The Antimicrobial Efficacy of Stainless Steel, Copper and Brass for the Reduction of Nosocomial Illness

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This experiment determined which type of metal surface would best reduce nosocomial illness. I hypothesized that while copper/brass possess intrinsic antimicrobial properties, the inherent malleability of copper will impact on its performance and durability rendering stainless steel the better choice for healthcare settings. I postulated that because copper/brass is “softer” than stainless steel, it will be more susceptible to damage in the form of scratches that result from normal use, where biomass may accumulate: Even with regular cleaning, this accumulation of biomass will act as a barrier between the copper and the micro-organisms thereby reducing the ion migration required for it to kill pathogens. The first experiments tested the efficacy of unadulterated samples of copper, brass, and stainless steel by inoculating samples with clinical isolates of Staphylococcus aureus/E. coli or biofilm and measuring the reduction of microorganisms at timed intervals. The materials demonstrated statistically significant differences: Copper was the most efficient, and stainless steel the least efficient in eliminating pathogens. The second series of experiments assessed the impact of normal wear on copper, brass and stainless steel that had been treated with Staphylococcus/E. coli and biofilm after scratching the surfaces and exposing the metals to cleaning cycles at timed intervals to mimic the conditions that would occur in healthcare settings: Stainless steel was the most efficient in eliminating pathogens and copper was the least efficient. This suggests that stainless steel is superior to both copper/brass for regular use in health care settings and in the prevention of nosocomial illness.

Awards Won: