

RESEARCH HIGHLIGHT

Environment, epigenetics and reproduction

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Abstract

A conference summary of the third biannual Kenya Africa Conference “Environment, Epigenetics and Reproduction” is provided. A partial special Environmental Epigenetics issue containing a number of papers in Volume 3, Issue 3 and 4 are discussed.

Key words: environment; epigenetics; reproduction; Africa

Conference Summary

Special Issue

This partial Special Issue of *Environmental Epigenetics* is entitled Environment, Epigenetics and Reproduction. The ability of environmental exposures such as toxicants, nutrition, or stress to influence reproduction and adult-onset disease is reviewed in three articles within Volume 3, Special Issue 3 and one that will appear in Issue 4. The papers in Volume 3, Issue 3 include “Exposure to phthalate esters induces an autophagic response in male germ cells, Paula Valenzuela-Leon and Ina Dobrinski”; “Generational comparisons (F1 versus F3) of vinclozolin induced epigenetic transgenerational inheritance of sperm differential DNA methylation regions (epimutations) using MeDIP-Seq, Daniel Beck, Ingrid Sadler-Riggelman and Michael K. Skinner”; “An overview of a Sertoli cell transplantation model to study testis morphogenesis and the role of Sertoli cells in immune privilege, Gurvinder Kaur, Scott Vadala and Jannette M. Dufour.” The paper in Volume 3, Issue 4 is “Epigenetic impact of endocrine disrupting chemicals on lipid homeostasis and atherosclerosis: a pregnane X receptor-centric view, Robert Helsley and Changcheng Zhou.”

Generally, environmental exposures do not have the ability to promote mutations in DNA sequence, suggesting additional molecular mechanisms such as epigenetics need to be considered. Environmental exposures have been shown to influence

epigenetic processes such as DNA methylation, histone modifications, chromatin structure or non-coding RNA. Therefore, environmental epigenetics provides a molecular mechanism for how the environment can influence biology. The articles and review included in this partial Special Issue provide insights into the molecular and physiological aspects of how environmental factors influence reproduction and related adult disease.

African Conference

The origin of this partial Special Issue comes from an Africa conference entitled, “Environment, Epigenetics, and Reproduction” held in October 2016 in Kenya, which is the third African conference on the topic with the first held in March 2011. This conference was hosted by the African Biomedical Center in Nairobi, Kenya, and involved conference sites at the Karen Blixen Coffee Garden and Cottages in Nairobi, the Kilaguni Serena Lodge near Mt. Kenya, and Island Camp on Lake Baringo. The host was Dr Bonnie Dunbar who was a Professor at Baylor University who did the pioneering work on the oocyte zone pelucida but moved to Kenya years ago and owns the Karen Blixen Coffee Garden and Cottages and Lake Baringo Island Camp Resort. Ms Anjali Devani with Travel Wild, Nairobi, arranged the conference logistics in Kenya. Several of the participants have provided the review and articles for this Special Issue. A photograph of the

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Figure 1: 2016 African conference group. Jannette Dufour, Isabelle Mansuy, Ina Dobrinski, Bruce Blumberg, John McCarrey, Michael K. Skinner, Changcheng Zhou, and Coby Dufour

participants of the conference is shown in Fig. 1. The cover art photographs on this Special Issue were taken by the participants in Kenya during the meeting.

Summary

World wide environmental exposures have significant biological impacts and influence disease for both humans and wildlife. Reproduction is often one of the first physiological

systems affected. Therefore, it is critical to understand how the environment, through molecular mechanisms such as epigenetics, can influence reproductive disease and processes. Several articles in the current Special Issue provide a molecular to physiological level understanding of how the environment can impact reproduction which can be used in the future for novel preventative and therapeutic strategies to improve wildlife and human health and reduce disease.