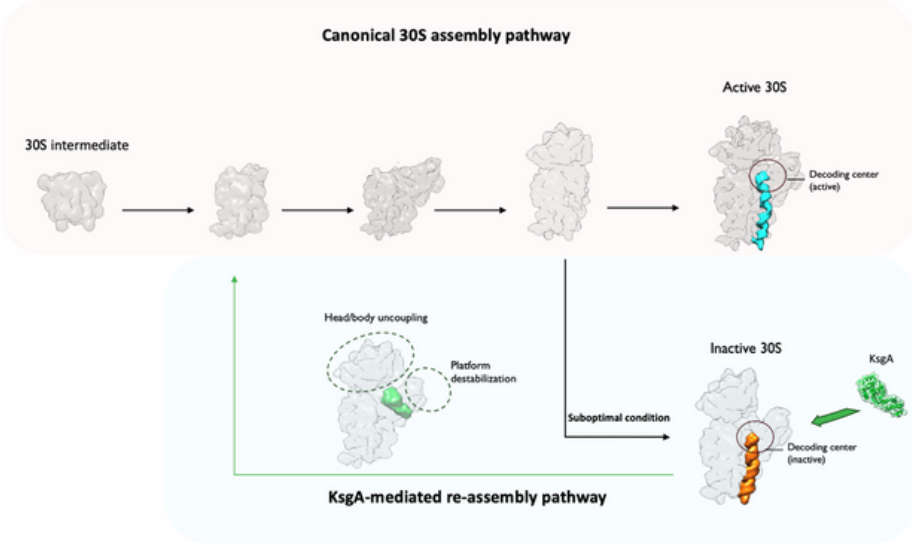
McGill | Department of Anatomy and Cell Biology | Département d'anatomie et de biologie cellulaire

PHD SEMINAR

Dissecting the role of KsgA in facilitating the late-stage maturation of 30S ribosomal subunit.



Jingyu Sun

PhD student, Prof. Ortega's lab

When

Wednesday, April 24, 2024
11:30 a.m. - 12:30 p.m.

Where

Strathcona Anatomy and Dentistry Building

Ribosome biogenesis is a complicated and energy-consuming process in prokaryotic and eukaryotic cells. The bacterial ribosome comprises a small subunit (30S) and a large subunit (50S). The assembly of the 30S subunit involves a 16S rRNA and 21 r-proteins to go through an energy landscape and form a functional 30S subunit. Protein factors facilitate this process by preventing assembling intermediates from falling into kinetic traps, where the ribosomes adopt an alternate conformation and become trapped in an inactive state. Our lab uses cryo-electron microscopy (cryo-EM) to understand the late-stages of the maturation process of the 30S subunit. These stages involve the formation of the decoding center, the functional core of the 30S. KsgA is a highly conserved methyltransferase that methylates two universally conserved adenosine residues (A1518 and A1519) in the decoding center. Recent studies suggested an additional role of KsgA as an assembly factor in facilitating the late-stage maturation of the 30S subunit. My PhD work mainly focuses on unveiling this additional role of KsgA by solving the high-resolution structure of KsgA in complex with assembling 30S particles. We found that KsgA recognizes and removes a specific structural lesion in the decoding center when the 30S intermediates assemble into an inactive state. These inactive particles with the lesion are partially disassembled by KsgA and allowed another opportunity to reassemble into the active state. Moreover, we found that other assembly factors, rbfA and Era, may work cooperatively with KsgA to facilitate this process. Overall, our research has established the additional role of KsgA as an assembly factor and provide insights into the relationship of KsgA with other factors in facilitating the late-stage maturation of 30S ribosomal subunit.