkopf, USAID, Washington, DC

This workshop will describe various programmes sponsored by US government agencies that provide graduate training and research funding that is available to African scientists. You will learn about mechanisms offered by the US State Department, i.e., the Young African Leaders Initiative, as well as USAID, i.e., BHEARD (graduate training in various fields), LEAP (one-year of graduate training), DIV (innovative ideas for development that might be commercialized, with a tiered funding structure), and HESN (higher education institutions uniting to solve problems). Of particular interest is the 'Partnerships for Enhanced Engagement in Research' (PEER) programme. The PEER Programme funds developing country scientists engaging in scientific or biomedical research with overlapping international development objectives to work in collaboration with US-funded researchers on projects of mutual interest. We will outline the programme mission, current grantees, including in Ghana, and also describe the application process for the next submission cycle in September. PEER is housed in the newly-formed US Global Development Lab. We will also introduce the MasterCard MS degree programme at Michigan State University. Be ready to ask questions and learn about opportunities.

Target audience: Graduate students seeking educational grants, as well as PIs seeking research funding.

Pre-conference Workshop

Tuesday, 29 July 2014, 9am – 5pm with lunch break

Structural Characterization using Nuclear Magnetic Resonance (NMR)

Facilitator: Dr. Elvis Tiburu, Dept of Bioengineering, U of Ghana, Legon

Have you ever wanted to learn about NMR spectroscopy or stay up-to-date with new methods? If so, this is the workshop for you. We will focus on the basic principles of NMR for biological macromolecule characterization. Be prepared to learn a few tips and how do pulse programming for various applications. You will be introduced to the following using online resources.

- 1) How to set up NMR experiments, including how to apply different pulse programmes
- 2) Structural and biophysical methods for biological macromolecules in solution
- 3) NMR screening of complex mixtures
- 4) Solid-state NMR techniques
- 5) Protein NMR data processing and analysis

You will need to bring your laptop and USB modem in order to link to the analysis web sites that we will use for the workshop. Space is limited to 10 people, so please register early by sending an e-mail to ghanabiomedicalconvention@gmail.com.

Embedded Workshop

Wednesday 30th July, 5.00pm – 8.00pm

Mentoring Workshop for Mentors and Mentees

Facilitator: Prof. Helen O. Kwanashie, Dept of Pharmacology & Therapeutics, Ahmadu Bello University, Zaria, Nigeria

The purpose for this workshop is to help kick-off the Mentorship Programme of the Ghana Biomedical Convention (GBC). However, the information presented will also be very useful to those who want to establish mentoring programmes within their own institutions or simply those who are curious about mentoring in general. The intended participants are those wishing to engage in mentor-mentee partnerships and senior colleagues who will serve as mentors are especially encouraged to attend. The proposed approach is for the workshop organiser to facilitate a 60-minutes presentation-cum-discussion on mentoring as a catalyst for career advancement and job satisfaction generally, and among biomedical scientists and researchers in particular. This will be followed by a committed mentors-mentees-stakeholders' 90-minutes session later that evening using participatory methodologies; during which several aspects of the GBC's Mentorship Programme will be drafted, including: the overall aim of the mentorship programme, its specific objectives, formats for the mentoring process, guidelines for monitoring and evaluation, the mentoring agreement and progress record forms, etc. During the workshop also, a co-ordinator of the Mentorship Programme to be assisted by a committee will be identified, matching of mentors and mentees will be effected, followed by signing of mentoring agreements by mentor-mentee pairs.

Learning Objectives:

1. Understand mentorship as an important help relationship distinct from supervision, counseling, sponsorship, etc.
2. Identify the characteristics, advantages and disadvantages of informal versus formal mentoring, phases in the mentoring process, benefits of mentoring to all involved (including mentors), mentoring pitfalls to avoid and best mentoring practices
3. Appreciate specialised mentoring situations such as supervisor doubling as mentor, distance-cum-e-mail mentoring, peer-mentoring, cross-cultural mentoring, cross-gender mentoring (including benefits and limitations of women mentoring women as opposed to men mentoring women, and vice versa).

Target Audience: All with an interest in the topic; no need for pre-registration. You will also have an opportunity to sign up as a mentor or mentee at this time.

Embedded Workshop

Friday 1st August, 2.30 – 3.30pm

Cancer Pharmacotherapy: The Promise of Individualized Medicine

Facilitator: Prof. George K. Acquah-Mensah, Massachusetts College of Pharmacy and Health Sciences, Worcester, MA. USA

The current spate of unprecedented innovations in biology and medicine can be traced to the molecular biology revolution of the most recent decades. It is now possible to study large collections of genes, proteins, and other biomolecules concurrently. A seminal event in this regard is the sequencing of the human genome. This has facilitated the identification of a variety of polymorphisms in the human genome, most notable of which are Single Nucleotide Polymorphisms (SNPs). These polymorphisms have associations that offer humanity the promise of individualized pharmacotherapy. The search for individualized therapies is vital especially for those drugs with narrow therapeutic indices. For instance, treatment with certain cancer drugs could be more targeted for better outcomes. The current science indicates that individuals with some given genotypes will not benefit from certain treatments; individuals with other identified genotypes will experience severe adverse events with certain treatments. In this presentation which will span the relevant biochemistry and pharmacology, progress made in this search will be highlighted. Ethical and economic issues associated with translating the basic science to the clinic will be raised. Drugs associated with cancer therapy, such as those involved in chemotherapy and chemoprevention will be at the heart of the presentation.

Learning Objectives: Following the successful completion of this workshop, a participant should be able to:

- 1) identify key lessons gleaned from the sequencing of the human genome;
- 2) identify the benefits of phenotyping and/or genotyping patients;
- 3) analyze the implications of specified polymorphisms on cancer drug therapy;
- 4) determine what needs to be done to ascertain the pharmacogenomic appropriateness of specified drug therapy for a given patient

Target Audience: All with an interest in the topic, no need for pre-registration

Embedded Workshop

Friday 1st August, 1.30pm – 2.30pm

Planning Your Science Outreach Programme: Making It Fun and Enjoyable

Facilitator: Saviour Badohu, School of Education, SUNY-Genseo, USA

Doing a science outreach to high school and junior high school students can be a challenge, but most teachers know that it takes only one fascinating project or experiment to change the way students think about science. Fun science experiments and projects that are also educational inspire young people to learn science better and pay closer attention to other content areas such as Mathematics, English Language, Social Studies, etc. Does the prospect of teaching science have about as much appeal to you as an acute headache? If that's how you feel, then take a deep breath and relax. Science is not as hard and mysterious a process as many people perceive it to be. This is what every science teacher must make their students understand. My goal is to make science teaching the most fun the students could ever have in the classroom! I also want students to enjoy other side benefits from science teaching as science learning strengthens their reading, writing and mathematical skills aside the creative, analytical and innovative skills. I know that planning good lessons takes time and thought. So my goal here is to share with you through discussion and demonstration, the best ways to get science across to students in a very enjoyable fashion. The goal is to make sure our students know that science is a way of knowing the real world. Science is about everyday life activity. Science is experimenting. Science is about questioning and finding answers to those questions. Science is about creativity, innovation and critical analysis. Science is about looking at ordinary events with fresh extraordinary eyes. Science is hands on learning and science is them! If our students are made to know the role that science plays in their everyday life as they wash, clean and cook their meals. As they play soccer, swim and plant their crops, they will realize how simple and fun science processes can be. In this workshop you will get ideas for doing exciting and enjoyable science outreach programmes with K-12 students.

Learning Objectives:

This workshop will present ideas for structuring science outreach programmes that achieve results. Participants should download these suggested ideas for outreach, [Outreach Workshop Notes](#).

Target Audience:

All with an interest in the topic, no need for pre-registration.