BIOLOGICAL AND CYTOGENETIC EFFECTS OF MYCOTOXINS

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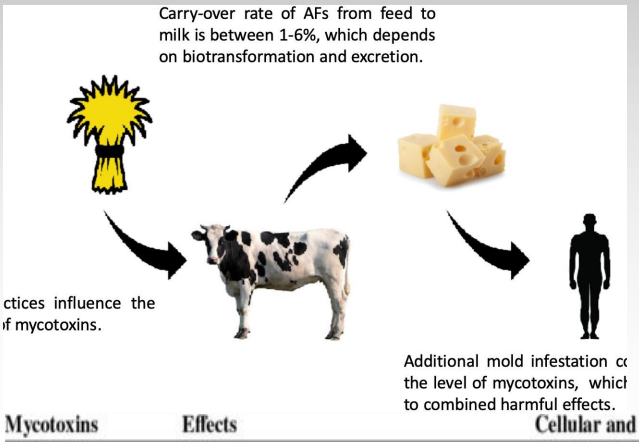
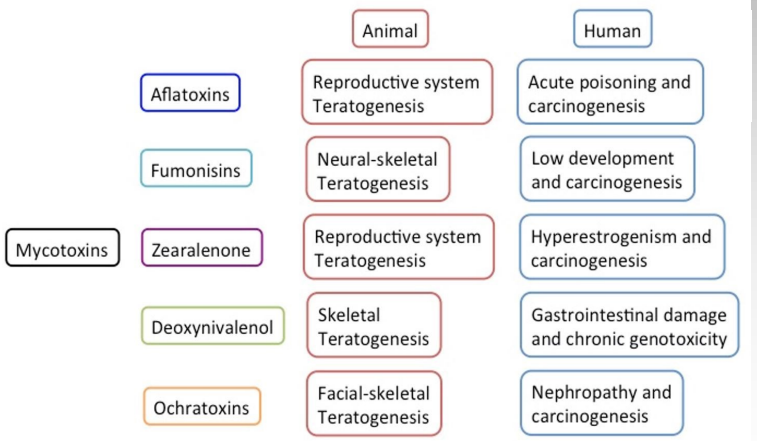
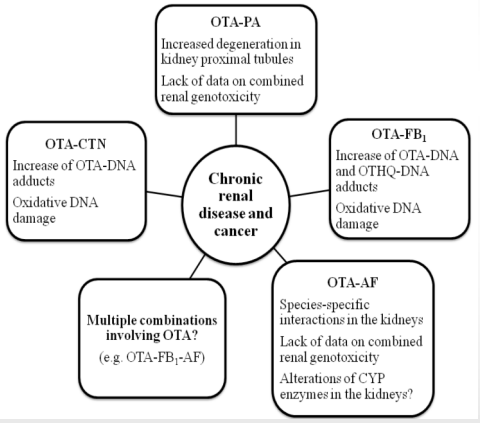
Mycotoxins are a group of chemically diverse secondary metabolites that exhibit a wide array of biological effects. Some of the mycotoxins can be mutagenic, carcinogenic, embryo-toxic, nephro-toxic, teratogenic, oestrogenic or immunosuppressive agents. Mycotoxins are secondary metabolites of moulds that exert toxic effects on animals and humans. The toxic effect of mycotoxins on animal and human health is referred to as mycotoxicosis, the severity of which depends on the toxicity of the mycotoxin, the extent of exposure, age and nutritional status of the individual and possible synergistic effects of other chemicals to which the individual is exposed. Acute mycotoxicoses can cause serious and some times fatal diseases.





Mycotoxins	Effects	Cellular and molecular mechanisms of action
Aflatoxin B1 and M1	Hepatotoxicity Genotoxicity Carcinogenicity Immunomodulation	Formation of DNA adducts Lipid peroxidation Bioactivation by cytochromes P450 Conjugation to GS-transferases
Fumonisins	Central nervous system damage Hepatotoxicity Genotoxicity Immunomodulation	Inhibition of ceramide synthesis Adverse effect on the sphinganin/sphingosin ratio Adverse effects on the cell cycle.
Ochratoxin A	Nephrotoxicity Genotoxicity Immunomodulation	Effect on protein synthesis. Inhibition of ATP production Detoxification by peptidases
Patulin	Neurotoxicity *In vitro* mutagenesis	Indirect enzyme inhibition
Trichothecenes (i.e.DON, T-2, HT-2)	Hematotoxicity Immunomodulation Skin toxicity	Induction of apoptosis in haemopoietic progenitor cells and immune cells. Effect on protein synthesis Abnormal changes to immunoglobulins
Zearalenone	Reproductive adverse effects	Binding to oestrogen receptors Bioactivation by reductases Conjugation to glucuronyltransferases



- ***Conclusions:*** *With accordance to carcinogenic effects of mycotoxins, these can cause mutations in genetic structure by showing genotoxic effects. Cytogenetic biomarkers can be used as outcome measures of genotoxicity cause by mycotoxins.*

More than 50 articles on investigation of genotoxic effects of mycotoxins were found. All of the study, confrme that carcinogenic mycotoxins are known to cause cancer through genetic damage. In these studies, it was reported that mycotoxins that are likely to be genotoxic carcinogens are aflatoxin B1, sterigmatocystin, luteoskyrin, ochratoxin A, azaserine, mitomycin C, and actinomycin. Knowing the genotoxic effects of a mycotoxin ensures the explanation of the disease molecular levels.

Organization

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SIMPOZIJ U ORGANIZACIJI ALISZP U BIH SA MEĐUNARODNIM UČEŠĆEM (NEUM, BIH, 13-15 MAJ 2022)