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*Dictyostelium discoideum* an eukaryotic, cellular slime mold, has been used for studying the effects of heavy metals viz., lead nitrate and cadmium chloride on its growth and development. Heavy metal induced toxicity is dose dependent and it is more in cadmium treated cells compared to lead treated *Dictyostelium* cells.

*Dictyostelium* amoebae treated with heavy metals (lead and cadmium) showed distorted cell morphology such as rounding up and pseudopodia retraction and smaller size. Scanning electron micrographs of heavy metal treated cells revealed membrane invaginations and ruptures. In developing cells less clusters formed in treated cells.

The lag phase cells were most sensitive to heavy metal treatment followed by mid log and stationary phase cells.

Growth inhibition was occurred when cells treated with 100 µM and 200 µM concentrations of lead and cadmium for duration of 20 min. The inhibition of growth resulted from both cell lysis and growth stasis.

Spore germination was also affected by heavy metal treatment.

Adverse affect of heavy metals were found in colony morphogenesis which showed delayed plaque formation and smaller size of colonies.

Heavy metals induced inhibition of macromolecular syntheses (include both DNA and Protein synthesis) was found in *Dictyostelium* cells.

Endocytotic activities (phagocytosis and pinocytosis) were inhibited in heavy metals treated *Dictyostelium* cells.

SDS-PAGE Analysis of membrane bound cytoskeletal proteins revealed higher actin content in heavy metal treated cells.
Heavy metal treatment caused altered morphogenesis in *Dictyostelium* cells.

In heavy metal treated cells morphogenesis was delayed and abnormal (smaller and more streamings, slugs and fruiting bodies).

Cyclic AMP-chemotaxis, and EDTA-stable cell contact were affected in heavy metal treated *Dictyostelium* developing cells.

Extra cellular cAMP dependent phosphodiesterase activity was reduced in the supernatant of the heavy metal treated cells thereby destroying the cAMP gradient which is necessary for morphogenesis.