



Alberta RNA Research
and Training Institute

University of
Lethbridge



Presents:

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(Hosted by Tony Russell, PhD)



"Conditional proteolysis as a regulator of gene expression: Does cold stress regulate heat stress?"

An ARRTI Speaker Series Lecture

Tuesday, June 30th, 2015

3:00pm – 4:00pm

C640 (University Hall)

The ability of free-living microorganisms to sense and respond to abiotic changes in their environment is crucial for survival. Expression of the sole DEAD box RNA helicase, *crhR*, in the photosynthetic bacterium *Synechocystis* PCC 6803 is regulated at a minimum of three autoregulatory, CrhR-dependent and three CrhR-independent checkpoints in response to temperature stress. This implies that the rearrangement of RNA secondary structure is required for cellular response to this stress. One of the checkpoints involves the autoregulatory, CrhR-dependent conditional proteolysis of CrhR in response to temperature upshift from 20 to 30°C. A whole cell proteome time course (Richard Fahlman) has identified proteins whose abundance is altered in response to the temperature upshift in a CrhR-dependent fashion. Potentially not unexpectedly, affected proteins are associated with translation and photosynthesis. Unexpectedly, our data suggests that the cold shock protein CrhR functions in a *Synechocystis* heat shock response. Conditional proteolysis is a much faster way to shut down a biosynthetic pathway than traditional transcription-translation regulatory networks. In the future, we hope to utilize the conditional proteolysis system to rapidly and precisely regulate biosynthetic pathway activity for biotechnological applications.

For more information:

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