The role of the novel sex steroid membrane receptor mPRε on metabolic homeostasis.

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Progesterone is a sex steroid hormone synthesized by the ovary, and plays a pivotal role for reproductive functions such as ovulation and the maintenance of pregnancy. Although these effects of progesterone have been implicated in nuclear progesterone receptors (PRs)-mediated classical signaling pathway, key pathways involved in non-classical progesterone signaling has been provided by the identification of membrane progesterone receptors (mPRα, mPRβ, mPRγ, mPRδ, and mPRε). Interestingly, mPRs may have been related to progesterone-mediated unknown rapid non-genomic action that cannot be currently explained by their genomic action through PRs. However, the structure, intracellular signaling, and physiological functions of these progesterone receptors are still unclear. In this study, we confirmed that mPRε, among mPRs receptors, is specifically expressed in the white adipose tissue (WAT), liver, and kidney of adult male and female mice. Furthermore, progesterone- mPRε signaling may contribute to suppression of glucose uptake and impair glucose tolerance in WAT. These findings provide new insights of regarding the non-genomic action of progesterone in metabolic homeostasis and novel therapeutic targets and strategies for metabolic disorder such as obesity and type 2 diabetes mellitus.