



Biol Reprod. 2010 Sep;83(3):488-501. Epub 2010 Jun 10.

Developmental exposures of male rats to soy isoflavones impact Leydig cell differentiation.

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Source

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Abstract

Testicular Leydig cells, which are the predominant source of the male sex steroid hormone testosterone, express estrogen receptors (ESRs) and are subject to regulation by estrogen. Following ingestion, the two major isoflavones in soybeans, genistin and daidzin, are hydrolyzed by gut microflora to form genistein and daidzein, which have the capacity to bind ESRs and affect gene expression. Thus, the increasing use of soy-based products as nondairy sources of protein has raised concerns about the potential of these products to cause reproductive toxicity. In the present study, perinatal exposure of male rats to isoflavones induced proliferative activity in Leydig cells. Isoflavones have the capacity to act directly as mitogens in Leydig cells, because genistein treatment induced Leydig cell division in vitro. Genistein action regulating Leydig cell division involved ESRs, acting in concert with signaling molecules in the transduction pathway mediated by protein kinase B (AKT) and mitogen-activated protein kinase (MAPK). Enhanced proliferative activity in the prepubertal period increased Leydig cell numbers, which alleviated deficits in androgen biosynthesis and/or augmented serum and testicular testosterone concentrations in adulthood. Together, these observations indicate that the perinatal exposures of male rats to isoflavones affected Leydig cell differentiation, and they imply that including soy products in the diets of neonates has potential implications for testis function.

PMID: 20554919 [PubMed - indexed for MEDLINE]