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Preface

Environment, Epigenetics and Reproduction

1. Special issue

This Special Issue of *Molecular and Cellular Endocrinology* is entitled "Environment, Epigenetics and Reproduction." The ability of environmental exposures such as toxicants, nutrition or stress to influence reproduction and adult onset disease will be reviewed in this Special Issue. 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. Epigenetics is defined as "molecular factors/processes around DNA that regulate genome activity independent of DNA sequence, and these processes are mitotically stable". 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.

A variety of species are considered from fish to humans. The reproductive organs and processes reviewed include the testis, ovary, mammary gland, uterus, reproductive tracts and embryo. The abnormal physiologies include endocrine defects, cancer, uterine defects, lactation defects, reproductive tract defects, and infertility. The articles and reviews included in this Special Issue provide insights into the molecular and physiological aspects of how environmental factors influence reproduction and related adult disease.

2. African conference

The origins of this Special Issue come from an African conference entitled, "Reproduction and the Environment" held August, 2013 in Kenya, which is the second 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 Amboseli Serena Lodge near Mt. Kilimanjaro, the Ashnil Mara Lodge in the Maasai National Reserve, 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 zona pellucida, 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. Many of the participants have provided the reviews and articles for this Special Issue. The meeting occurred during the great African migration and a photograph of the participants of the conference is shown in Fig. 1. Dr. Bonnie Dunbar provided the Special Issue cover art photograph of the great migration in Southern Kenya.

3. Summary

Worldwide environmental exposures have significant biological impacts and influence disease for both humans and wildlife. Reproduction is often one of the first physiological systems affected, and a number of reproductive processes are shown in Fig. 2. Therefore, it is critical to understand how the environment, through molecular mechanisms such as epigenetics, can influence reproductive disease and processes. Insights into these mechanisms will lead to potential novel therapies; however, a reduction of these harmful environmental exposures is required in the future. The 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.

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Fig. 1. Evening Sundowner for 2013 African Conference Group.

Fig. 2. Animal Reproduction. Photographers: Anjali Devani, Bonnie Dunbar, Lee Perks, Frederick vomSaal, Grant Vandenberg.