

Micro 201

Dove Lecture 3, Class 20: Trans-translation and Protein Degradation

April 11th, 2019

Overview

This class will focus on a system for rescuing stalled ribosomes in bacteria. I will begin with a brief introduction to translation in bacteria. This will be followed by a discussion of a classic paper from the Sauer lab detailing the discovery of the ribosome rescue or trans-translation system in *E. coli*. Through this discussion we will touch on important aspects of protein degradation in bacteria. (The review by Baker and Sauer serves as a refresher on ClpXP.) The class will finish with a discussion of an elegant experiment described in the second paper (Flynn et al.) in which a catalytically inactive protease is used to trap and identify protease substrates. We will pay particular attention to Figures 1-3 from this second paper.

Papers for Discussion

1. Keiler KC, Waller PRH, Sauer RT. (1996) Role of peptide tagging system in degradation of proteins synthesized from damaged messenger RNA. *Science* 271, 990-993.
2. Flynn JM, Neher SB, Kim Y-I, Sauer RT, Baker TA. (2003) Proteomic discovery of cellular substrates of the ClpXP protease reveals five classes of ClpX-recognition signals. *Mol. Cell* 11, 671-683.

Background Reading

3. Baker TA, Sauer RT. (2006) ATP-dependent proteases of bacteria: recognition logic and operating principles. *Trends Biochem. Sci.* 31, 647-653.