

THE GRADUATE COLLEGE OF THE  
UNIVERSITY OF OKLAHOMA HEALTH SCIENCES CENTER

ANNOUNCES THE FINAL EXAMINATION OF

# Dawn Bender

FOR THE DEFENSE OF THE DOCTOR OF PHILOSOPHY DEGREE  
GRADUATE COLLEGE  
Department of Cell Biology



Friday, April 24, 2020, 2:00 pm

Location Zoom: <https://omrf.zoom.us/j/369307669>

Password: 097139

## *Mechanisms of ESCO-dependent cohesin regulation*

COMMITTEE IN CHARGE: *Susannah Rankin, PhD, Gary Gorbisky, PhD, Chris Sansam, PhD, Eric Howard, PhD, Karla Rodgers, PhD, Sanjay Bidichandani, PhD*

ABSTRACT: The tethering together of sister chromatids by the cohesin complex ensures their accurate alignment and segregation during cell division. In vertebrates, sister chromatid cohesion requires the activity of the ESCO2 acetyltransferase, which modifies the Smc3 subunit of cohesin. It was shown recently that ESCO2 promotes cohesion through interaction with the MCM replicative helicase. However, ESCO2 does not significantly colocalize with the MCM complex, suggesting there are additional interactions important for ESCO2 function. Here we show that ESCO2 is recruited to replication factories, sites of DNA replication, through interaction with PCNA. We show that ESCO2 contains multiple PCNA-interaction motifs in its N-terminus, each of which is essential to its ability to establish cohesion. We propose that multiple PCNA-interaction motifs embedded in a largely flexible and disordered region of the protein underlie the unique ability of ESCO2 to establish cohesion between sister chromatids precisely as they are born during DNA replication.