**Bacterial Resistance: From Modern Technologies to Ancient Mechanisms**

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Use of complex metal oxide nanoparticles has drastically risen in recent years, especially due to their utility in electric vehicle batteries. However, use of these materials has outpaced our understanding of how they might affect environmental organisms, which they could encounter through release during manufacture, use, and disposal. In particular, little is known about the effects of chronic exposure to complex metal oxide nanoparticles. We have focused on an environmentally relevant bacterial species, *Shewanella oneidensis,* which is ubiquitous in nature and responsible for bioremediation of heavy metals, and assessed the toxic effects of nanoscale lithiated nickel manganese cobalt oxide (NMC), which is an emerging battery cathode material for electronic devices. We have reported that chronic exposure of *S. oneidensis* to NMC, specifically the nickel and cobalt ions liberated during dissolution of this material, results in the emergence of resistant mutants. This presentation will discuss the roles of reactive oxygen species (ROS), DNA damage and gene duplication, as well as changes in phenotype of the metal-resistant bacterial population. In addition, evidence of the co-occurrence of metal and antibiotic resistance evolution will be explored.