

ABSTRACT

Scientific and professional achievements. After defending of PhD thesis (1998) I have extended the studies concerning the reactivity of skin and mucosae lymphoid tissue in other species of farm animals (ducks, pigs, cattle, horses) in different physiological and pathological circumstances. Some new research directions were developed, in histopathology, using immunohistochemistry and electronic microscopy for study of pathogenesis of some mycotoxicoses and protective potential of some natural antioxidants, also aiming the transfer of knowledge in human medicine, taking into account the actual concept *One Health- One Medicine*. Results of research have been published as articles in extenso in ISI indexed Journals with impact factor (11), ISI without impact factor (7), abstracts in international Congresses indexed ISI (8) and 162 papers in journals indexed in other international databases.

A study was conducted to evaluate the **nephrotoxic effect of ochratoxin A (OTA)** in broiler chickens. Macroscopically the kidneys were enlarged, showing degeneration and gout deposits. Histologically, glomerulonephrosis and tubulonephrosis were common lesions in all chicks. In two of the five chicks exposed to OTA, focal tubular cell proliferation, multiple adenoma-like structures and Bcl-2-positive epithelial cells were identified in layers of the renal papilla and in convoluted tubules. The nephrotoxic effect of ochratoxinosis in chickens is probably due to carcinogenic changes induced in the epithelial tissues (Solcan et al., 2013). Transmission electron microscopy of the proximal convoluted tubules identified abnormal forms of mitochondria.

A case of renal **myelolipoma** and amyloidosis associated with osseous metaplasia was described in one of OTA intoxicated broiler chickens. Histological examination of the kidney revealed a proliferation of mature adipocytes, accumulation of numerous myelocytes, erythroblasts, eosinophilic myelocytes and heterophils, delimited by an osseous tissue surrounded by renal parenchyma. A similar ectopic metaplastic tissue was observed in the lungs. Additionally, in kidneys, skin and liver an amorphous deposit of amyloid was observed (Solcan et al., 2015).

The **immunotoxic effect** of ochratoxin A on intestinal mucosa lymphoid tissue and cytotoxic action on intestinal epithelium in the experimentally intoxicated broilers were studied. OTA toxicity caused the decrease of leucocytes, lymphocytes and altered intestinal mucosa architecture. After 14 days of exposure to ochratoxin A, the immunohistochemistry showed a significant reduction of the lymphocyte population in the intestinal epithelium and in the *lamina propria*. After 28 days of exposure, an increase of the CD4+ and CD8+ values in both duodenum and jejunum of chickens from experimental groups was observed, but TCR1 and TCR2 lymphocytes showed a significant reduction. The results suggested that ochratoxin A induced decrease of leucocytes, lymphocytes and was cytotoxic to the intestinal epithelium and mucosa lymphoid tissue, altering the intestinal barrier and increasing the susceptibility to various associated diseases (Solcan et al., 2015).

Aflatoxins are very toxic metabolites produced by molds from *Aspergillus*, *Penicillium*, *Rhizopus*, *Cladosporium* and *Alternaria* genera. One study aimed to evaluate any immunosuppressive and proto-oncogenic effects of aflatoxin B1 (AFB1) in experimentally dosed chickens. The AFB1 exposure induced significant reductions in body weight and in the weight of the lymphoid organs at the end of the experiment. In parallel, severe thymocyte and lymphocyte depletion, considered due to apoptosis, was evidenced in the thymus and bursa of Fabricius, whereas reticulo-epithelial cells proliferated and strongly expressed the Bcl-2 protein. These results demonstrate the severe immunosuppressive effects of AFB1 on B and T cells in chickens, and its proliferative action on the reticulo-epithelial cells involved in lymphocyte maturation, suggesting a proto-oncogenic action (Solcan et al., 2014).

Other investigations were made on ducklings (6 days old), considered the most sensitive to aflatoxin B1. After exposure AFB1 produced hepatic steatosis (hepatocytes were surcharged with lipidic droplets) which became more evident after 20 days of exposure and congestion were also observed. After 14 days of exposure to 30µg/kg bw AFB1 more than steatosis we noticed necrosis around centrolobular vein, in portobiliar spaces, ovalar shaped cells, considered precursors of carcinogenesis were observed.

Deoxynivalenol (DON) is a potent nephrotoxic, hepatotoxic and immunosuppressant. The study aimed to prove the immunosuppressant action of deoxynivalenol in chickens experimentally poisoned. Histopathology studies of thymus and bursa of Fabricius were made. After 28th day a marked proliferation of stromal cells in the reticulum network, in medulla zone, presence of mucous cells, small mucous cysts and haemorages were observed (Solcan et al., 2012).

Histopathological studies of bursa of Fabricius showed that lymphoid depletion of Fabricii bursa appeared from the beginning and persisted during the recovery phase of experimental poisoning. After 21 and 28 days of exposure bursa revealed a lack of cortico-medullar differentiation, lymphoid depletion and necrosis.

The leaves and berries of Sea buckthorn (SB) (*Hippophae rhamnoides*; family *Elaeagnaceae*) are medically claimed as having phyto-antioxidant, anti-inflammatory and anti-cancerous properties in humans. One study evaluated the **hepatoprotective activity** of oil from SB berries against toxicity induced by AFB1 and OTA in broiler chickens. The toxicity of OTA (E1 group) was highlighted by a decrease of total serum proteins and albumin, an increase in AST and ALT and by histological changes, when compared to Control. In the E2 (treated with OTA and SB oil) group the decrease of total proteins and albumin and the increase of AST and ALT were lower, while the histopathological changes were less severe. Immunohistochemical assays indicated that COX2, Bcl-2 and p53 were expressed intensely in the liver of chickens from the E1 group and their expression was reduced in the E2 group. The OTA levels in the livers of chickens were reduced significantly by SB oil. These findings suggest that SB oil has a potent hepatoprotective activity.

Quite similar effects were observed in chickens treated with AFB1 and SB oil, these findings suggesting that SB oil has a potent hepatoprotective activity, reducing the concentration of aflatoxins in liver and diminishing their adverse effects (Solcan et al., 2013).

Ability to coordinate research teams is revealed from the obtaining by national competition and manage as director of five research grants involving multidisciplinary teams.

In **didactic** field I have being contributed at the elaboration of 11 textbooks, monographs, and practical guides in Histology and Embriology, as well as Molecular Biology, also collaborating at some textbooks of Cell biology and dermatology.

For the future, in research I intend to continue the investigations concerning the antitoxic potential of some poliphenolic natural antioxidants in laying hens, quails and zebrafish. I am also intending to continue to develop new multidisciplinary and interinstitutional collaborations in the field of biocompatibility of some new biomaterials on experimental models: rats, rabbits and pigs, taking into account the promising recently results (Fântânariu et al., 2015, Trincă et al. 2015).

Also in didactic field I will modernize the lectures and practical works using multimedia facilities of the institution; to introduce new technics of immunohistochemistry and molecular biology in practical works; to attract and to coordinate young students and PhD students in research activities.