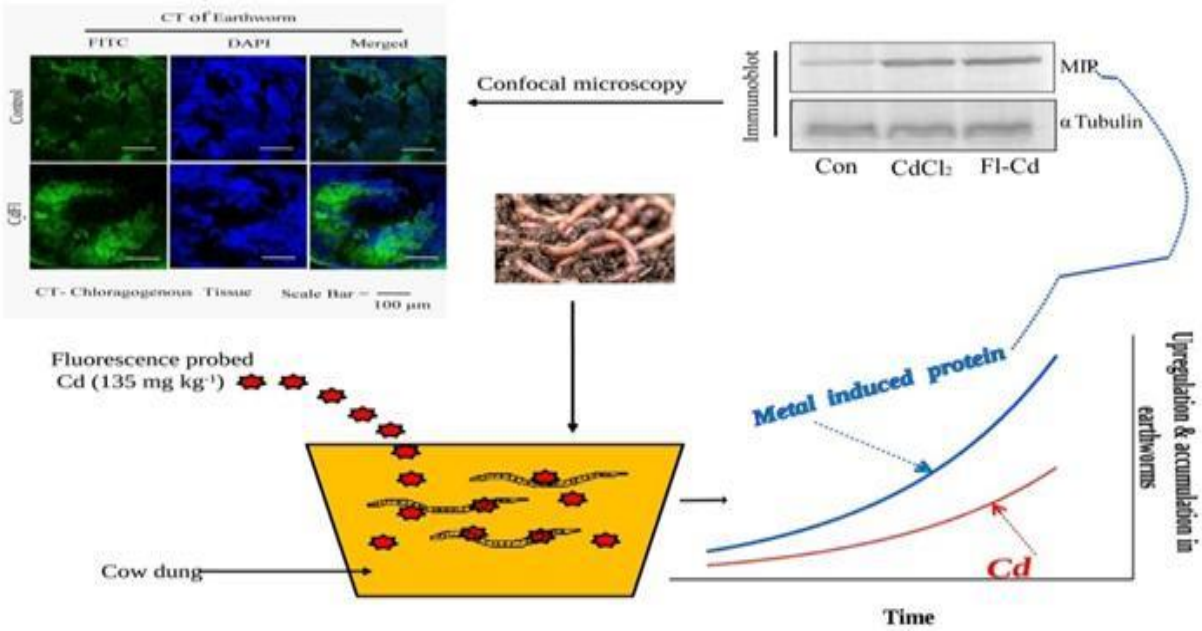
Metal induced non-metallothionein protein in earthworm: A new pathway for cadmium detoxification in chloragogenous tissue

Investigation by Scientists at DBT's Regional Centre for Biotechnology (RGCB), Thiruvananthapuram demonstrated that expression of some non-MT metal induced proteins was responsible for such incongruity. After 60 days of exposure cadmium accumulation in earthworm intestines was significant. Immunofluorescence staining followed by confocal microscopy exhibited that MIP accumulates ingested cadmium in the intestinal region and eventually deposits the metal in the chloragogenous tissue. The N-terminal sequence of 15 amino acid residues was determined and after bioinformatic analysis, it was concluded that MIP is most probably a glutamic acid rich, novel cadmium binding protein.

To further validate the binding mechanism, paper chromatography and continuous variation experiments which evidenced that cadmium readily binds to glutamic acid were conducted. The present finding is the first *in-vivo* evidence of a non-metallothionein cadmium binding protein induced in the intestines of earthworm exposed to a cadmium rich environment.



Earthworms neutralize toxic metals by a small (~13 kDa) cysteine rich metal binding protein, metallothionein (MT). Although the rate of metal accumulation and MT expression does not correlate well, and the reason behind such inconsistency has not yet been deciphered.

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