

Association between Copper Uptake and Decrease of Copper (hypocupremia) in Burn Patients-Infected *Pseudomonas aeruginosa*

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Abstract : In this study, *Pseudomonas aeruginosa* was isolated from infected burn patients and characterized by standard biochemical tests. The in vitro copper uptake was compared between this isolated pathogenic strain and two non-pathogenic control strains of Gram positive bacteria *Bacillus thuringiensis* strain Israelis as well as Gram negative bacteria *Enterobacter aerogenes*. Maximum copper uptake of 470 ppm/g biomass was obtained by *P. aeruginosa* strain, while the control strains *B. thuringiensis* and *Enterobacter aerogenes* had copper uptake of 350 and 383 ppm/g biomass, respectively. However, the lowest copper uptake (60 ppm/g biomass) was observed with another control the saprophytic strain *Pseudomonas (Shewanella) putrefaciens*. A further investigation regarding the effect of copper toxicity on bacterial growth, gave an MIC score of 600 ppm for *P. aeruginosa* strain compared to 460 and 300 ppm for the two Gram positive and Gram negative control strains, respectively. In tandem with these in vitro findings, blood analysis on burn patients infected with *P. aeruginosa* has indicated a selective decrease of copper (hypocupremia) and ceruloplasmin plasma levels. The iron metabolism was also affected by this copper deprivation leading to a similar decrease in plasma levels of PCV, iron, total iron binding capacity, and transferrin. All these hematological changes were significantly different ($P < 0.05$) from the matched group of non-infected burn patients. The observed hypocupremia in infected burn patients was attributed to demanding scavenger ability by *P. aeruginosa* strain for the copper of plasma.

Keywords : pseudomonas, Cu uptake, burn patients, biosorption

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