

## Induction of Superovulation in South American Camelids

Marcelo H Ratto<sup>1</sup>, Wilfredo Huanca<sup>2</sup>, Teodosio Huanca<sup>3</sup>, Gregg P Adams<sup>4</sup>

<sup>1</sup>Department of Animal Science, Universidad Austral de Chile, Valdivia, Chile; <sup>2</sup>Laboratory of Animal Reproduction, Universidad Nacional Mayor de San Marcos, Lima, Peru; <sup>3</sup>Inia Huancayo, Peru; <sup>4</sup>Department of Veterinary Biomedical Science, University of Saskatchewan, Saskatoon, Canada

The development of Assisted Reproductive Technologies in South American Camelids is considerably behind to that in other livestock species. Relatively poor results have tempered initial enthusiasm for the application of embryo transfer in llamas and alpacas during the 1990s. Successful application of the technique has been hampered by the lack of effective superstimulatory treatment protocols, low embryo recovery rate, and the recovery of hatched blastocysts which are less able to survive the cryopreservation process and further commercialization. Ovarian superstimulation has been attempted using equine chorionic gonadotropin (eCG) and follicle stimulating hormone (FSH) during the luteal phase (induced by eliciting ovulation, or by progesterone treatment), the sexually receptive phase, or at the time of follicular wave emergence regardless of a natural or induced luteal phase. The need to induce a luteal phase prior to or during superstimulation in camelids is not clearly understood, but it may simply reflect an empirical bias to conventional methods used in other ruminants.

Superstimulatory protocols that are combined with control of ovarian follicular wave development have resulted in a more consistent ovarian response and a large number of follicles available for follicular puncture and oocyte collection. However, when these treatments are used for superovulation and embryo collection, embryo recovery rates are apparently low, perhaps due to failures in ovulation, *in vivo* fertilization, or gamete transport. The number of ovulations or CL varies widely among studies, ranging from 2 to more than 15 per animal, and the number of transferable embryos ranges from 0 to 4 per animal. Much of the variation may be attributed to the follicular status at the time superstimulation treatments are initiated. More studies are needed to determine if follicular dominance will suppress the superstimulatory response in llamas and alpacas as it does in cattle. However, recent studies in llamas have demonstrated that the use of an intravaginal progesterone-releasing device, LH administration, or follicle ablation can synchronize follicular wave emergence, thus enabling the start of gonadotrophin treatment in the absence of a dominant follicle, resulting in a more consistent ovulatory response. Few studies have compared the response and success of superovulation and embryo collection in alpacas vs llamas. Field studies conducted in alpacas in our laboratory indicate that not only is the ovarian response more variable than that observed in llamas, but it is lower and there are more non-responders. The objective of this review is to describe the different superstimulation protocols that have been conducted in llamas and alpacas in the last 15 years, and to discuss and analyze potential protocols that allow initiation of gonadotrophin treatment at specific stages of follicular growth.