

Effect of Ulipristal acetate on sperm capacitation and acrosomal reaction in human spermatozoa.

M.J. Munuce, C. Zumoffen, J. Cicaré, A. Caille, S. Ghersevich, L. Bahamondes
University of Campinas, Campinas, SP, Brazil

Objectives: Ulipristal acetate (UPA) is a selective progesterone receptor modulator launched recently as emergency contraception (EC). Progesterone (P) regulates gamete transport, fertilization and pregnancy maintenance. Considering that spermatozoa could be exposed to UPA in the female genital tract during pill intake, we aimed to evaluate sperm function after incubation with UPA.

Materials and Methods: Motile spermatozoa from 11 donors were selected by swim-up and incubated at 10×10^6 spermatozoa/mL in Ham F10 + 5 mg/mL BSA for 22 h at 37°C and 5% CO₂ in the presence of UPA (dissolved in ethanol): 1, 10, 100, 1,000, and 10,000ng/mL or control medium. We assessed sperm viability (Eosin Y), tyrosine phosphorylation (TyrP; Western Blot and antiphosphotyrosine antibody), spontaneous acrosomal reaction (AR) and the 20% v/v human follicular fluid (hFF)-induced AR (Pisum sativum technique). Additionally, we calculated the induced population: [IP]=% induced AR - % basal AR. Data are expressed as mean \pm SEM. Significance was established as $p < 0.05$.

Results: UPA had no significant effect on sperm viability (>88% viable cells), on TyrP pattern, or on AR at all concentrations assayed when compared to controls. The ranges of spontaneous AR at all UPA concentrations analyzed [14.0 \pm 1.5% to 18.0 \pm 1.9%] were statistically similar to the range in control medium [15.0 \pm 2.0%]. Furthermore, the presence of UPA did not prevent occurrence of the hFF-induced AR; IP values were statistically similar between all UPA concentrations and control: 23.0 \pm 2.7% (1ng/mL); 23.0 \pm 2.6% (10ng/mL); 28.0 \pm 4.2% (100ng/mL); 23.0 \pm 4.5% (1,000ng/mL); 16.0 \pm 2.4% (10,000ng/mL), and 24.0 \pm 3.6% (control medium).

Conclusion: Sperm incubation at a range of UPA concentrations around the expected plasma levels after EC pill intake (~100ng/mL) did not modify the signal transduction of TyrP involved in sperm capacitation. Moreover, UPA showed no agonist effect on P receptors, because it did not induce AR. Considering that P in hFF is known to be essential for AR induction, and UPA did not prevent the hFF-induced AR, an antagonist action of UPA on AR is unlikely. Our data suggests that, in contrast with the genomic receptor, UPA has low specificity/activity for the non-genomic spermatozoa receptor at the range of doses evaluated. The data suggest that UPA has no effect on sperm capacitation nor on AR and therefore, its mechanism of action for EC is unrelated to these sperm functions.