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Regulation of PKC-induced COX-2 expression by sex steroid hormones in rat granulosa cells

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Sex steroid hormones regulate multiple female reproductive functions. Cyclooxygenase-2 (COX-2) is an inflammation-associated enzyme to regulate prostaglandin production. Previous studies demonstrated that COX-2-deficient mice failed to ovulate suggesting a vital role of COX-2 in ovulation. Sex steroid hormones were reported to modulate COX-2 expression: Dihydrotestosterone (DHT) was able to inhibit interlukin-1β-induced COX-2 expression in vascular smooth muscle cells while estradiol (E2) was able to promote COX-2 expression in the rat oviduct. In the ovary, the significance and the involving mechanisms of androgens and estrogens in COX-2 regulation remain mostly unclear. The aim of this study was to clarify whether and how sex steroid hormones affect COX-2 expression in rat ovarian granulosa cells. Previous studies suggested that PKC could be activated by FSH or LH in follicular granulosa cells leading to inflammatory-like consequences. Thus, a PKC activator PDD (phorbol-12, 13-didecanoate) was used in this study. It was noted that DHT appeared to attenuate PDD-induced COX-2 protein, mRNA expression and promoter activity; However, E2 was able to enhance PDD induced COX-2 protein, mRNA expression and promoter activity. In addition, the PDD-mediated PGE2 production was also impacted by DHT and E2. The PDD-mediated COX-2 expression was inhibited by parthenolide (NF-κB inhibitor) but was enhanced by SP600125 (JNK inhibitor) or wortmannin (PI3K inhibitor). Thus, DHT and E2 may affect PKC-mediated inflammation in ovarian granulosa cells by acting through these signaling players.

Biography

Yuh-Lin Wu has completed his PhD training in the University of Wisconsin-Madison and the Postdoctoral studies in the University of North Carolina at Chapel Hill in USA. He is currently an Associate Professor at School of Medicine, National Yang-Ming University in Taipei, Taiwan. He has published more than 20 research articles in reputed journals and has been serving as reviewers of many professional journals.

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