Endocannabinoid Signaling in Reproduction and Fertility

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Localization of endocannabinoid system (ECS) elements in the human sperm cell.
Subcellular localization of CB1-R in human ejaculated spermatozoa

Subcellular localization of CB1-R in human ejaculated spermatozoa

Sagital section of the mid-piece and the tail (a)

Transverse section of the mid-piece (d-e)

control sections incubated without the primary Ab (b,c,f)
Δ9-Tetrahydrocannabinol (Δ9-THC) attenuates mouse sperm motility and male fecundity

Basal and bicarbonate-stimulated motility is inhibited by Δ9-THC. (A) Treatment with 1 μM Δ9-THC or 10 μM Δ9-THC for 15 min progressively reduced the percentage of motile sperm. (n= 111–138 cells). At least eight cells were examined from each animal in two to three independent experiments. #P < 0.05 (untreated vs. 1 μM THC), *P < 0.05 (untreated vs. 10 μM THC).
Effect of Meth-AEA and THC on sperm motility.

Motile fractions of human spermatozoa isolated by direct swim-up were incubated with Meth-AEA (1 mM) or without (0.2% DMSO in BWW medium) for up to 90 min (A).

Removal of Meth-AEA reverses the inhibitory effect on sperm motility (B).

Effect of MET-F-AEA on sperm viability, Acrosin activity and...
Effects of meth-AEA on human sperm motility and viability.

AM251 reverses the AEA effect on Motility and Viability

CB1 receptor blockade by rimonabant influences sperm parameters

Rimonabant positively affects sperm motility and viability. Rimonabant positively affects sperm Acrosin activity.

Rim = Rimonabant
URB = FAAH inhibitor URB597

LIF and AEA levels are essential for successful pregnancy.
THC and control of hormonal cycle

Cannabinoids in Blastocyst migration and implantation

Exposure to high concentrations of Δ⁹-THC or anandamide will arrest the development of the blastocyst.

Adequate levels of CB₁R expression are required in the Fallopian tube to allow passage of the embryo into the uterus and prevent ectopic implantation. Implantation can only occur in areas that express low CB₁R and AEA.

Cannabinoid signaling impacts various pregnancy events.
AEA levels through the menstrual cycle and gestation.