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Small **Interfering**
RNA Transfection Across a Phospholipid Membrane KEN-ICHI
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ing and Simulations, Department of Physics and Astronomy, University
of Southern California, Los Angeles, California — Small interfering RNA
(siRNA) molecules play a pivotal role in silencing gene expression via
the RNA interference mechanism. We have performed steered MD sim-
ulations to study the transfection of a bare siRNA and siRNA/Oleic
Acid (OA) complex across the dipalmitoylphosphatidycholine (DPPC)
bilayer at $T = 323$ K. Bare siRNA induces the formation of frustrated
lipid gel domains, whereas in the presence of siRNA/OA complex the
membrane is found to be in the liquid-ordered phase. In both cases
the stress profiles across the membrane indicate that the membrane
is under tension near the head groups and highly compressed at the
water-hydrophobic interface. During transfection, the membrane is de-
formed and the lateral stress is significantly lowered for the bare siRNA
and siRNA/OA complex. The bare siRNA transfects through a lipid-
nanopore of hydrophilic head-groups and hydrophobic carbon chains,
whereas the siRNA/OA complex transfects through a lipid-nanopore of
hydrophilic head groups.

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