

Abstract ID: - 13

Abstract Topic: - Cancer

Abstract Title: - Mutational profiling of the genes involved in cadmium toxicity - An in silico study

Presenting author name: - Trupti Patel

Presenting author institute: - VIT

Co-authors name: - Lucky Parida

Co-authors institute: - VIT, Vellore

Aims: - We aim to elucidate the impact of long-term cadmium exposure on DNA repair and onset of genomic instability.

Methods: - In silico tools were used to explore the mechanisms through which cadmium exposure altered the gene expression and trigger initial hallmarks of cancer. Differentially expressed genes were mined from GEO databases and an interactome was drawn between these genes and genes of major repair pathways. For each of the interacting genes we carried out structural and functional mutational profiling of nsSNP retrieved from COSMIC database. Further docking revealed destabilizing effect of the mutations. Finally, we docked certain natural products and vitamins with these genes to assess their protective role and regaining normalcy after Cd-toxicity.

Results: - Preliminary analysis revealed about 40 mutations in various toxicity genes were potentially damaging to their functions. COSMIC revealed that they were mainly deregulated in blood cancers. The normal dynamics of mutants with their interacting repair partner was altered. We presume that downstream repair mechanisms can become weak due to altered expression or mutation in Cd-related genes. Impaired repair overtime can impact genomic stability and lead to cancers. To check the affinity of the genes involved in Cd-toxicity towards ameliorative agents, we further docked them compounds from black turmeric, a indigenous spice from India. A positive affinity scores affirmed a protective effect of spices molecular toxicity induced by Cadmium.

Conclusions: - Early hallmarks of cancer are triggered by chronic exposure to Cd and disturbed dynamics of DNA repair with the gene involved in toxicity. A protect role of dietary supplement is suggested in this study.

Keywords: - Preliminary analysis revealed about 40 mutations in various toxicity genes were potentially damaging to their functions. COSMIC revealed that they were mainly deregulated in blood cancers. The normal dynamics of mutants with their interacting repair partner was altered. We presume that downstream repair mechanisms can become weak due to altered expression or mutation in Cd-related genes. Impaired repair overtime can impact genomic stability and lead to cancers. To check the affinity of the genes involved in Cd-toxicity towards ameliorative agents, we further docked them compounds from black turmeric, a indigenous spice from India. A positive affinity scores affirmed a protective effect of spices molecular toxicity induced by Cadmium