

Invited lecture



Department of Plant Sciences
School of Life Sciences
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Living Dangerously : the Deinococcus way

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Venue: Seminar hall, School of Life Sciences

Date: 30-06-2017

Time: 10:30 am

Abstract

The deep orange/red-colored, non-pathogenic, Gram-positive bacterium *Deinococcus radiodurans* finds mention in the Guinness Book of World Records as the “world’s most radio resistant microbe”. In addition to radiation, this superbug is also resistant to all kinds of genotoxic stresses including desiccation and nutrient starvation. Complete genome sequencing of this microbe in 1999 revealed some unexpected facts and opened up new possibilities, both for basic research as well as biotechnological applications. Our laboratory has been responsible for elucidating some novel facets of this bacterium’s fascinating biology. Some of the interesting discoveries made include identification of novel antioxidants, benefits of loss of key DNA repair genes, protein recycling and role of proteome kinetics and dynamics during post-irradiation magical recovery of this bug, and molecular mechanisms underlying radiation-responsive gene expression in this microbe. We have also genetically modified *D. radiodurans* to over-express acid and alkaline phosphatase genes, to accomplish bioprecipitation and removal of uranium from aqueous radioactive waste over a wide range of uranium concentrations and pH. Methods have also been optimized to recover the precipitated uranium. Current efforts aim at further enhancing U removal efficiency through surface display of candidate proteins and their enhanced expression using radiation-induced gene promoters. Highlights of these studies will be presented.

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