Whole Genome Sequencing Project

The unifying premise of integrative epidemiology is that the same genes that are implicated in cancer risk may also be involved in a person’s propensity to carcinogenic exposure and/or to modulation of therapeutic outcome. Based on this notion, we will construct somatic and germline genetic profiles that could be used to assess risk, to individualize therapy, and to increase our understanding of the complex role of genetic, lifestyle and environmental factors in breast cancer etiology and progression.

It is now well recognized that women of African ancestry experience a disproportionate burden of premenopausal breast cancer and higher mortality rates in comparison to other racial/ethnic groups. We, and others have demonstrated an overrepresentation of triple-negative breast cancer (TNBC) or basal-like breast cancer in particular, among young women of African ancestry. TNBC is by far the most deadly of all breast cancer subtypes and molecular targets for pharmacologic therapy have not yet been identified.

We are conducting a Genome Wide Association Study (GWAS) of 1,973 cases and 2,283 controls, all of African ancestry. Detailed epidemiologic risk factors including assessments of demographic, neighborhood and cultural background, reproductive and menstrual history (specifically onset of puberty), medical history, hormone use, alcohol consumption, smoking and radiation exposure, and physical activity as well as serum and plasma to measure biomarkers such as bilirubin levels (antioxidant), markers of chronic inflammation as well as Vitamin D or any other emerging biomarkers have been collected. To harness genomics and biotechnology to improve global health and pursue new knowledge about the etiology of TNBC in an underserved and understudied Nigerian population, we propose a high-throughput whole genome DNA sequencing project. We hypothesize that rare, moderate-penetration, inherited and/or somatic variants play a role in the determination of breast cancer heterogeneity and account for the over-representation of triple negative breast cancer in women of African ancestry.