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Effects of recombinant human LH and hCG on serum and urine LH and androgens in men.

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CONTEXT:
The administration of gonadotrophins is prohibited in sport but the effect in men of recently available recombinant hCG and LH on serum and urine concentrations of gonadotrophins and androgens has not been systematically evaluated in the antidoping context.

OBJECTIVE:
To determine the time-course of recombinant LH (rhLH) and hCG (rhCG) on blood and urine hormone profiles in men to develop effective tests to detect rhLH and rhCG doping.

DESIGN:
Two randomized controlled studies with a 2 x 2 factorial design.

SETTING:
Academic research centre.

PARTICIPANTS:
Healthy male volunteers aged 18-45 years.

INTERVENTIONS:
In the rhLH study, men were randomized into (i) either of two single doses of rhLH (75 IU or 225 IU), and (ii) suppression of endogenous LH and testosterone by nandrolone or no suppression. In the rhCG study, men were randomized into (i) either of two single doses of rhCG (250 or 750 microg), and (ii) suppression of endogenous LH and testosterone by nandrolone decanoate (ND) or no suppression. ND suppression comprised a single dose of 200 mg ND 3 days prior to, and in the rhCG study an additional dose 1 day after gonadotrophin injection.

MAIN OUTCOME MEASURES:
Serum and urine hCG, LH, T, T : LH ratio, urine epitestosterone (E) and urine T : E ratio.

RESULTS:
Neither rhLH dose produced a significant increase in serum or urine LH or T or in the T : E or T : LH ratios regardless of ND-induced suppression of endogenous LH and T. Nor did an even higher dose (750 IU) in three healthy men with unsuppressed gonadal axis. These findings were confirmed with two different commercial LH immunoassays together with adjustment for any influence of urine sediment and dilution. Both rhCG doses produced a steep, dose-proportional increase in serum and urine hCG with increases in serum and urine T and suppression of serum and urine LH, regardless of hCG dose. Serum but not urine T was lowered by ND suppression. The T : LH ratio showed a progressive increase unrelated to rhCG dose or ND suppression, whereas both rhCG and ND suppression minimally increased T : E ratio.

CONCLUSIONS:
Both rhCG doses produce a striking increase in serum hCG and T with suppression of serum LH but, at single doses up to 750 IU, rhLH has no influence on serum or urine LH or T. Effective rhLH doping, which relies on a sustained increases in endogenous T, would

require much higher and more frequent daily rhLH doses. Use of LH immunoassays optimized for serum to detect rhLH doping by urine LH measurement requires more standardization and validation and, at present, is unreliable. The T : LH ratio is, however, a useful screening test for hCG doping although its utility requires further evaluation.

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