Palestra ACorner/IST

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Dia 14 Maio (3ª feira) 10:00 am

Sala: QA02.2 (south tower)

Urease and Nickel in Biology

Urease, the first enzyme to be crystallized and the first shown to possess nickel, catalyzes a simple reaction, but it requires a remarkably complex biosynthesis machinery. Formation of the dinuclear nickel metallocenter with its bridging carbamylated lysyl ligand is dependent on the functions of the metallochaperone UreE, the GTPase UreG, and the protein scaffold UreF/UreD that contains a molecular tunnel through which nickel must pass. Other nickel-containing enzymes include guanidinase, glyoxylase, acireductone dioxygenase, superoxide dismutase, [NiFe] hydrogenase, carbon monoxide dehydrogenase, acetyl-CoA synthase/decarbonylase, hydroxyacid racemase/epimerase, and methyl coenzyme M reductase. The metallocenters in these enzymes encompass mononuclear and dinuclear sites, more complex clusters, and organometallic complexes, where the biosynthetic pathways for several of these enzymes are also complex. In contrast to its essential functions, nickel exhibits toxicity in animals, plants, and microorganisms. Homeostatic control of nickel concentrations involves nickel-dependent transcriptional regulators and nickel transporters. A recent intriguing aspect of the biology of nickel is its use in long-distance (centimeter-long) electron transfer via periplasmic filaments in cable bacteria.

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