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Heiko T. Jansen, Christopher Cutter, Steven Hardy, Michael N. Lehman, and Robert L. Goodman. August 2003. Seasonal Plasticity within the Gonadotropin Releasing Hormone (GnRH) System of the Ewe: Changes in Identified GnRH Inputs and Glial Association.

Endocrinology 144(8):3663-3676.



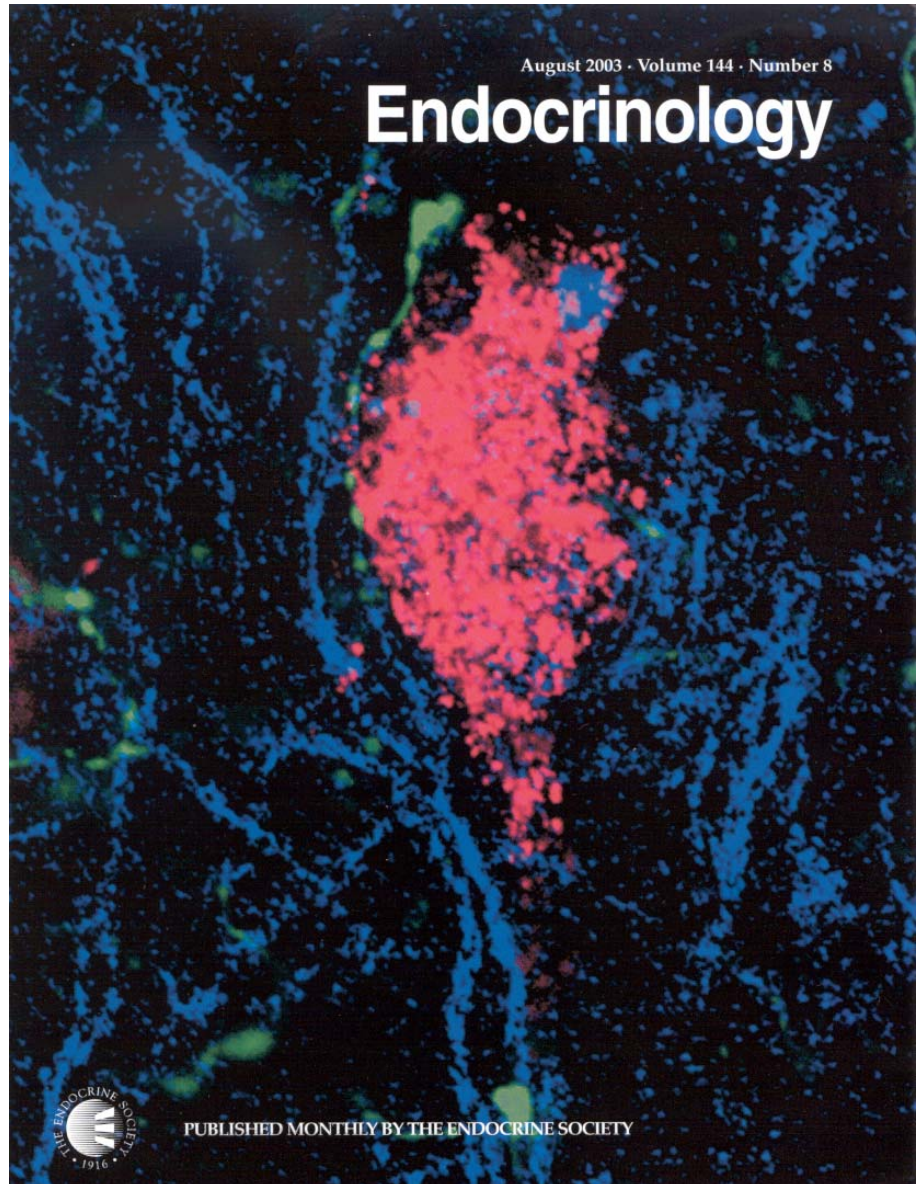
Sheep, like many mammals living in temperate climates, have evolved a reproductive strategy to restrict

periods of mating and birth to particular times of the year in order to ensure the survival of offspring. While several factors may influence the absolute timing of onset and cessation of breeding activity, the annual change in daylength represents the most important environmental signal. How environmental signals (e.g., photoperiod) affect reproduction is still not completely understood; however, a small group of neurons in the brain producing the neurohormone, GnRH, ultimately determine whether reproduction is to occur. The regulation of GnRH release from the brain likely involves, to a varying degree, information relayed from distal populations of neurons via axonal projections. The nature of these projections (inputs) and whether they vary seasonally was addressed in the present study. Furthermore, another class of cells within the brain, glia, were also examined. The results reveal that specific neural inputs vary seasonally and also provide compelling evidence that glial cells, which outnumber neurons by a factor of 10, also are actively involved in regulating the GnRH neuron seasonally. Thus, the emerging picture of the brain of a model seasonal breeder such as the sheep, is one of changing synaptic interactions and glial associations ultimately shaping the annual reproductive cycle. Because the reproductive cycle is an all-or-none phenomenon, understanding these neural mechanisms can yield important information to aid in the future development of techniques to modulate reproduction.

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