

## 070 – EFFECTS OF SOY ISOFLAVONES ON THE MAMMARY GLAND IN AN ANIMAL MODEL OF DIET INDUCED OBESITY

K. Oden<sup>1</sup>, T. Blei<sup>1</sup>, F. M. Kluxen<sup>1</sup>, D. Mueller<sup>1</sup>, M. Piechotta<sup>3</sup>, S. T. Soukup<sup>2</sup>, S. E. Kulling<sup>2</sup>, P. Diel<sup>1</sup>, A. Kurrat<sup>1</sup>

**Scope:** Obesity is an important risk factor for the development of breast cancer whereas isoflavone (ISO) exposure is discussed to reduce this risk. The aim of this study was to investigate the effects of dietary soy ISO intake on proliferation and progesterone receptor (PR) expression in the mammary gland of obese female Wistar rats. **Methods:** Female Wistar rats grew up on low fat ISO-depleted diet (LF IDD) or ISO-rich diet (LF IRD; ISO: 431 mg/kg diet). Starting postnatal day 83, ovariectomized (OVX) and intact animals received high fat diet in the absence (HF IDD) or presence of ISO (HF IRD, ISO: 467 mg/kg diet) for 12 weeks to induce obesity. A special diet switch group (HF IRD switch OVX), which grew up on LF IDD and switched to HF IRD after ovariectomy, mimics the short term exposure to ISO in postmenopausal Western women. Two intact control groups received LF diet either with or without ISO (LF IRD, LF IDD) lifelong. From ablactation until the end of the experiment body weight and food consumption were monitored twice a week. After 12 weeks of HF diet animals were sacrificed and body weight, visceral fat mass and serum leptin were measured and breast tissue was excised. Protein expression of proliferating cell nuclear antigen (PCNA) and PR in breast tissue was analyzed by both immunohistochemistry (IHC) and Western Blot.

**Results:** HF diet increased body weight, visceral fat mass and serum leptin levels. In the mammary gland the expression of the proliferation marker PCNA (IHC and Western Blot analyze) and PR (IHC) increased in HF groups compared to LF groups. Western Blot analyzes of PR confirm these results partially. Lifelong but not short term ISO exposure reduced body weight, visceral fat mass and leptin levels. In the mammary gland lifelong ISO exposure resulted in a reduced PCNA expression (IHC and Western Blot) in intact animals. In OVX animals lifelong ISO exposure increased PCNA expression (IHC) compared to short term ISO exposure and PR expression (IHC) increased in HF IRD OVX compared to HF IDD OVX.

**Conclusion:** Our results indicate that in female rats lifelong ISO intake results in a reduced risk to develop obesity. In the mammary gland lifelong ISO exposure decreases cell proliferation and increases the expression of PR, whereas effects of short term ISO exposure are less strong. This supports the hypothesis that lifelong ISO exposure

reduces the risk to develop breast cancer.

<sup>1</sup> Institute for Cardiovascular Research and Sports Medicine, Department of Molecular and Cellular Sports Medicine, German Sports University, Cologne, Germany

<sup>2</sup> Department of Safety and Quality of Fruit and Vegetables, Max Rubner-Institut, Karlsruhe, Germany

<sup>3</sup> Clinic for Cattle, Endocrinology, University of Veterinary Medicine, Hannover, Germany