Structural and spectroscopic investigations of metal-bound rubrerythrin from *B. pseudomallei*

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Ruberythrin (Rbr) proteins belong to the ferritin-like superfamily and often function physiologically in oxidative stress tolerance, especially in anaerobic bacteria. Most Rbrs contain a di-iron site within a four-helix bundle with an N- or C-terminal rubredoxin-like domain. Rbr from *Burkholderia pseudomallei*, however, is missing the rubredoxin domain and also possesses unique structural features, including a domain swapped dimer. *B. pseudomallei* is an aerobic, Gram-negative, soil-dwelling bacterium that is the causative agent of meliodosis. Given its association with high mortality rates, intrinsic antibiotic resistance, and ease of aerosol transmission, *B. pseudomallei* has been identified as a potential bioterrorism agent. Ongoing questions that our research probe include: What metals bind in the di-metal site in *Bp*Rbr? What is the physiological function of Rbr in aerobic bacteria like *B. pseudomallei*? What are the potential evolutionary implications of the differences between aerobic and anaerobic rubrerythrin proteins? We will present our recent structural models of *Bp*Rbr in the apo, Mn-bound and Fe-bound forms, and will address spectroscopic approaches to identifying peroxide in the active site.