### UWI SOLUTIONS FOR DEVELOPING COUNTRIES (UWI SODECO)



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### WORK OF THE DEPARTMENT

hat is UWI SODECO? UWI SODECO is a novel type of UWI research entity intended to be lower cost for both establishment and operations, to be global in its operations and networking, to leverage its global network to focus on big research questions from a stance that yields research findings proximate to product, and thus, to bring benefit to poor populations in developing countries and kudos to The University of the West Indies.

Why that structure? UWI SODECO is deliberately structured as a research charity, embedded in UWI, to facilitate it receiving funds and gifts from a range of sources. The structure assures UWI SODECO is embedded functionally in its constituencies; these include the Global Network of Researchers and the populations they serve, and the Local and Foreign Network of Philanthropists and commercial entities from

which it receives support. It is governed by a board which is Chaired by the UWI Vice Chancellor or designate, and comprising, the CEO, 6 UWI Members and 4 Private Sector Members all of whom serve on Campus Council and/or the University Council. The private sector members as Trustees of the overall mission to improve health in developing countries, have been planning the establishment of the research entity since 2003, and have been instrumental in raising some J\$150 million dollars to help establish UWI SODECO. Major donors have given primarily through the framework of UWI Development and Endowment Fund, and include overseas donors, Jamaica National Building Society Foundation, and Jamaica Producers Group. UWI SODECO's governance arrangements are deliberately flat to enable rapid, focused, informed and out of the box decisions to enable nimbleness in operations. UWI SODECO as a double headed coin, has its Charity structure on one side, and UWI department on the other, and this property enables it to function with a familiar and user-friendly feel both within and outside the UWL

### WHAT ARE UWI SODECO'S MAIN GOALS?

UWI SODECO aims to solve one big medical question; what are the molecular mechanisms underlying the greatly increased risk of obesity, diabetes, hypertension, stroke and heart attack affecting populations, poor for generations, who adopt western economic arrangements; See details in the Research Programme below.

UWI SODECO intends to have its research findings used to create novel interventions to prevent or treat these chronic diseases; Discoveries from this research can reach to product through two main paths. Firstly, the agencies that fund the research, e.g., the National Institutes of Health and The Bill and Melinda Gates Foundation, both have structured means of engaging industry to uptake findings and use them to develop products that improve health. Secondly, UWI SODECO will increasingly pursue collaborating with academics who are skilled in pharmacogenomics to learn/participate in the proximate steps in this discovery-to-drug process. This path is being developed in conjuction first with our collaborators at University of Maryland; plans have also been formulated to follow suit with one at Harvard later in 2015.

UWI SODECO aims to convene appropriately skilled partners to solve other societal problems whose solutions create economic gain.

Solutions for Society, a think tank within UWI SODECO, partnered with the private sector in Jamaica and international agencies to provide the Bank of Jamaica, Ministry of Finance and the Jamaican Financial Sector a blueprint to implement mobile financial services using the existing financial companies, and the two telecoms providers. This report has been used by the Bank Of Jamaica to inform its recently published regulations governing the area.

Earlier in 2015 UWI SODECO handed over to the reconstituted National Commission on Science and Technology its PIOJ adopted project to lead the development of a national science policy.

The current project is in its planning stages, again involving the Jamaican private sector, the PIOJ and international agencies to provide to the Ministry of Finance and Planning and the Private Sector some options for driving economic growth in Jamaica, a topical subject.

### WHAT IS UWI SODECO'S STRATEGY TO ACHIEVE ITS GOALS?

### **Global Stance**

UWI SODECO deliberately functions as a node in a selected global network, with other nodes chosen to bring to bear specific skills required to get the job done. With its current goal, the molecular unravelling of underlying mechanisms of obesity and comorbidities, UWI SODECO has identified for best fit a number of University institutions including: University of Auckland, Liggins Institute, Sir Peter Gluckman, Dr. Allan Sheppard and Dr. Tony Pleasants for developmental biology and epigenetics; University of Maryland, Professor Richard Macko, Professor Charlene Hafer-Macko, Professor Alice Ryan, Professor Fred Ivey, Professor Braxton Mitchell, Dr. Anindo Roy, for neuroscience, exercise physiology and genomics; Loyola University of Chicago, Professor Amy Luke, Dr. Ramon Durazo, Professor Richard Cooper for chronic disease epidemiology in African populations; University of Wisconsin, Madison, Professor Dale Schoeller, for energy metabolism; Baylor College of Medicine, Professor Farook Jahoor, for stable isotope metabolism; University of London, St. Thomas' Hospital, Professor Kennedy Cruickshank, for cardiovascular epidemiology; Kwame Nkrumah University of Science and Technology, Dr. Jacob Plange-Rhule for ecological contrasts for nutrition, epidemiology and epigenomics; University of Cape Town/MRC ZA, Professor Bongani Mayosi, Professor Andre-Pascal Kengue, for ecological contrasts for nutrition.

### Global Staff

UWI SODECO has chosen members of the network not only for scientific skill, but a shared commitment to use this network to train and season young academic staff so as to fit them to function seamlessly in the global research environment.

# WHAT INVESTMENTS ENABLE UWI SODECO TO PURSUE ITS GOALS?

At inception, UWI and the private sector made capital investments.

### Physical Infrastructure:

UWI Mona allocated space (25 West Road to function as UWI SODECO headquarters; two new laboratories in the Faculty of Medical Sciences Teaching and Research Complex for basic science; ground floor space in the former UHWI School of Nursing to serve as Clinical Science Laboratories; a house on College Common to serve as Visiting Fellows' Residence). The laboratories have been equipped with state of the art basic science equipment with the use of a J\$60m grant from UWIDEF. Headquarters and Visiting Fellow's Residence have also been refurbished with grants from UWIDEF and Jamaica National Building Society Foundation. The UHWI former School of Nursing building is being refurbished by a J\$30m grant from UWIDEF to the University to serve as UWI SODECO Clinical Science Laboratories.

# WHAT HAS UWI SODECO ACCOMPLISHED IN THE FIRST 2 YEARS OF OPERATION?

UWI SODECO began operations May 2013 when it moved into its headquarters at 25 West Road, UWI Mona Campus. Over this 2 year period it has established its infrastructure for research and administration, while simultaneously delivering its current research programme. Importantly we are aggressively going after new funding primarily from the US National Institutes of Health in order to extend the research funding from December 2016 five years forward.

### RESEARCH PROGRAMME

Below is a brief summary of the research strategy pursued by UWI SODECO to achieve its goal of illuminating the molecular mechanisms of the increased risk for obesity and cardiovascular disease experienced by populations with a history of malnutrition over generations.

### Background

- There is a global epidemic of obesity and associated diseases, hypertension, diabetes, and their vascular consequences, stroke and heart attack.
- The burden of these diseases rests heavily on developing world populations.
- Obesity and its associated diseases grow increasingly common when populations, previously poor and undernourished, enter the global economy and food becomes more available along with changes in social and economic organization which lead to more sedentary lives.
- There is growing recognition that the risk of obesity and its associated diseases is amplified by under-nutrition in early life, sometimes beginning in utero, as well as going back several generations.

- Intergenerational under-nutrition affects approximately 40% of the global population and rests heavily on sub-Saharan Africa, rural India and China, and Latin America and the Caribbean.
- Left unattended, the burden of disease will rise exponentially, and its effects on morbidity, individuals' ability to work, and interruption of investment in children in families will retard economic development at country level.
- There has been a global response at national and UN levels along two main tracks. First, public health interventions have been designed to prevent disease, and second, health system responses to assure better, more efficient management of disease recommended. However, despite ramped up efforts, the epidemic continues virtually unabated especially in developing countries.
- Awareness has therefore arisen for the need for game changers and many institutions are focused on this issue.
- UWI SODECO's approach makes the assumption that knowledge of the underlying molecular mechanisms that drive the obesity and chronic disease responses to increases in availability of food and reduction in activity levels, especially in inter generationally undernourished peoples, is a pre-requisite to identifying game changing prevention and cure strategies.
- UWI SODECO through its global network is tasked to devise one specific scientific approach to the problem: to use cutting edge technologies to search for and find underlying molecular mechanisms of amplified risk existing in previously undernourished populations and to use this knowledge to guide the crafting of novel interventions for prevention and treatment.
- The combination of infrastructure as described and research grants in hand extending through December 2016 has enabled thought leadership from Jamaica in the area of the interaction of malnutrition, developmental biology, and risk of obesity and associated diseases to combine with other expertise in the network nodes to tackle this problem.

#### **Research Deliverables**

When this set of current projects is complete in December 2016, we would have:

- i) described the molecular pathways that underpin both the heightened risk of obesity and cardiovascular disease resulting from intergenerational malnutrition.
- ii) described those pathways in muscle that respond to exercise to reverse the increase in risk of cardiovascular disease resulting from stroke, the preeminent complication of obesity and its comorbidities.

## UWI SODECO CONTRIBUTING TO RESEARCH IN THE FACULTY OF MEDICAL SCIENCES

UWI SODECO operates de facto as a University Research Unit within the Faculty of Medical Sciences, UWI Mona Campus. From its inception, UWI SODECO has worked closely with the Dean, Professor Horace Fletcher and the designated officer responsible for research, Deputy Dean, Professor John Lindo to further research in the faculty. The collaborative team UWI SODECO/FMS Research Dean's Office has proposed to the Dean, a three pronged programme now being implemented with the Dean's approval. The first intervention is a strategic one and is an external peer evaluation of research in the Faculty led by an external body based at the University of Nottingham. The results of the research assessment will be used to create a strategic plan for research for the Faculty and identify network assets who can contribute to key elements of that strategy. The second intervention is an accelerated programme to identify and train research leaders in Departments. The Faculty has agreed to reallocate time and modify evaluation criteria appropriately to allow Research Leaders 80% time to focus on research so as serve as the engines within their departments for research. Clinical and Teaching Faculty will thus have a Departmental focal point for research in which they can participate without carrying the full burden of research and clinical/teaching simultaneously. The first three candidates have been agreed and are being enrolled in a tightly run PhD programme embedded

in the UWI SODECO research programme with a three year graduation timeline. The third intervention is designed to broaden support for Research Leaders and other research active Faculty; it is the constitution of a local network of research active senior scientists around whom mentorship will be organised more broadly.

### PEER REVIEWED PUBLICATIONS

- Sani M, Refinetti R, Jean-Louis G, Pandi-Perumal SR, Durazo-Arvizu RA, Dugas LR, Kafensztok R, Bovet P, Forrester TE, Lambert EV, Plange-Rhule J, Luke A. "Daily activity patterns of 2316 men and women from five countries differing in socioeconomic development". Chronobiol Int. 2015 Jun;32(5):650-6.
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- Locke AE, Kahali B, Berndt SI, et al. "Genetic studies of body mass index yield new insights for obesity biology". *Nature.* 2015 Feb 12;518(7538): 197–206.
- Shungin D, Winkler TW, Croteau-Chonka DC, et al. "New genetic loci link adipose and insulin biology to body fat distribution". *Nature*. 2015 Feb 12;518(7538): 187–96.
- Durazo-Arvizu RA, Camacho P, Bovet P, Forrester T, Lambert EV, Plange-Rhule J, Hoofnagle AN, Aloia J, Tayo B, Dugas LR, Cooper

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- Orcholski L, Luke A, Plange-Rhule J, Bovet P, Forrester TE, Lambert EV, Dugas LR, Kettmann E, Durazo-Arvizu RA, Cooper RS, Schoeller DA. "Under-reporting of dietary energy intake in five populations of the African diaspora". *Br J Nutr.* 2015 Feb 14;113(3):464-72.
- Cooper RS, Forrester TE, Plange-Rhule J, Bovet P, Lambert EV, Dugas LR, Cargill KE, Durazo-Arvizu RA, Shoham DA, Tong L, Cao G, Luke A. "Elevated hypertension risk for African-origin populations in biracial societies: modeling the Epidemiologic Transition Study". J Hypertens. 2015 Mar;33(3):473-80; discussion 480-1.
- Ettinger AS, Bovet P, Plange-Rhule J, Forrester TE, Lambert EV, Lupoli N, Shine J, Dugas LR, Shoham D, Durazo-Arvizu RA, Cooper RS, Luke A. "Distribution of metals exposure and associations with cardiometabolic risk factors in the "Modeling the Epidemiologic Transition Study"". *Environ Health*. 2014 Nov 5;13:90.
- Gordon-Strachan G, Cunningham-Myrie C, Fox K, Kirton C, Fraser R, McLeod G, Forrester T. "Richer but fatter: the unintended consequences of microcredit financing on household health and expenditure in Jamaica". *Trop Med Int Health*. 2015 Jan;20(1):67-76.
- Gonseth S, Dugas L, Viswanathan B, Forrester T, Lambert V, Plange-Rhule J, Durazo-Arvizu R, Luke A, Schoeller DA, Bovet P. "Association between smoking and total energy expenditure in a multi-country study". *Nutr Metab* (Lond). 2014 Oct 4;11(1):48.

- Wood AR, Esko T, Yang J, et al. "Defining the role of common variation in the genomic and biological architecture of adult human height". *Nat Genet.* 2014 Nov;46(11):1173-86.
- Royal-Thomas T, McGee D, Sinha D, Osmond C, Forrester T. "Association of maternal blood pressure in pregnancy with blood pressure of their offspring through adolescence". *J Perinat Med.* 2014 Aug 28.
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- Durazo-Arvizu RA, Camacho P, Bovet P, Forrester T, Lambert EV, Plange-Rhule J, Hoofnagle AN, Aloia J, Tayo B, Dugas LR, Cooper RS, Luke A. "25-Hydroxyvitamin D in African-origin populations at varying latitudes challenges the construct of a physiologic norm". *Am J Clin Nutr.* 2014 Sep;100(3):908-14.
- Thompson DS, Ferguson TS, Wilks RJ, Phillips DI, Osmond C, Samms-Vaughan M, Forrester TE, Boyne MS. "Early-life factors are associated with nocturnal cortisol and glucose effectiveness in Afro-Caribbean young adults". *Clin Endocrinol* (Oxf). 2015 Mar;82(3):352-8.
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- Green, C.O., Badaloo, A., Hsu, J.W., Reid, M, Taylor-Bryan, C., Forrester, T and Jahoor, F. Effects of randomized supplementation of methionine or alanine on cysteine and glutathione production during the early phase of treatment of children with edematous malnutrition. *Am J Clin Nutr* 99(5) 2014: 10520-8.

• Green, C.O., Wheatley, A.O., Bailey, D., Sotelo, A. and Asemota, H.N. (2014). Nutritional composition of Jamaican Citrus agro byproduct with potential for nutraceutical product development. *Research.* 1 (2014): 771

### PRESENTATIONS

- Green, C.O. Methods for treating hypercholesterolemia using Ortanique Peel extract. Scientific Research Council. 3rd Biennial S&T Conference. Display Booth. The Conference Theme: Green gold: Medicinal Ganja and other natural products – a potential source of wealth. The Ballroom: Jamaica Pegasus Hotel. November 10–12, 2014.
- Green, C.O., Wheatley, A. O., McGrowder, D.A., Dilworth, L. L., and Asemota, H. N. Ortanique peel PMFs extract (PMFort©) for hypercholesterolemia. Faculty of Medical Sciences. Competitiveness productivity and Innovation in a global environment. Poster. Principal Research days, 2014.

### PUBLIC SERVICE

### **Professor Terrence Forrester**

- Membership on, National Commission on Science and Technology
- Membership on, Ministry of Education, STEM Committee

### Dr. Curtis Green

- Member of the American Society for Nutrition (ASN)
- Member of the American Physiological Society (APS)
- Member of Society for Scientific Advancement (SOSA)

### Dr. Patrice Francis-Emmanuel

- Executive member of the Caribbean Endocrine Society

### Dr. Claudia Campbell

- Mentor in the Y.U.T.E (Youth Upliftment Through Employment) program
- Member of Kiwanis Club, Kingston and St. Andrew

### DISTINCTIONS, HONOURS, SCHOLARSHIPS AND AWARDS

2014: First Place: "National Innovations awards"– awarded by the Ministry of Science and Technology in the Category "Health and Safety" – Dr. Curtis Green

2014: Principal's award for Most Outstanding Research Activity – Dr. Curtis Green

Endocrine Society "Early Career Forum Travel award" (March 2015) – **Dr. Patrice Francis-Emmanuel** 

### STUDENTS

Three PhD students enrolled 2015.