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## JOURNAL ARTICLE

# Intracellular calcium accumulation and responsiveness to progesterone in capacitating human spermatozoa

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Progesterone induced a rapid, long-lasting, dose-dependent increase of intracellular free calcium concentration ( $[Ca^{2+}]_i$ ) in human sperm capacitated overnight. This effect was not counteracted by the cytosolic progesterone receptor antagonist RU486 (1  $\mu\text{mol/L}$ ) nor by the GABA-A receptor antagonists bicuculline (10  $\mu\text{mol/L}$ ) and picrotoxin (50  $\mu\text{mol/L}$ ). Also, the rank order of potency of several progestative steroids on  $[Ca^{2+}]_i$  differed from that previously reported for uterine intracellular progesterone receptor or for P-GABA interaction in the central nervous system, indicating a different pathway for progesterone stimulation of human sperm. Modifications of basal and progesterone-stimulated  $[Ca^{2+}]_i$  during sperm capacitation were also studied. A progressive, parallel increase of basal and progesterone-stimulated  $[Ca^{2+}]_i$  in capacitating spermatozoa was found. In particular, progesterone-stimulated  $[Ca^{2+}]_i$  increased from a basal concentration of 147%  $\pm$  17% at 10 minutes to 327%  $\pm$  65% after 120 minutes of incubation in capacitating medium. This increase was well correlated with basal  $[Ca^{2+}]_i$  ( $r = 0.93$ ). In contrast, basal and progesterone-stimulated  $[Ca^{2+}]_i$  concentrations were constantly low in spermatozoa incubated in noncapacitating medium. In capacitated spermatozoa, initial responsiveness to progesterone and basal  $[Ca^{2+}]_i$  was higher than in capacitating and noncapacitated samples, and remained constant throughout the duration of the experiment. The progressive, parallel increase of  $[Ca^{2+}]_i$  and response to progesterone observed during *in vitro* capacitation of human spermatozoa might be physiologically relevant *in vivo* during capacitation of sperm in the female genital tract.

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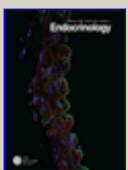
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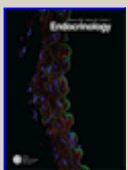
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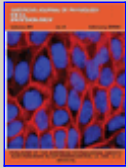
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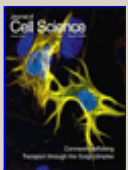
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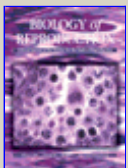
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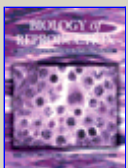
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