

## ***Escherichia coli* and Metal: How Much Will Be Sequestered and Where?; a STEM-EDX Study**

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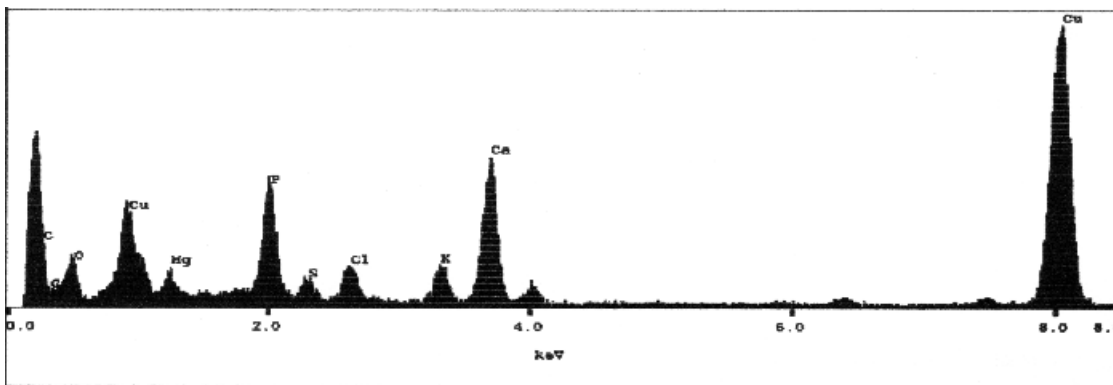
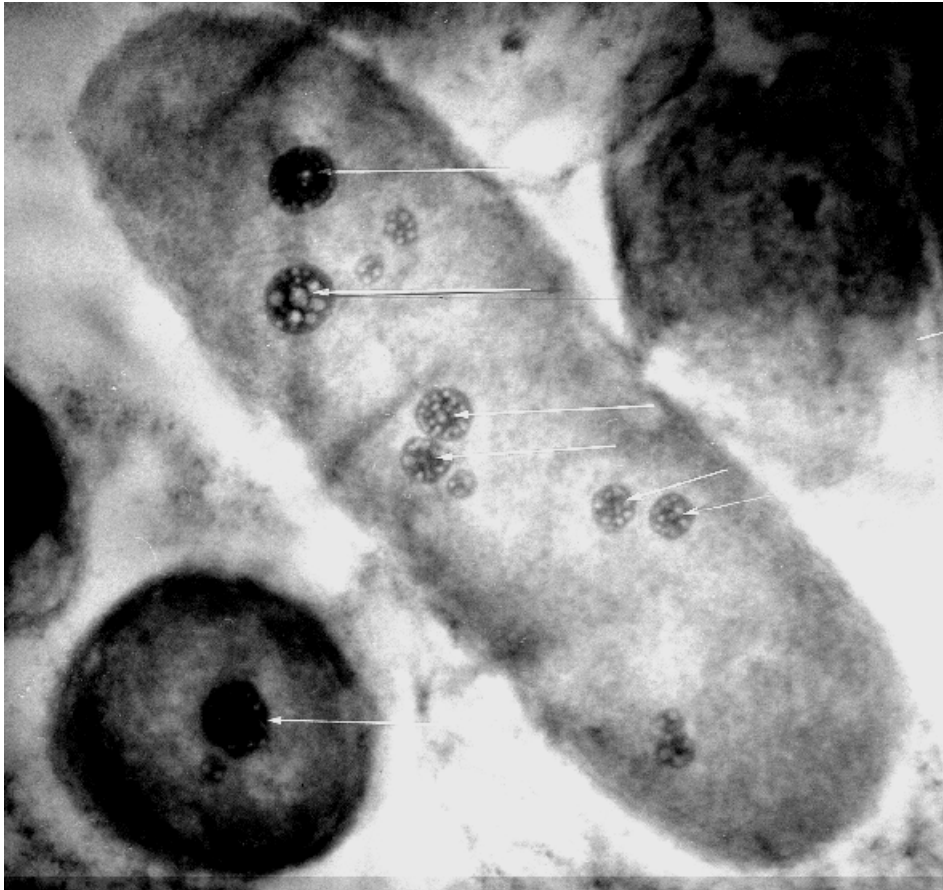
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Cells of *Escherichia coli* were exposed to six different heavy metals, Al, Cd, Cu, Mn, Pb, Zn, exposure was done at concentrations of 20ppm, except for the Cd which was done at 5ppm. The cells were analyzed using the STEM mode of a transmission electron microscope in conjunction with a PGT IMIX energy dispersive x-ray spectrometer. The data was analyzed using a bulk sample analysis program in standardless mode (w/w). We analyzed the cell wall, the cytoplasm and polyphosphate bodies. Approximately 20 cells were analyzed per treatment and averages of the elements present were calculated. The cells of *E. coli* were grown in nutrient broth and then embedded in Epon according to Luft's procedure. Quantitative analysis of the three different parts of the cell revealed that in cells exposed to Al, the wall contained on average Al(2.0%), the cytoplasm contained Al(2.0%), the PPB's contained Al(13.44%); Cu, the wall contained on average Cu(3.62%), the cytoplasm contained Cu(2.1%), the PPB's contained Cu(11.6%) S(3.44%); in cells exposed to Cd, the wall contained Cd(11.76%), the cytoplasm contained Cd(9.77%), the PPB's contained Cd(13.15%); cells exposed to Mn, the wall contained Mn(3.89%), the cytoplasm contained Mn(3.5%), the PPB's contained Mn(11.6%); cells exposed to Pb, the wall contained Pb(4.92%), the cytoplasm contained Pb(5.47%) the PPB's contained Pb(17.64%); cells that were exposed to Zn, the wall contained Zn(4.7%) , the cytoplasm contained Zn (8.2%) the PPB's contained Zn(19.10%). These data indicate that different cell components sequester metals differentially. In general, most of the metals had a higher bioconcentration in the PPB's than in the other parts of the cell. This holds true for all the metals except for Cd, which was found in all parts of the cell.

### **References:**

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**FIG.1** Thin sectioned sample of *Escherichia coli* . Dense body at arrow is a PPB.



**Fig 2** EDX Spectrum of PPB.