Retrograde transfer of $^{125}$I-radiolabelled activin and inhibin in the periovarian vascular complex in the sow

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Abstract

This study investigated whether activin A and an inhibin-α subunit fragment (INHα) could permeate in a periovarian vascular complex from ovarian effluent into the ovarian artery and be retrograde transferred into the ovary. Radiolabelled activin A ($^{125}$I-activin A) and INHα ($^{125}$I-INHα) were injected (2.7×10⁷ dpm) into follicles or corpora lutea (CL). It was demonstrated that $^{125}$I-activin A and $^{125}$I-INHα were released into the ovarian effluent and permeated into the arterial blood supplying the ovary in both phases of the cycle. The concentration of $^{125}$I-activin A in ovarian arterial blood was higher in the luteal phase (LP) than in the follicular phase (FP) ($P<0.0001$) in contrast to $^{125}$I-INHα which was higher in the FP ($P<0.0001$). The concentration of $^{125}$I-activin A in uterine tissues generally did not differ between the phases of the estrous cycle, but the concentration of $^{125}$I-INHα was higher ($P<0.05$) in the LP than in the FP. The concentration of $^{125}$I-activin A was higher in the LP in samples of endometrium and myometrium ($P<0.05$), as well as mesometrium ($P<0.01$), and higher in the FP in samples of mesometrium ($P<0.05$) close to the ovary than in the samples adjoining the uterine body. In the FP, the concentration of $^{125}$I-INHα was higher in endometrium and mesometrium close to the ovary than in samples adjoining the uterine body ($P<0.05$). In conclusion, the study demonstrated that it was possible for INHα and activin A to be retrograde transferred to the ovary. Thus this transfer could elevate their concentration in arterial blood supplied to the ovarian follicles or CL and may influence production of these peptides in the ovary, modulating ovarian function.

Key words: retrograde transfer, ovary, activins, inhibins, gilts

Introduction

Intraovarian local regulatory effects of activins and inhibins have been studied extensively in many species and are well documented (Knight and Glister 2003). Activins and inhibins act as auto- and paracrine regulators of follicle development (Mihm and Austin 2002), oocyte maturation, atresia, and CL formation (Knight and Glister 2001, Kaneko et al. 2003, Phillips 2005). In the porcine ovary, the concentration of mRNA of inhibin/activin α and β subunits and immunoreactivity of inhibin was found to change during follicles development (Guthrie et al. 1992) and a relationship between the concentration of inhibin and