PHYSIOLOGY AND ENDOCRINOLOGY SYMPOSIUM: Reproductive success in ruminants: A complex interaction among endocrine, metabolic, and environmental factors

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The Physiology and Endocrinology Symposium titled “Reproductive Success in Ruminants: A Complex Interaction Between Endocrine, Metabolic and Environmental Factors” was held at the Joint Annual Meeting of the American Dairy Science Association and American Society of Animal Science (ASAS) from July 20 to 24, 2014, in Kansas City, MO. The symposium was organized by the Physiology and Endocrinology Committee, which included Gregory Bedecarrats (University of Guelph, Ontario, Canada), Lance H. Baumgard (Iowa State University, Ames), Russell Hovey (University of California, Davis), G. Cliff Lamb (University of Florida, Marianna), José E. P. Santos (University of Florida, Gainesville), Brian K. Whitlock (University of Tennessee, Knoxville), and Kyle C. Caires (Berry College, Mount Berry, GA). The purpose of the symposium was to discuss new findings regarding mechanisms by which extrinsic and intrinsic factors can alter various aspects of endocrinology, metabolism, immunology, and physiology, each with important ramifications for reproductive success in a variety of ruminant models. Five outstanding scientists were selected by the symposium committee because they were each recognized as being exceptional speakers and leading experts in their respective fields. The symposium’s presentations included the ASAS–European Federation of Animal Science (EAAP) exchange presentation. In addition, 1 presentation was selected from among the standard submission of abstracts submitted by speakers who received an American Dairy Science Association–EAAP Travel Award.

The first presentation of the symposium, titled “Recent advances in the hypothalamic control of reproduction,” was presented by Iain Clarke (Monash University, Clayton, Victoria, Australia). Reproduction cyclicity is driven by GnRH, and recent evidence indicates that kisspeptin neurons are most likely orchestrating the pulsatile secretion of GnRH in response to a variety of intrinsic and extrinsic factors (Clarke, 2014a). Whole-animal and cellular experiments conducted by Clarke’s laboratory significantly improved our understanding of the mechanisms by which leptin and other reproductive neuropeptides, such as neurokinin B and dynorphin, regulate reproductive cyclicity in the ewe in response to changes in metabolic status, lactation, and seasonality (Jacobi et al., 2013; Clarke, 2014b). Special emphasis was placed on understanding the dual role gonadotropin inhibitory hormone plays as a suppressor of reproductive function and as an appetite stimulant in neuropeptide Y neurons. Extensive in vivo and in vitro experimentation helped define novel relationships between metabolic circuits and reproductive circuits in the hypothalamus and, in doing so, highlight new signal transduction pathways important for the control of gonadotropin secretion in ruminants.

The second speaker of the symposium was T. Welsh Jr. (Texas A&M University, College Station), who discussed the “Influence of stress on male reproductive physiology” (Welsh et al., 2014). It is known that environmental, psychological, and physiological stressors are associated with decreased fertility in domestic livestock species and humans. Recent work presented by the speaker demonstrated how stress hor-