The importance of estrogen cycles

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Oral contraceptives are implicated in slightly increasing breast cancer risk. This birth control method contains forms of estrogen, a hormone that binds ERalpha (estrogen receptor alpha), to alter the reproductive cycle. While much is known about estrogen signaling, few have researched how receptor homeostasis is maintained to ensure regular

cycling.

Deborah Lannigan, Ph.D., and colleagues discovered that RSK2, a potential tumor-suppressor protein, is integral for ERalpha levels when comparing reproductive tissues of wild-type and RSK2 knockout mice.

Further analysis by mammary gland staining showed that RSK2 maintains receptor homeostasis, and therefore regular cycling, by reducing oxidative stress. These findings were supported in a cohort of women using oral contraceptives, as they had lower levels of RSK2 than a control group.

In the journal *Cell Reports*, the researchers identified RSK2 as a key regulator of the estrogen receptor and suggested that its downregulation by contraceptive use can increase DNA damage, a common cause of cancer, via oxidative stress.

More information: Katarzyna A. Ludwik et al. RSK2 Maintains Adult Estrogen Homeostasis by Inhibiting ERK1/2-Mediated Degradation of Estrogen Receptor Alpha, *Cell Reports* (2020). DOI: 10.1016/j.celrep.2020.107931

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