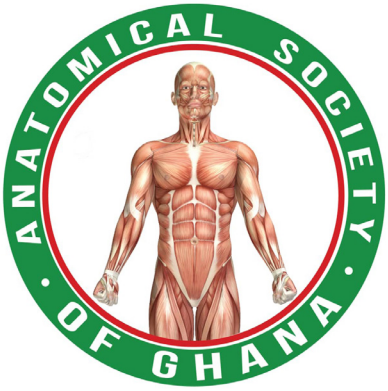

ANATOMICAL SOCIETY OF GHANA

3rd Annual Scientific Conference, 2019

RESEARCH PROPOSALS

FRIDAY, 28TH - SUNDAY, 30TH JUNE, 2019

1 SCANNING ELECTRON MICROSCOPIC STUDY OF THE MORPHOLOGY OF INDIGENOUS GHANAIAN ALBINO HAIR

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Background: The hair is the most distinct feature of mammals and identification of hair is a very important feature in forensic investigation. Human hairs as seen in various ethnic groups exhibit different morphological features. Albinism is a genetic condition that results from mutations involved in the biosynthesis of melanin pigment. **Aim:** The aim of this work is to study the morphological profile of indigenous Ghanaian Albino hairs using the Scanning Electron Microscope. **Methodology:** The study design will be cross sectional and observational. Ethical clearance will be sought from the Ethical and Protocol Review Committee of the College of Health Sciences, University of Ghana. Samples will be obtained from 30 albino males and 30 albino females from the Scalp (frontal, temporal, parietal and occipital regions) and eyebrows. Volunteers will be solicited from persons living with albinism. Hairs will be plucked using a pair of cosmetologist tweezers from study participants. Standard electron microscopy protocols will be followed including treating the samples with gold or platinum and examined in the standard SEM. Both quantitative and qualitative characteristics will be measured. Descriptive analysis will be done using ANOVA (SPSS version 20) at a 95% confidence interval. **Expected outcome:** The morphology of indigenous Ghanaian Albino hairs will be different from non-Albino hairs. Indigenous Ghanaian albino hairs will have different at different regions of the body.

2 THE LEVEL OF MATCH OR MISMATCH BETWEEN CLASSROOM FURNITURE AND ANTHROPOMETRIC MEASUREMENT OF STUDENTS IN GREATER ACCRA REGION

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Background: Prolonged sitting is known to be a risk factor for musculoskeletal disorders. The comfort and physical health of students during lessons in classrooms depend partially on the work spaces and furniture that they use. Furniture for school children should match their anthropometric and biomechanical characteristics. Students spend about 6-8hours a day in school and much of this duration is spent sitting down to perform their activities. Furniture designed without considering anthropometric features of its users, results in students assuming wrong posture when sitting. Prolonged exposure to such an environment can cause some anatomical changes and functional problems in the future. **Aim**: To determine the level of match or mismatch between classroom furniture and the anthropometric data of school children. **Methodology**: The study will be a cross- sectional study. It will be conducted in five different schools with children within 9-12 years (from class four(4) to class six(6)). An estimated number of about 450 students will be enrolled in the study. Ethical clearance will be sought from College of Health Sciences Ethical and Protocol Review Committee. Approval from participating school authorities will be obtained. Assent and consent will be sought from students and guardians respectively to enable students enroll in the study. Furniture variables to be measured are seat height, seat width, seat depth, upper edge of back rest, table height, underneath desk height and anthropometric measurements to be measured are weight, height, elbow sitting height, subscapular height, buttock popliteal length, popliteal length, hip width. Data will be analysed with SPSS version 22.0. **Expected outcome**: Results will be used to determine the level of match or mismatch between the furniture parameters and the anthropometric measurements using standardized equations as stated by Castellucci *et al* (2014). And this will determine if the furniture used in the various schools match the anthropometry of students. Policy makers will be informed of the findings so

they ensure that artisans factor in anthropometry students in the design and manufacturing of school furniture. Thereby reducing the risk of musculoskeletal disorders.

H.I. Castellucci et al. 2014. Applying diferent equations to evaluate levels of mismatch between students and classroom furniture. Applied Ergonomics .1123-1132

3 EVALUATION OF BRCA 1 GENE POLYMORPHISM AND FINGER DERMATOGLYPHIC PATTERNS IN BREAST CANCER

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Background: Breast cancer is the commonest malignancy among women and it is the primary cause of cancer death among women globally. In Africa, there is increasing incidence of breast cancer. In Ghana, about 2,900 breast cancer cases are diagnosed annually out of which one eighth of these individuals die annually. Late diagnosis of breast cancer has been cited as a factor for increased mortality in Africa and this is due to lack of a screening tool for a population at risk. The risk of breast cancer is associated with BRCA 1 gene polymorphism and finger dermatoglyphics. **Aim:** To analyze the relationship between the single nucleotide polymorphic status of BRCA 1 gene and finger dermatoglyphic patterns. **Methodology**: The study will be a quantitative cross-sectional study and sample will consist of 80 breast cancer individuals and 80 age-matched non breast cancer individuals who will be recruited from the National Centre for Radiotherapy, Oncology and Nuclear Medicine, and the Surgical Department at the Korle-Bu Teaching Hospital. Data for Finger dermatoglyphic analysis will be collected through the Ink method. Restriction Fragment Length Polymorphism will be used to analyze the status of single nucleotide polymorphism of BRCA 1 of study participants. **Expected outcome:** It is expected that whorls (finger dermatoglphics) will correlate positively with the mutant form of the single nucleotide polymorphism (BRCA1) in breast cancer individuals.

4 ASSESSMENT OF CIRCULATING CELL-FREE DNA (CFDNA) AS A BLOOD BIOMARKER FOR MONITORING TUMOR BURDEN IN BREAST CANCER PATIENTS UNDERGOING TREATMENT

Evelyn Adusei, Benjamin Arko-Boham and John Ahenkorah

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Background: Cancer incidence and its related mortality is rising and is the second leading cause of death globally. In Africa, breast cancer in females is the worst globally and it is the world's commonest cancer among women. Circulating cell –free DNA are degraded DNA fragments that are released from cells into the blood. In healthy individuals, the source of cfDNA is solely apoptosis, producing evenly sized shorter DNA fragments. In cancer patients, however, necrosis produces uneven longer cell-free DNA fragments in addition to the even sized short fragments thereby increasing the levels of cfDNA in cancer patients. Investigating cfDNA can be used as a biomarker to monitor tumor burden in breast cancer patients. The lack of established biomarkers that can be used to monitor the effectiveness treatment methods on tumor burden in breast cancer patients, presents the opportunity of using cfDNA as a biomarker. **Aim:** This study seeks to assess circulating cell-free DNA as a blood biomarker for monitoring tumor burden in breast cancer patients undergoing treatment**. Methodology:** Consent breast cancer patients undergoing treatment will be recruited from the Surgical Department at the Korle-Bu Teaching Hospital. Also, participants who are not diagnosed of breast cancer and are aged- matched will also be recruited from the territory. Clinico-pathological parameters like age and hypertension will be taken from their hospital folders and anthropometric parameters like BMI and WHR will also be measured. 5mls of peripheral blood will be taken from participants and serum will be separated. Circulating cell-free DNA will be extracted from the serum using the appropriate kits and the concentration of it will also be determined by using quantitative real-time PCR. **Expected outcome:** Circulating cell-free DNA will be affected by the necessary treatment administered to the breast cancer patient so that, it can be used as a blood biomarker to monitor tumor burden in breast cancer patients undergoing treatment.

5 EFFECT OF HIGH-FAT-DIET-INDUCED OBESITY AND NATURAL COCOA ON ADIPOSE TISSUE INFLAMMATION AND LIVER STEATOSIS

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Background: Obesity is associated with inflammation that triggers the development of metabolic disorders such as non-alcoholic fatty liver diseases (NAFLD) and insulin resistance. Adipose tissue in obesity constitutes a critical source of inflammation. Hence an intervention that minimizes adipose tissue inflammation may reduce NAFLD development, insulin resistance and other related disorders. **Aim:** To investigate the effect of high-fat-diet-induced obesity on adipose tissue inflammation, liver steatosis and whether regular intake of natural cocoa can minimize these effects. **Methodology:** Fifteen (15) male albino rats, 8-10 weeks old with weight ranging from (180g-200g) will be obtained and randomly grouped into three (3). Group 1: will feed on the normal rat chow and serve as the control. Group 2 & 3 will be exposed to high-fat-diet (HFD). Group 3: In addition to the high-fat-diet, this group will receive natural cocoa. The animals will be sacrificed at the end of 8 weeks period and organs of interest (liver, epididymal fat) harvested. Organs harvested will be weighed and fixed with 10% neutral buffered formalin. Histological sections will be prepared and stained (H&E) to compare size of adipocytes, accumulation of fat and macrophages in liver. Inflammatory markers (TNF, Interleukin-6) in blood and tissues will be measured. Blood will be collected to analyze glucose and insulin levels. **Expected outcome:** High-fat-diet-induced obesity may increase adipose tissue inflammation marked by increased tumor necrosis factor (TNF) and interleukin-6 (IL-6). Increased adipocyte size in HFD fed rats compared to controls and HFD+cocoa group is expected. Intake of natural cocoa may minimize fat accumulation in the liver, size of adipocytes and reduce insulin resistance.

6 RESEARCH PROPOSAL TITLE: EFFECT OF FUNGAL AND VIRAL INFECTIONS ON THE ARCHITECTURE OF THE PLACENTA

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Background: The human placenta is a chimeric tissue that contains maternal and fetal components organized to promote communication between mother and fetus. Pathogens including viruses and fungi can infect several cellular components of the placenta such as trophoblast, syncytiotrophoblasts and haematopoietic cells which may lead to fetal malformations and pre-term labour. **Aim:** The aim of the study is to assess by stereology the histo-morphology of fungal and viral infected placentae compared with normal placentae at term. **Methodology:** This cross sectional study will involve the collection of three hundred (300) placentae from the Obstetrics & Gynaecology Department of Korle-Bu Teaching Hospital. 2ml to 3ml of blood from both maternal and fetal sides of the placenta will be collected for screening Human immune-deficiency virus (HIV), hepatitis B (HBV), hepatitis (HCV), *Candida spp, Aspergillus spp* and *Cryptococcus spp.* Screening will be done using rapid diagnostic test kits. Placentae will be weighed and volume recorded by liquid displacement. Placentae will be divided into four quadrants and choosing from a random start, tissue will be sampled at full-depth, fixed in 10% buffered formalin and subjected to tissue processing procedures. Tissues will be sectioned at 5µm thick and systematically selected for staining with H&E. Micrographs will be taken using the optical light microscope and volume densities of syncytial knots, fetal capillaries, intervillous spaces and syncytial necrosis will be determined. Student's T-Test will be used to determine significance of difference and $p < 0.05$ will be considered statistically significant. **Expected outcome:** It is expected that viral (HIV, HBV, HCV) and fungal (*candida spp, Aspergillus, Crytococcus* spp) infections may alter the architecture of the placenta.