

Enhanced FSH Stimulation Promotes LH-Receptor Expression in Granulosa Cells and Modulates Progesterone Production at Oocyte Retrieval

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Introduction:

Gonadotropins are required to achieve multifollicular growth in ovarian stimulation. Approximately 40% of stimulation cycles are characterized by elevated progesterone (eP4) towards the end of the follicular phase. It is assumed that FSH, used for ovarian stimulation, affects regulation of P4 via FSH-induced LH-receptor-expression in the GCs of the growing follicle. The enhanced follicle sensitivity towards LH by an increase of LH-receptors results in increased P4-secretion.

Study question:

Do increased gonadotropin doses used for ovarian stimulation result in an increase of LH- receptors on granulosa cells and a rise in progesterone levels?

Materials and methods:

Prospective interventional study, including 6 healthy volunteers with a normal ovarian reserve, undergoing two ovarian stimulation (OS) cycles (150IU / 300IU) for oocyte cryopreservation.

In each stimulation cycle follicular fluid (FF) and GC were collected from 1 follicle, at follicle-sizes (FS) of 14-16mm / 17mm / before the trigger and at OPU. Evaluation of LHR gene expression levels was achieved by relative quantification RT-PCR analysis.

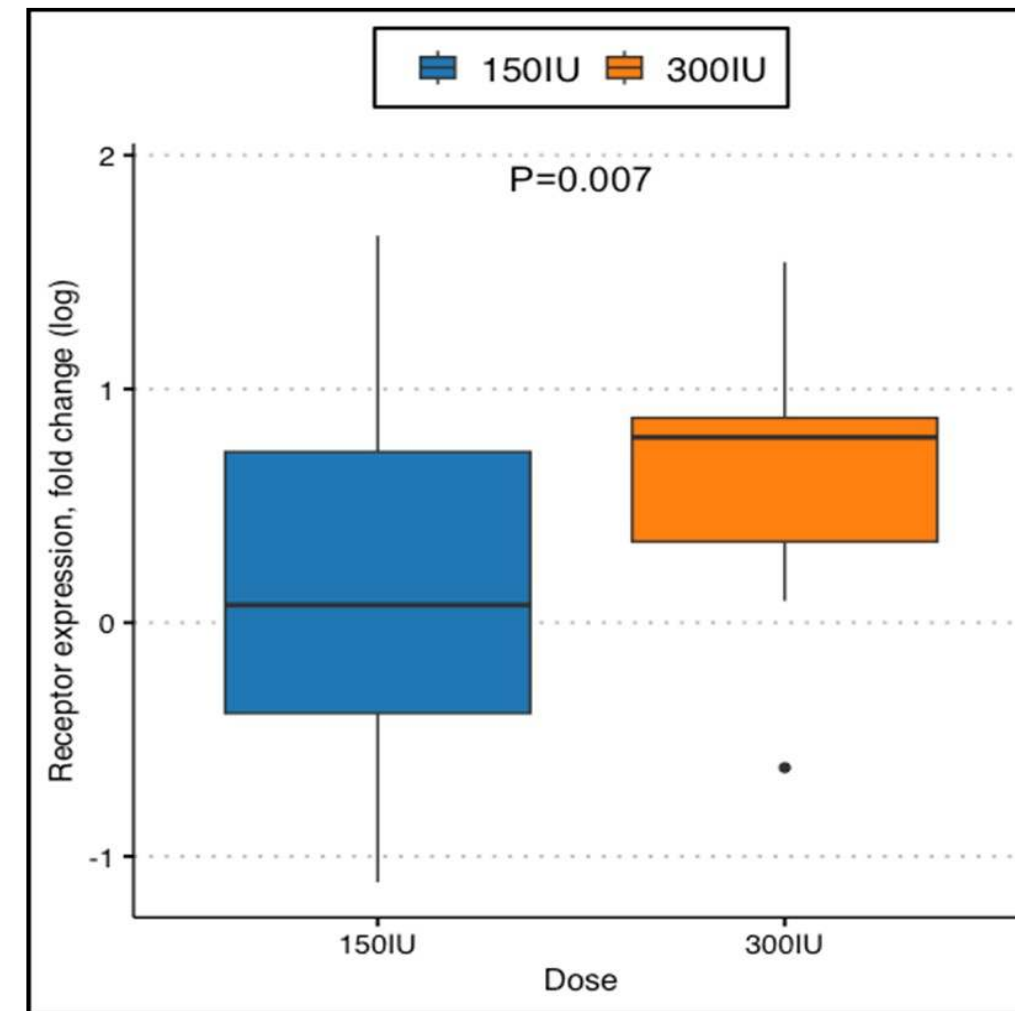


Figure 1: Figure Receptor expression in 150IU and 300IU groups.

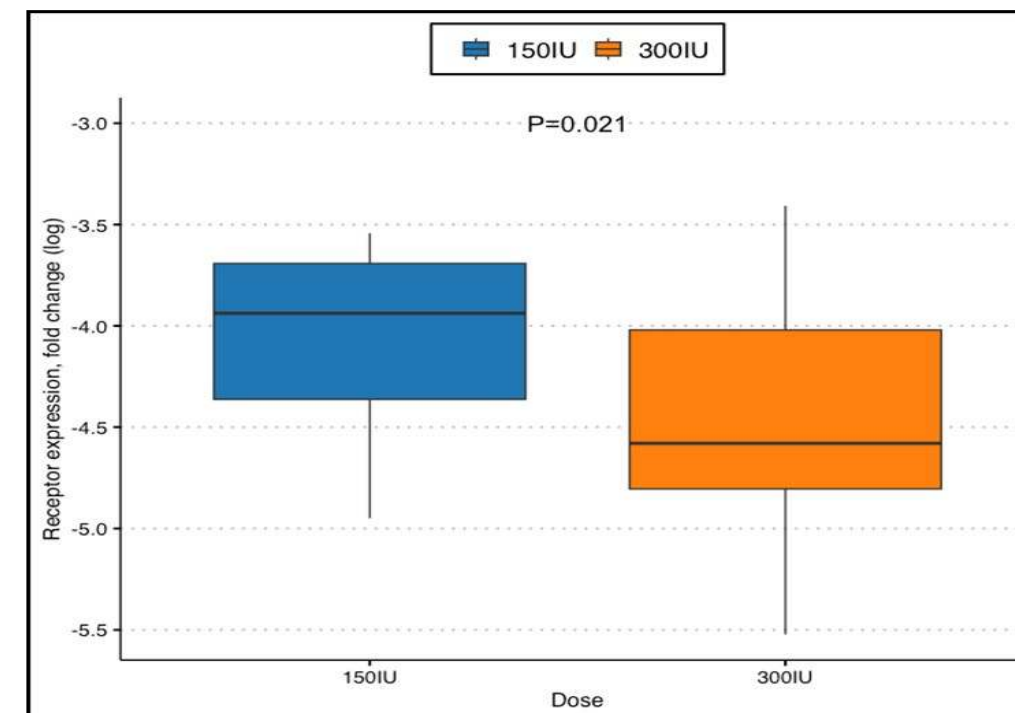


Figure 2: Receptor expression (fold change, log) in 150IU and 300IU groups.

Main results:

The LH-receptor-expression was significantly higher in the 300IUOS-group compared to the 150IUOS group. P4-levels on the day of oocyte-pick-up are significantly associated with LH-receptor levels after adjusting for the FSH-dose (p=0.011).

Table 1: Stimulation outcomes

label	levels	Gn 150 IU	Gn 300 IU
AFC (n)	Median (IQR)	13.5 (12 to 14)	13 (12 to 15)
Stimulation dosage (IU)	Median (IQR)	1650 (1350 to 1800)	3150 (3000 to 3300)
Stimulation days (n)	Median (IQR)	10.5 (9 to 12)	10.5 (10 to 11)
COC (n)	Median (IQR)	11.5 (10 to 14)	12.5 (7 to 15)
MII (n)	Median (IQR)	10.5 (7 - 12)	10 (6 to 12)

Conclusion:

Higher gonadotropin doses significantly increase LH-receptors in granulosa cells (GC), and progesterone-levels (P4) are