Mycotoxins- products of metabolism of fungi, are present in our diet mainly with cereal products. According to recent research mycotoxins might modulate the hormonal balance and trigger disturbances in animals fertility. Moreover, mycotoxins are also reported to modulate viability of cancer cells. Zearalenone (ZEA) is one of the most common mycotoxins and due to its structural similarity to naturally occurring estrogens is considered as endocrine disruptor (EDC). European Food Safety Authority (EFSA) reported that approximately 83% of maize products are contaminated with ZEA. So far, no restriction and monitoring of metabolites of ZEA have been published by EFSA.

Our previous studies showed that ZEA might modulate viability of prostate cancer cells dependently on its concentration by induction of apoptosis or increase its metastatic potential. The results showed that α-zearalenol and β-zearalenol (α-ZOL and β-ZOL) which are products of metabolism of ZEA by hydroxylation with steroid hormonal dehydrogenase, might be more estrogenic that ZEA itself.

The aim of this project is to evaluate if α-ZOL and β-ZOL, similarly to ZEA, might modulate the prostate cancer cells metabolism via induction of oxidative stress and invasiveness of them. To evaluate this hypothesis we will conduct an *in vitro* study which will verify the hypothesis and molecular mechanism associated with estrogenic properties of α-ZOL and β-ZOL. Our previous results suggest that transcription factor FOXO3a, reported to be involved in basic cell processes like proliferation, cell cycle or apoptosis might be involved in molecular mechanism of α-ZOL and β-ZOL action in cells. To verify it during our project we will use the newest research technique to knock-down the expression of FOXO3a in cells (CRISPR/Cas9).

The results of this study will bring the new basic knowledge concerning the mechanism and impact of mycotoxins on human health and might serve as a beginning of the necessity of monitoring of the metabolites of mycotoxins. In the last years, the mortality of patients with prostate cancer has been decreasing, although unchangeably the incidence of prostate cancer is still increasing. In that case it seems crucial to understand the molecular mechanism of the potential impact of the active mycotoxins metabolites which might disturb the hormonal balance in men and partially thought it participate in prostate carcinogenesis.