

Effects of isoflavone exposure on the androgen sensitivity of male Wistar rats

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There is contradictory data about the consequences of isoflavone (ISO) exposure during development of male and female organisms. Potential impacts on tumor risk, reproduction but also altered susceptibility for metabolic diseases like obesity or diabetes are discussed. An important finding in studies with females was that estrogen sensitivity evidently is affected by lifelong ISO intake. The aim of this study was to investigate whether ISOs also impact on androgen responsiveness in males. Hence we conducted a dose response experiment in male rats starting exposure in utero, maintaining it through adolescence into adulthood. Until sacrifice at PND 96 rats received a diet enriched with an ISO extract in different concentrations [IDD (ISO depleted diet); IRD50 (ISO rich diet; 50 mg ISO/kg food); IRD400 (400 mg ISO/kg food)].

To investigate androgen sensitivity we conducted a Hershberger assay. Rats were orchietomized (ORX) at PND 80. After hormonal decline for 7 days, rats were treated with testosterone propionate [TP (1 mg/kg bw/day)] or vehicle for 10 days.

In ORX rats the treatment with TP generally resulted in an increase of weight of seminal vesicles, prostate and levator ani. Interestingly, rats exposed to ISO showed an increased stimulation of levator ani (by 25%) and seminal vesicle (by 12%) weight by TP if compared to rats grown up on IDD. In TP treated IRD rats bone density of the tibia was also significantly higher than in TP treated IDD animals. TP treatment in ORX IDD and IRD50 rats decreased visceral fat mass by 21%. IRD400 diet was able to reduce it equally without TP stimulation.

In summary, results of this study demonstrate, that exposure over all critical periods of development to ISO results in a decrease of visceral fat mass and prostate weight in ORX animals. Androgen sensitivity of tissues like muscle, seminal vesicles and bone but not prostate was affected by ISO exposure. Underlying molecular mechanisms have to be analyzed in future studies.