The Human Heredity and Health in Africa Initiative

2nd H3Africa Consortium Meeting

16-18 May 2013, Accra, Ghana

Audrey Duncanson
Wellcome Trust
TrypanoGEN – genetic determinants of susceptibility to trypanosomiasis

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- Issa Sidibe, CIRDES, Burkina Faso
- Dieudonne Mumba, INRB, Democratic Republic of Congo
- Mathurin Koffi, University of Abob-Adjame, Côte d’Ivoire
- Gustave Simo, University of Dschang, Cameroon
- John Enyaru, Makerere University, Uganda
- Martin Simuunza, University of Zambia, Zambia
- John Chisi, University of Malawi, Malawi
- Stafford Kibona, NIMR, Tanzania
- Vincent Pius Alibu, Makerere University, Uganda
- Annette Macleod, University of Glasgow, UK
- Philippe Büscher, ITM Antwerp, Belgium
- Bruno Bucheton, IRD Marseille, France
- Neil Hall/Christiane Hertz-Fowler, University of Liverpool, UK
- Mike Parker, University of Oxford, UK
RHDGen Network – Genetics of rheumatic heart disease

Bongani Mayosi
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• Raj Ramesar, University of Cape Town, South Africa
• Nicola Mulder, University of Cape Town, South Africa
• Andrew Whitelaw, New Groote Schuur Hospital, South Africa
• Stephen Ogendo, University of Nairobi, Kenya
• Ana Mocumbi, Instituto Nacional de Saude, Mozambique
• Christopher Hugo-Hamman, CBMH, South Africa
• Okechukwu Ogah, University College Hospital, Nigeria
• Ahmed El Sayed, Khartoum, Sudan
• Charles Mondo, Uganda Heart Institute, Uganda
• John Musuku, University of Zambia, Zambia
• Guillaume Pare, McMasters University, Canada
• Bernard Keavney/Heather Cordell, Newcastle University, UK
• James Dale, University of Tennessee, USA
• Mike Parker, University of Oxford, UK

Co-applicants

Collaborators
Burden, spectrum and aetiology of type 2 diabetes in sub-Saharan Africa

Albert Amoah
University of Ghana, Ghana

- Clement Adebamowo, Institute of Human Virology, Nigeria
- Pontiano Kaleebu, Uganda Virus Research Institute, Uganda
- Saidi Kapiga, NIMR, Tanzania
- Naomi Levitt, University of Cape Town, South Africa
- Ayesha Ahmed Motala, UKZN, South Africa
- Moffat Nyirenda, University of Malawi, Malawi
- Charles Rotimi, NHGRI, USA
- Manjinder Sandhu, Wellcome Trust Sanger Institute, UK
- Eugene Sobngwi, University of Yaoundé, Cameroon
- Mark McCarthy/Mike Parker, University of Oxford, UK
- Dominic Kwiatkowski, Wellcome Trust Sanger Institute, UK
- Branwen Hennig/Liam Smeeth, LSHTM, UK
- Naby Moussa Balde, SED, Guinée
- Sophie Hawkesworth, MRC Gambia, The Gambia
- Patricia Marshall, Case Western Reserve, USA
H3Africa as a Consortium....
Consortium approach

- Individual projects funded under H3Africa would come under the H3Africa ‘umbrella’

- Funders envisioned a Consortium approach, such as HapMap, WTCCC and the 1000 Genomes Project

- Maximise the benefit and impact of the H3Africa Consortium
Could be thought of as a ‘Participatory Democracy’

‘Aims to create opportunities for all members of a Consortium [population] to make meaningful contributions to decision-making and to obtain as broad a range of views as possible’
Challenges

- Participants need to buy-in to the structure and overarching goals
- Can be burdensome for participants, eg Working Groups, Steering Committee calls
- Individual preferences or ways of working may need to adapt and change
- Consortia need to flexible and change over time
- Communication essential – internally and externally
Benefits

- Shared resources
- Exchange of ideas
- Centralised resources, *eg* H3ABioNet
- Standardized operating procedures, methods and analysis schemes
- Access to training, bioinformatics and analysis pipelines
Benefits cont’d....

• Added value from cross-project and cross-consortium collaborations

• Shared risk
What do we need from you?

• Participation!

• Working Groups

• Steering Committee
Consortium Coordinating Centre

- Provide support for trans-H3Africa Consortium activities
- Will employ an administrator and coordinator
- Will provide support for the Working Groups and H3Africa Steering Committee
- Reports to the Steering Committee
Samples deposition

- Deposition of biological samples into NIH-funded biorepositories is not a condition of WT award.

- Concern there would be challenges in using biorepositories, such as moving samples across borders.

- It is the expectation that Trust-funded samples will be deposited, if no barriers exist.
Questions?
“TrypanoGEN – genetic determinants of susceptibility to trypanosomiasis”

Enock Matovu
College of Veterinary Medicine
Makerere University, Uganda

- **Vision:**
  - Develop an integrated study of human, parasite and vector genetic variation in trypanosomiasis

- **Initial high level objectives:**
  - Create a biobank of retrospective and prospective samples
  - Generate a database of human genetic variation across Africa

- **Re-sequencing of African population**
  - N=160 from 4 centres to estimate unobserved SNPs

- **Discovery cohort**
  - 600 stage 1 and 2 patients
  - 200 asymptomatic controls
  - 500 population controls

- **Validation cohort of 1% top hits**
  - 400 Stage 1 and 2 patients
  - 200 asymptomatic controls
  - 900 population controls
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“RHDGen Network – Genetics of rheumatic heart disease”

Bongani Mayosi
Department of Medicine
University of Cape Town

- **High level aim:**
  - Broaden understanding of RHD pathogenesis in sub-Saharan Africa by identifying resistance and susceptibility genes

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**Case-control study**
- 1500 cases
- 1500 controls
- ...to discover SNPs associated with RHD

**Family-based GWAS**
- 1000 independent cases
- 2000 parents
- ...to confirm or refute significant hits

**Combined analysis**
- 2500 cases
- 2500 controls/pseudo-controls
- ...to identify associations of smaller effect size
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“Burden, spectrum and aetiology of type 2 diabetes in sub-Saharan Africa”

Albert Amoah
University of Ghana, Ghana

• **High level aim:**
  - Assess burden and aetiology of type 2 diabetes and its complications in adult populations across sub-Saharan Africa

• **Initial development of epidemiological and genomic resource:**
  - Recruitment of up to 1000 cases from each of 12 centres (diabetes clinics, hospitals, referral centres, tertiary clinics)
  - Population-based cross-sectional survey

• **Possible genomics projects:**
  - Re-sequencing of candidate regions at high coverage of 4000 participants
  - Sequencing of 500-600 genomes at low coverage
  - Whole genome sequencing of 1000 participants
  - Genotyping of 1500 participants
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Disease burden in Africa

Poverty
+
Limited access to affordable modern health care
=
Disproportionate burden of disease
Differences in disease prevalence*

- Environmental factors

- Human genomic factors

= Vast differences in disease prevalence between
  - Countries
  - Geographic regions within a country
  - Ethnic groups in the same geographic region

* all individuals affected by a disease within a particular period of time
Contemporary genetic and genomics research in Africa?

- African populations and their genetic variation in the context of disease are understudied.
- African researchers are underrepresented in modern genetics and genomics research.
- African research capacity to undertake population-based genetics and genomics research is underdeveloped.

Human Heredity and Health in Africa = H3Africa
The vision of H3Africa

“To facilitate an African-based contemporary research approach to the study of genomics and environmental determinants of common diseases with the goal of improving the health of African populations”
NIH and Wellcome Trust join forces

• Announcement of partnership between the NIH and the Wellcome Trust (June 2010)
• White Paper “Harnessing genomic technologies toward improving health in Africa” (February 2011)
• H3Africa conference in Cape Town (March 2011)
One initiative, multiple calls...

- Themed Strategic Awards to support research networks

WT call for proposals

NIH calls for proposals

- Bioinformatics Network
- Biorepository Grants
- Collaborative Centres of Excellence
Building on existing capacity

- Cohort studies and demographic surveillance systems
- Networks
  - MalariaGEN
  - African Bioinformatics Network
  - INDEPTH
- Training
  - African Regional Training Centre for Bioinformatics and Applied Genomics
Building on NIH and WT investments
THANK YOU.

http://h3africa.org