

## FINAL REPORT

### IUIS/FAIS IMMUNO-KENYA WORKSHOP How viruses hijack host immunity leading to cancers September 23<sup>rd</sup>- 28<sup>th</sup> 2018

Organizers:

Ruth Nyakundi (Institute of Primate Research, Kenya, KSI)

Dr. Lucy Ochola (Institute of Primate Research, Kenya, KSI)

Dr. Susan Musembi (Kenyatta University, Kenya)

Prof. Dieter Kabelitz (University of Kiel, Germany/IUIS)

Prof. Eleanor Fish (University Health Network & University of Toronto, Canada/IUIS)

Prof. Ann Moormann (University of Massachusetts Medical School, USA)

Prof. Clive Gray (University of Cape Town/IUIS, South Africa)



## **Introduction**

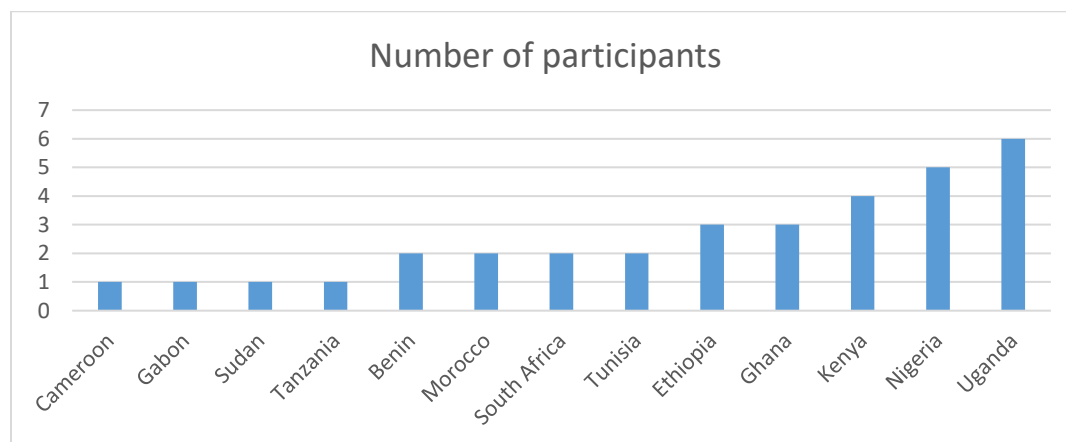
The IUIS-FAIS Immuno-Kenya workshop was a 5-day workshop held on September 23<sup>rd</sup> to 28<sup>th</sup> at the KCB leadership center in Karen, approximately 24km from Nairobi, Kenya. The workshop brought together 33 participants from different countries in Africa and international Immunology experts who gave insightful lectures on how viruses hijack the host's immunity leading to cancers. Apart from the lectures, the participants were involved in group assignments, a poster session and round table discussions with the experts.

## **Facilitators**

- Dr. Aileen Rowan- Imperial College of London, UK
- Dr. Andre Boonstra- Erasmus MC, Rotterdam, The Netherlands
- Prof. Andrea Cossarizza- University of Modena and Reggio Emilia, Italy
- Prof. Ann Moormann- University of Massachusetts Medical School, USA
- Prof. Angela Santoni- School of Medicine of Sapienza University, Italy
- Prof. Besam Louselati- University of Tunis El Manar, Tunisia
- Prof. Clive Gray- University of Cape Town, South Africa
- Prof. Dieter Kabelitz- University of Kiel, Germany
- Prof. Eleanor Fish- University of Toronto, Canada
- Prof. Holden Maecker- Stanford University, USA
- Dr. Julius Oyugi- University of Nairobi, Kenya
- Prof. Martin Muller- German Cancer research center, Germany
- Prof. Reinhold Schmidt- Hannover Medical University, Germany

## **Participants**

The workshop attracted 33 graduate and post-doctoral students from 13 African Countries.



## Session 1: Introduction to the immune system and viral evasion (24<sup>th</sup> September)

The first session was opened at 8.30am with a welcome speech from Prof. Simeon Mining, Director of Research at Moi University and President of Kenya Society of Immunology (KSI), this followed introductions from all participants and facilitators. Prof. Mining went on to discuss how the field of immunology is very diverse and how new information is always emerging. He then explained the role of KSI which is a society consisting of Researchers, Students, Universities and research students whose main aim is to contribute to the advancement of immunology and provide opportunities to share and network. Prof. Mining ended his opening speech with thanks to the organizing committee and sponsors of the workshop.

The first presentation was made by Dr. Anna Nga'nga of the National Cancer Control Program, Ministry of Health, Kenya. Dr. Nga'nga is a Public health specialist who gave a talk on the status of cancer in Kenya. She described the strategies that are currently being undertaken to reduce the morbidity and mortality of cancer cases in the country as well as programs developed by the Kenyan government relocate resources and implement these strategies. She also addressed the challenges that Kenyan Health care is facing in regards to early diagnosis and treatment of cancer. She suggested possible ways of tackling these challenges and referred to the available fellowships and Oncology trainings at the University of Nairobi. She then encouraged the formation of partnerships in government, research and academic institutes and the community.

Prof. Eleanor Fish took the participants through a brief introduction of the innate and adaptive immune systems and immune cell types. Prof. Fish started her talk with the formation, maturation, activation and regulation of the immune cells. She discussed the roles of the various cells, cytokines and antibodies in the innate and adaptive immune responses.

After the refreshment break, Prof. Angela Santoni gave her presentation on how various viruses, such as HPV, EBV, HCV, HIV, HTLV-1 and Merkel cell Polyoma, hijack the host's immune responses. Prof. Santoni described the development of immune responses against viruses and how immune suppression occurs during these viral infections. She emphasized on the viral immune evasion strategies which results in virus persistence and cancer development.

Prof. Dietrich Kabelitz gave a lecture on virus control and cellular transformation by  $\gamma\delta$  T cells. He described the 3 classes of cytokines and the features of the unconventional  $\gamma\delta$  T cells. He went ahead and described their reactions to viruses and their role in tumor immunology.

After the lunch break, Prof. Clive Gray gave a short presentation on the International Union of Immunological Societies (IUIS) and the FAIS legacy project which aims to train 1000 African PhD students in 10 years. The FAIS legacy project will provide the PhD students with a 5000USD grant and provide an opportunity to partner with any IUIS lab in the world. The application details are available on the Immunopaedia website and the deadline for submission is 1<sup>st</sup> October.

Prof. Fish gave another presentation on Off-target effects of vaccines. She discussed various studies on efficacy and safety of vaccines and their effects on child mortality.

Dr. Julius Oyugi provided a presentation on the status of HIV vaccines. He addressed the challenges of developing an effective vaccine against HIV the numerous vaccine trails carried out.

Clive divided the participants into 6 groups which were each assigned 2 themed modules from the immunopaedia thematic course content. The participants were given 1 hour to read through the module summary, answer the quiz. The members were then asked to;

- Describe their topics in 1 sentence
- How the topic is in line the theme “how viruses hijack host immunity”
- State one fact that they have learnt from the module

Under the guidance of Prof Eleanor Fish, participants were then divided into another 2 groups that would prepare presentations on vaccines (Tuesday 25<sup>th</sup> September) and emerging diseases (Thursday 27<sup>th</sup> September). This exercise involved pubmed searches on their assigned topic and preparation of a 15 minute presentation.

VACCINE SESSION (Tuesday 25 <sup>th</sup> September)			
Group A Ebola Vaccines	Group B HCV vaccine status	Group C Seasonal Flu vaccines: Challenge	Group D Therapeutic HIV vaccines: Primate studies
<ul style="list-style-type: none"> <li>• Albert Doughan</li> <li>• Dawit Hagos</li> <li>• Matthew Ojezele</li> <li>• Seyigbena Berry</li> <li>• Beatrice Muriuki</li> </ul>	<ul style="list-style-type: none"> <li>• Caleb Sinclear</li> <li>• Esmael Belachew</li> <li>• Temilola Owojuyigbe</li> <li>• Michele Stella Majoumouo</li> </ul>	<ul style="list-style-type: none"> <li>• Samuel Ahuno</li> <li>• Yayehyriad Gadena</li> <li>• Yamkela Qumbelo</li> <li>• Vicky Gent</li> </ul>	<ul style="list-style-type: none"> <li>• Zian Zeineb</li> <li>• Augusta Nsonwu-Anyanwu</li> <li>• Marie Chabi</li> <li>• Elsa Assegone</li> </ul>

EMERGING DISEASES (Thursday 27 <sup>th</sup> September)			
Group E Zika Virus	Group F Chikungunya Virus	Group G Dengue Virus	Group H Coronaviruses: SARS, MERS
<ul style="list-style-type: none"> <li>• Hassan Filali</li> <li>• Ijeoma Ifeora</li> <li>• Alice Bayiyana</li> <li>• Aleyo Chabeda</li> </ul>	<ul style="list-style-type: none"> <li>• Angela Nalwoga</li> <li>• Christopher Kintu</li> <li>• Mariem Ahmed</li> <li>• Khalid Elgorashi</li> </ul>	<ul style="list-style-type: none"> <li>• Annah-Ritah</li> <li>• Hassan Kasujja</li> <li>• Nicholas Kisilu</li> <li>• Anfrid Mahenge</li> </ul>	<ul style="list-style-type: none"> <li>• Annah Biira</li> <li>• Stanlaus Musyoki</li> <li>• Kolawole Oladipo</li> <li>• Azza Habel</li> </ul>

The session was closed at 6.00pm.

## Session 2: Viruses and cancer 1 (25<sup>th</sup> September)

The second day of the workshop started at 9.00 am with a lecture by Prof. Fish on IFN as the 1<sup>st</sup> responders to virus infection. She discussed the possibilities of boosting a host's immune system using Interferons so as to treat various viral infections such as Ebola, SARS and Influenza.

The second lecture was on the development of first, second and third generation prophylactic Human Papillomavirus (HPV) vaccines by Prof Martin Muller. He explained the origin and the types of HPV and how the oncogenic strains cause cancer, especially cervical cancer. He gave an account of the development of the 2 HPV vaccines and the 3<sup>rd</sup> vaccine which is currently under trials. He justified the need of a 3<sup>rd</sup> generation vaccine.

Prof Ann Moorman gave a lecture on EBV induced Oncogenesis. She expounded on how EBV triggers cancer and how malaria may increase the risk of EBV and cancer. She described the functional implications of EBV in immune surveillance.

Prof Clive Gray gave a talk on HIV/KHSV and Cancers, followed by a talk on virally induced tumors in patients with immunodeficiency by Prof. Schmidt and then CMV and cancers by Prof. Holden Maecker.

Students selected on Monday in Groups A, B, C, and D gave their presentations on their assigned vaccines.

The evening ended with the poster sessions by the participants.

		TITLE	PRESENTING AUTHOR	INSTITUTE
1.	CAN01	Burkitt's Lymphoma	Albert Doughan	Kwame Nkrumah University of Science and Technology, Ghana
2.	CAN02	Implication of Cytokines as biomarkers for ovarian cancer risk	Azza Habel	ElManar University, Tunisia
3.	CAN03	Epstein-Bar virus and endemic Burkitt lymphoma	Beatrice Muriuki	Kenya Medical Research Institute
4.	CAN04	Tumor biomarkers profile and its association with clinicopathological features among breast cancer patients in Ethiopia	Esmael Besufikad	Addis Ababa University, Ethiopia
5.	CAN05	20S proteasome as a marker of Hematologic malignancies in 145 Moroccan patients	Hassan Filali	Mohammedia-University Hassan II of Casablanca, Morocco

6.	CAN06	Cytokines as biomarkers in occurrence of endometrial cancer	Mariem Ahmed	Faculty of Sciences of Tunis, Tunisia
7.	CAN07	The incidence of virus related cancers at Moi teaching and referral hospital	Nicholas Kisilu	Moi teaching and referral hospital, Kenya
8.	CAN08	Seroprevalence of some oncogenic viruses in patients with lymphoproliferative diseases in Ile-Ife	Temilola Owojuyigbe	Obafemi Awolowo University, Nigeria
9.	CAN09	Association between Loa loa microfilaria with human T-lymphotropic virus (HTLV)	Elsa EyangAssengone	Regional doctoral School of Central Africa, Gabon
10.	HPV10	Construction of a Zera®-adjuvanted Human papillomavirus (HPV) E7-based DNA vaccine delivered in plant made HPV pseudovirions	Aleyo Chabeda	University of Cape Town, South Africa
11.	HPV11	Expression pattern of exhaustion markers on cervical mucosal T-cells in HIV- and HIV+ women with or without precancerous cervical lesions/Invasive cancer from Mbeya, Tanzania	Anfrid Mahenge	NIMR-Mbeya Medical Research Center, Tanzania
12.	HPV12	Prevalence of Human papillomavirus and factors associated with oral and oropharyngeal squamous cell carcinoma among HIV-1 infected patients attending Mulago hospital, Uganda	Annah Biira	Makerere University, Uganda
13.	HPV13	Antibody against Human papillomavirus type 16 as marker for early detection of cervical cancer among HIV-infected women in Ogbomoso, Nigeria	Kolawole Oladipo	Adeleke University, Nigeria
14.	HPV14	Human papillomavirus in pregnant women at a teaching hospital in Nigeria	Matthew Ojezele	Delta state University, Nigeria
15.	HPV15	Human oncogenic papillomavirus genotypic variations and their relationship to precancerous cervical lesions in south of Benin: An epidemiological study	Marie-Marthe Chabi	University of Abomet Calavi, Cotonou, Benin
16.	HPV16	Paradigm to target cervical cancer caused by HPV: Apoptosis induction towards cervical cancer	Michele Majoumouo	University of Yaounde, Cameroon

		cells using F3 from fruits of <i>Bersama engleriana</i>		
17.	HPV17	Evaluation of genotypes and cyto-immunological profiles in human papillomavirus and human immunodeficiency virus co-joint infections among women attending Kisii teaching and referral hospital, Kenya	Stanslaus Musyoki	Kenyatta University, Kenya
18.	HPV18	An investigation into the role of <i>Schistosoma mansoni</i> infection on Human papillomavirus (HPV) vaccine induced protective responses	Vicky Gent	Institute of Primate Research, Kenya
19.	KSHV19	Risk factors for KSHV viral load in blood and in saliva across the life course in rural Uganda	Angela Nalwoga	MRC/UVRI and LSHTM Uganda research Unit, Uganda
20.	KSHV20	Kaposi's sarcoma-associated herpes virus is reactivated by malaria exposure	Christopher Kintu	MRC/UVRI & LSHTM, Uganda
21.	KSHV21	Serum microRNA and cytokine profiles of patients with epidemic Kaposi's sarcoma	Hassan Kasujja	Makerere University, Uganda
22.	HIV22	Longitudinal changes in CD4+ and CD8+ T cell phenotype and activation marker expression among cytococcal meningitis patients initiating on anti-retroviral therapy	Alice Bayiyana	Makerere University, Uganda
23.	HIV23	Interleukin 2, CD8 T cell function and total leukocyte count in HIV infection	Augusta Chinyere	University of Calabar, Nigeria
24.	HIV24	Characterisation of langerhan cells in the human foreskin	Yamkela Qumbelo	University of Cape Town, South Africa
25.	HIV25	Multiple viral hepatitis and HIV infections among patients with HCC and CLDs in southern and central Ethiopia	Yayehyirad Tassachew	Addis Ababa University, Ethiopia
26.	TB26	Mycobacterium tuberculosis associated immune activation, exhaustion, gene expression and cytokine profiling to predict active tuberculosis disease in bronchoalveolar lavage fluid of presumptive tuberculosis cases	Anna Namuganga	Makerere University, Uganda

27.	TB27	The effect of maternal helminth infection on maternal and neonatal immune function and immunity to tuberculosis	Dawit Gebreegziabiher	Addis Ababa University, Ethiopia
28.	MAL28	Dynamics of immunological memory to Plasmodium falciparum infection among Ghanaians living in a malaria hypo-endemic region	Caleb Sinclear	Noguchi memorial Institute for Medical research, Ghana
29.	MAL29	Quantification of memory B cells specific to the vaccine antigen in a group of vaccinated nulligravid Beninese women	Deo-Gracias Berry	Institut des sciences Biomedicales Appliquees, Gabon
30.	SLE30	Anti-ds-DNA antibody relation to sex hormones levels in Sudanese patients with systemic lupus erythematosus	Khalid Elgorashi	Tropical medicine research institute, Sudan
31.	SLE31	Moroccan patients with systemic Lupus erythematosus	Zeineb Zian	Faculty of Sciences and techniques of Tangier, Morocco
32.	HEP32	Hepatitis C and delta viruses among hepatitis B surface antigen positive cohort in Abuja Nigeria	Ijeoma Ifeora	University of Nigeria Nsukka, Nigeria
33.	MEN33	Assessment of meningitis causing bacteria at the Kumasi central Prison	Samuel Ahuno	Kwame Nkrumah University of Science and Technology, Ghana

Session ended at 10.00pm

### Session 3: Viruses and cancer 2 (26<sup>th</sup> September)

The session started at 9.00am with a talk on HBV, HCV and hepatocellular carcinoma by Prof Andre Boonstra. Andre described the five forms of the hepatitis virus and how they develop into a chronic infection and how the immune system reacts to the viruses.

The next lecture was on cytokines as biomarkers for HCV by Prof. Besma Loueslati. She illustrated the course of the HCV infection, the role cytokines have on the progression of the disease and the prospect of using these cytokines as biomarkers.

After a break, Prof Cossarizza gave a talk on Cancer immunology and immunotherapies. He explained how the immune system uses various antigens to recognize cancers and how immune evasion is the hallmark of cancer. This lecture was followed by a talk on HTLV and T cell leukemia by Prof Aileen Rowan. Prof. Rowan took the audience through the modes of transmission of the virus, the immune response to the virus and how the virus transforms T cells leading to cancer.



She ended her talk with an account on the virus can be prevented. Prof. Muller gave a talk on the use of Adeno-associated viruses as genetic vectors. He described their possibility as treatment for cancers.

The top poster presentations were selected to give a 10 minute oral presentation:

	Name of presenter	Title
1.	Elsa EyangAssengone	Association between Loa loa microfilaria with human T-lymphotropic virus (HTLV)
2.	Alice Bayiyana	Longitudinal changes in CD4+ and CD8+ T cell phenotype and activation marker expression among cytocoecal meningitis patients initiating on anti-retroviral therapy
3.	Aleyo Chabeda	Construction of a Zera®-adjuvanted Human papillomavirus (HPV) E7-based DNA vaccine delivered in plant made HPV pseudovirions
4.	Anfrid Mahenge	Expression pattern of exhaustion markers on cervical mucosal T-cells in HIV- and HIV+ women with or without precancerous cervical lesions/Invasive cancer from Mbeya, Tanzania
5.	Angela Nalwoga	Risk factors for KSHV viral load in blood and in saliva across the life course in rural Uganda
6.	Yamkela Qumbelo	Characterisation of langerhan cells in the human foreskin

The evening was spent as a round table discussion with the day's speakers.

#### **Session 4: Planning for success (27<sup>th</sup> September)**

The session started at 9.00 with a lecture on Ethics in research by Prof Ann Moormann followed by a lecturer on Sex and gender in immunity, Prof Eleanor Fish. Prof. Fish also gave a short talk on the Beyond Science Initiative (BSI) which provides mentorship to young researchers. Dr. Kirtika Patel, Chair and senior lecture at the Department of Immunology at Moi University, Eldoret, gave a presentation on her journey in immunology and research.

After the refreshment break, Group E, F, G and H gave their presentations on their assigned emerging disease.

After the lunch break, the participants were taken through 2 lectures on the Introduction to flow cytometry by Prof Cossarizza and Prof Maecker.

After dinner, the participants were divided into groups with one facilitator who took them through Student grant and CV preparation.

The session closed at 10.00pm

### **Session 5: Flow cytometry (28<sup>th</sup> September)**

The participants left for the Institute of Primate research at 8.30am where they underwent three theoretical lectures from Prof. Cossarizza, Dr. Maecker and Mr. Harry Fanjo (BD Sciences) on flowcytometry. The participants were then divided into groups and were taken through practical session involving cell separation, staining and flow cytometry and data analysis using flowjo and cytobank software.

The session ended at 6.00pm

The participants and facilitators then left for Tamarind Tree hotel for diner which was then followed by a Keynote Talk on the Africa Academy of Sciences and scholarship opportunities by Prof. Thomas Kariuki.

The winners of the Best poster and Oral presentations were announced:

1. Angela Nalwoga
2. Alice Bayiyana
3. Yamkela Qumbelo

The session was closed at 10.00pm



*Figure: IUIS-FAIS IMMUNO-KENYA 2018 participants*

We extend our gratitude to all our Sponsors: IUIS, IUIS-CIC, BD Biosciences, Surface Oncology, Institute of Primate Research, Inqaba biotech, Trianni, NRF Kenya and Cytobank) and all the Organizers of the event.