

# 1<sup>st</sup> Advances in Precision Medicine

## Epigenetics and Precision Medicine

29<sup>th</sup> November – 1<sup>st</sup> December 2021

كلية العلوم الصحية والحيوية  
College of Health & Life Sciences

جامعة حمد بن خليفة  
HAMAD BIN KHALIFA UNIVERSITY



# Day 1 (29<sup>th</sup> November 2021)

08:00 – 09:30 Registration – Breakfast

09:30 – 09:45 Welcome and Introduction

09:45 – 10:00 QNRF talk

## Session 1 - **Epigenetics Contribution to Neurological Disorders**

Neurodevelopmental diseases have long been associated with aberrant epigenetic mechanisms (e.g. Rett syndrome, Coffin-Lowry syndrome), but more recently it has been shown that neurodegenerative diseases and other neurological and mental disorders also have hallmark epigenetic changes. In this session we will focus on the epigenetic landscape of neurological disorders, linking DNA methylation, histone modification and chromatin organization defects to the development of these diseases and identifying potential epigenetic therapies for them. We will also discuss how epigenetic mechanisms can shed light on the relevance of neurological disease-associated genetic variants.

10:00 – 10:45 Keynote speaker: **Shelley Berger**, University of Pennsylvania – USA

10:45 – 11:15 **Shigeki Iwase**, University of Michigan – USA

11:15 – 11:30 Selected short talk

11:30 – 12:00 **Dorret Boomsma**, Vrije University – Netherlands

12:00 – 12:30 **TBD**

12:30 – 13:00 **Borbala Mifsud**, Hamad Bin Khalifa University- Qatar



13:00 – 14:00 Lunch

14:00 – 15:00 Poster session 1

## Session 2 – **Epigenetics of Aging**

Aging is the major risk factor for several diseases including cancer, neurodegeneration, diabetes, and cardiovascular disease. During the last decade, several discoveries were made about the role of epigenetics in aging and age-related disease. It is currently well-established that epigenetic alterations are hallmarks of senescence and the aging process. Epigenetic mechanisms are reversible in nature, which provide promising avenues for slowing down aging and regulating longevity. In this session, we will be addressing major advancements in epigenetics aging research and how they can be applied to personalized medicine. We will also explore key advances in epigenetic clocks and their potential clinical application as biomarkers of disease. Furthermore, we will highlight the importance of identical twin-based studies to measure epigenetic drift associated with aging.

15:00 – 15:30 **Nady El Hajj**, Hamad Bin Khalifa University – Qatar

15:30 – 16:00 **Jordana Bell**, King's College London - UK (online)

16:00 – 16:30 **Riccardo E Marioni**, Centre for Genomic and Experimental Medicine MRC Institute of Genetics and Molecular Medicine –UK

16:30 – 17:00 Coffee break

17:00 – 17:30 **Wolfgang Wagner**, University of Aachen -Germany

17:30 – 18:00 Selected short talk

18:00 – 18:45 Keynote speaker : **Steve Horvath**, University of California, Los Angeles - USA (online)



# Day 2 (30<sup>th</sup> November 2021)

## Session 3 - **Epigenetic Mechanisms Involved in Cancer**

The development of cancer is associated with major changes in the gene expression program of the cell leading to uncontrolled proliferation. Until recently, the emphasis was on how somatic mutations can cause cancer, however, by now it is evident that carcinogenesis is driven not only by mutations but also by alterations of the normal epigenetic profile. The extent to which epigenetic mechanisms contribute to cancer development varies considerably, even with a few examples where the disease is solely due to epigenetic disruptions. In this session we will introduce epigenetic features, including DNA methylation, histone modifications and 3D chromatin conformation, that are associated with cancer. We will examine how these signatures can be used for diagnosis, early diagnosis and patient stratification. Finally, we will discuss how epigenetic features can be integrated with genetic drivers to better understand cancer evolution.

09:00 – 09:45 Keynote speaker: **Ali Shilatifard**, Northwestern University – USA

09:45 – 10:15 **TBD**

10:15 – 10:30 Selected short talk

10:30 – 11:00 Coffee break

11:00 – 11:30 **TBD**

11:30 – 12:00 **Cameron Osborne**, King's College London - UK

12:00 – 12:15 Selected short talk

12:15 – 12:30 Exhibitor talk – Dovetail Genomics

12:30 – 14:00 Lunch

14:00 – 15:00 Poster session 2



## Session 4 - **Epigenetics in Obesity, Diabetes, Bone and Cardiovascular Diseases**

The prevalence of obesity, type 2 diabetes (T2D), and cardiovascular disease (CD) is increasing worldwide and they are associated with significant morbidity and mortality. In recent years, there has been great interest in epigenetic mechanisms involved in obesity, T2D, and CD. Epigenetic modifications are an obvious link between our genes and environmental exposures as well as lifestyle factors. Therefore, researchers have tried to gain a better understanding of their role in disease. Till now, several epigenetic alterations have been identified in various tissues of patients with T2D and CD as well as in obese individuals including blood, liver, pancreas, skeletal muscle, heart, and adipose tissue. In this session, we will discuss how epigenetics can be used to develop a personalized approach for disease care and risk management. We will also explore the role of various epigenetic modifications including DNA and histone methylation as well as epigenetic regulators in T2D, CD, and obesity. Finally, we will discuss the possibility to modulate these epigenetic marks by dietary or surgical interventions as well as through exercise.

15:00 – 15:30 **Karsten Suhre**, Weill Cornell Medicine - Qatar

15:30 – 16:00 **Jorge Ferrer**, Imperial College London - UK

16:00 – 16:15 Selected short talk

16:15 – 16:45 Coffee break

16:45 – 17:15 **Omar Albagha**, Hamad Bin Khalifa University - Qatar

17:15 – 17:45 **TBD**

17:45 – 18:30 Keynote speaker: **Michael Snyder**, Stanford University -USA (online)

19:30 - Conference dinner



# Day 3 (1<sup>st</sup> December 2021)

## Session 5 - **Epigenetics and Transgenerational Inheritance**

The notion of transgenerational epigenetic inheritance has been the subject of heated debate for centuries. The passage of epigenetic information from one generation to the next is now well established, especially in model organisms. In recent years such inheritance has been implicated in many biological processes associated with human diseases. This session will gather leading scientists working on epigenetic modification and transgenerational inheritance to discuss the current state of research and new findings. We will cover major questions of epigenetic research ranging from transcriptional regulation to complex pathways associated with epigenetic inheritance. Furthermore, we will be discussing the fundamental aspects of epigenetic memory in the different model systems. Finally, we will emphasize the importance of epigenome editing technology and discuss its impact on basic research and clinical application that can potentially lead to precision medicine.

09:30 – 10:15 Keynote speaker: **Susan Gasser**, Friedrich Miescher Institute – Switzerland

10:15 – 10:45 **TBD**

11:00 – 11:30 Coffee break

11:30 – 12:00 **TBD**

12:00 – 12:30 **TBD**

12:30 – 13:00 **Ehsan Pourkarimi D**, Hamad Bin Khalifa University- Qatar

13:00 – 14:15 Lunch



## Session 6 - **Epigenetics in Immunology and Autoimmune Diseases**

Epigenetic modification such as DNA methylation and histone modifications are crucial to regulating innate and adaptive immunity. It is now well-established that changes in DNA modification are associated with autoimmune diseases like systemic lupus erythematosus. In this session, we will address the effect of chromatin modification on both innate and adaptive immunity, and notably on how pathogens can evoke epigenetic memory. We will also be exploring the impact of DNA methylation on autoimmune diseases focusing on systemic lupus and how our basic knowledge can be applied to tailor made/ personalized medicine.

14:15 – 14:30 Exhibitor talk

14:30 – 15:00 **Gioacchino Natoli**- European Institute of Oncology - Italy

15:00 – 15:30 **Rab Prinjha**, GlaxoSmithKline Pharma -UK

15:30 – 15:45 Selected short talk

15:45 – 16:15 Coffee break

16:15 – 16:45 **Judith Zaugg** - European Molecular Biology Laboratories - Germany 16:45 – 17:00

Selected short talk

17:00 – 17:45 Keynote speaker: **Anjana Rao** – La Jolla Institute of Immunology - USA - (online)

17:45 – 17:50 Closing remarks

