# Resistance Under Pressure: Tracking the Emergence of Mupirocin Resistance in S. epidermidis

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Staphylococcus aureus is a pathogenic bacteria well known for developing resistance to antibiotics, with dire consequences for human staph infections. This study explored the time required for Staphylococcus epidermidis, a close relative of S. aureus, to develop resistance to the antibiotic mupirocin. The reason S. epidermidis (BSL-1) was used instead of S. aureus was to reduce risk to the researcher, as S. epidermidis exists naturally as part of the skin microbiome and does not cause disease in healthy individuals. Two mupirocin-resistant strains of S. epidermidis were generated through successive exposure to mupirocin. One strain was later cultured without mupirocin and tested for mupirocin resistance at regular intervals to assess its permanence. It was hypothesized that (1) resistance to mupirocin would develop in six generations or less and (2) that the resistance would be lost once resistance pressure was removed. In this study, it took S. epidermidis only three generations to develop resistance to mupirocin in support of the hypothesis. However, once gained, it showed no signs of losing resistance to mupirocin over another six generations when cultured without mupirocin, even without any selective pressure. Therefore, the second part of the hypothesis, that resistance would be lost after mupirocin was removed, was not supported. The rate at which S. epidermidis developed mupirocin resistance and maintained it, makes it a continued concern for the future. This suggests that additional antibiotics should be combined with mupirocin prescriptions for recurring infections in people instead of prescribing mupirocin alone repeatedly.

**Awards Won:**