

Abstract Submitted  
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**Understanding DNA Condensation: From Simple Ions to Protamine-DNA Packaging in Sperm** JASON DEROCHEY, University of Kentucky — DNA in nature exists primarily in a highly compacted state critical for most biological functions. DNA condensation, however, remains poorly understood at the molecular level. We are interested in understanding the fundamental interactions, molecular scale forces and elucidating mechanisms by which polycations interact with DNA in vitro and in vivo. We use osmotic stress coupled with x-ray scattering, to study packaging densities and compaction energies between DNA helices in the presence of various cations. In this talk, we will discuss from simple ions to complex proteins and how these cations modulate both the attractive and repulsive forces between DNA helices. Lastly, the biological implications of these forces will be discussed with regards to spermatogenesis where chromatin histones are replaced by arginine-rich protamines to densely compact DNA in sperm heads. Tight packaging from spermatogenesis is considered essential for both successful transport as well as to protect DNA from damage.

Jason DeRouchey  
University of Kentucky

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