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RECENT PROGRESS IN THERIOGENOLOGY —WITH AN EMPHASIS ON THE HORMONES INVOLVED—

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Science technologies have rapidly progressed in recent years. The same situation holds true also in theriogenology research, and the aspect of artificial control of reproductive phenomena has been remarkably developed in areas such as embryo transfer, embryonic manipulation, nuclear transplantation, and production of cloned and transgenic animals. The progress in research of endocrinology is no exception, the general idea of hormones, in which only chemical messengers with endocrine actions were formerly handled as hormones, has been so markedly expanded in scope by development of molecular biology as well as its related sciences, and the chemical messengers with paracrine or autocrine actions also have become recognized as hormones. Consequently, as for the manifestation of the reproductive functions, various kinds of neurotransmitters and immunity-related substances such as cytokines are now being considered as new hormones in addition to the former classic hormones. Furthermore, with regard to the mode of hormonal secretion, the realities of pulsatile secretion have been revealed ; also thanks to the progress made in the study of receptors, the pulse therapy is likely to be introduced into the hormone treatment. Moreover, the discovery of new hormonal substances, inhibin and activin, made it clear that there exists another, quite different control-regulation relationship within the formerly known control-regulation mechanism of the hypothalamo-hypophysial-gonadal axis, and also the study on clinical application of these hormone antibodies is in progress. Besides, the problems concerning the samples of follicle stimulating hormone (FSH), which are presently applied widely for treatment of superovulation in embryo transfer, have been examined. As a result, production of the pure FSH without contamination of luteinizing hormone (LH) is now desirable. The FSH and LH of gonadotropins are produced and secreted by the anterior pituitary ; both are protein hormones, and so similar in chemical nature to each other that there is difficulty in separating completely both hormones by extraction and purification. In this situation, if the recombinant DNA technique is employed for manifestation of only the gene for a particular hormone, there is a possibility that this hormone can be mass-produced. Thus, recombinant porcine FSH has been produced in insect cells by the researches so far undertaken, using baculoviruses as vectors and then its biological activity has

been examined. These results indicate that the FSH thus produced has its biological activity while showing no biological activity of LH. It reveals the secretory activity of progesterone by acting on porcine granulosa cells *in vitro*, and furthermore that it promots germinal vesicle breakdown in porcine embryos *in vitro*. In addition to that, by means of ultrasonography whose performance has been improved in recent years, the movements of follicular waves have been revealed in the ovaries of luteal phase in cows, and the technique for oocyte aspiration through vaginal walls is now being developed.

This lecture gives an outline of ongoing researches on theriogenology, mainly focused on hormonal research.

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