Lecture Series: Structural insight into the biogenesis of beta barrel membrane proteins

Event Type: IBBR Seminar Series
Contact Person: S. Saif Hasan

Event Info
Date: Oct 21 2019 - 11:00am to 12:00pm
Location: Auditorium

Details
Speaker/Presenter: Dr. Susan Buchanan
Speaker Title: Chief, Laboratory of Molecular Biology
Speaker Affiliation: NIDDK, NIH
Event Description:
Structural insight into the biogenesis of beta barrel membrane proteins

Susan Buchanan1, Jeremy Bakelar2, Nicholas Noinaj2

1 Laboratory of Molecular Biology, NIDDK, NIH, USA
2 Markey Center for Structural Biology, Department of Biological Sciences, Purdue University, USA

β-barrel membrane proteins are essential for nutrient import, signaling, motility, and survival. In Gram-negative bacteria, the β-barrel assembly machinery (BAM) complex is responsible for the biogenesis of β-barrel membrane proteins, with homologous complexes found in mitochondria and chloroplasts. Structures of BamA, the central and essential component of the BAM complex, were determined from two species of bacteria: Neisseria gonorrhoeae and Haemophilus ducreyi. BamA consists of a large periplasmic domain attached to a 16-strand transmembrane β-barrel domain. Three structural features speak to the mechanism by which BamA catalyzes β-barrel assembly. The first is that the interior cavity is accessible in one BamA structure and conformationally closed in the other. Second, an exterior rim of the β-barrel has a distinctly narrowed hydrophobic surface, locally destabilizing the outer membrane. And third, the β-barrel can undergo lateral opening, evocatively suggesting a route from the
interior cavity in BamA into the outer membrane. Recent structures of the BAM complex illustrate how the BamC, BamD, and BamE lipoproteins assemble on the BamA periplasmic domain and provide further evidence for lateral opening of the β-barrel.

References


Setup

**IT Setup:** Projector
Laptop
Podium
Lavalier Microphone
Wireless PPT
Remote