

Abstract

Nuclear pore complexes are fundamental components of all eukaryotic cells. They mediate nucleocytoplasmic exchange, regulate gene expression and are of high human health relevance. Elucidating their 110 MDa structure imposes a formidable challenge and requires *in situ* structural biology approaches. How cells address this challenge and assemble ~1000 building blocks in a faithful manner remains enigmatic. I will discuss our efforts to determine the structure of the nuclear pore complex. I will present novel insights into the assembly mechanism of nuclear pores that are relevant to oogenesis and early embryonic development. I will further discuss how cells degrade this massive membrane-embedded structure.