GMS6061 Nuclear Structure and Dynamics

Format
Short (“chalk”) talk and discussion.
Your grades will be based on your participation in the review and research paper discussion.

For reviews:
Point of greatest interest
What point/paradigm/model/finding/observation is of most interest to you?

For original research papers:
Hypothesis
What hypothesis do the authors test?
Method
What method is of most interest to you?
Result
Which result is of most interest to you? Does it support the hypothesis and conclusions of the authors?

Opinitional:
Form an opinion about the conclusion(s) of the paper.
Your experiment
Propose one (or more) experiment to extend or further support the conclusions of the paper.

Faculty
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1. Thursday, January 8

**Topic:**
Nuclear domains/Methods in nuclear organization study (FRAP, FRET, BiFC).
Introduction into nuclear architecture, overview of nuclear domains and methods used in nuclear study.

**Review:**
Dundr M, Misteli T.
Functional architecture in the cell nucleus.

Nuclear bodies and compartments: functional roles and cellular signalling in health and disease.
Zimber A, Nguyen QD, Gespach C.

Toward a high-resolution view of nuclear dynamics.
Trinkle-Mulcahy L, Lamond AL.

**Paper:**

**Optional:**
Bubulya PA, Spector DL.
"On the move"ments of nuclear components in living cells.

2. Tuesday, January 13

**Topic:**
PML NB’s/ND10 assembly and function.

**Review:**
Structure, dynamics and functions of promyelocytic leukaemia nuclear bodies.

**Paper:**

Optional:

3. Thursday, January 15:

Topic:
Nuclear dynamics, chromosome territories and genome organization

Review:

Chromosome territories—a functional nuclear landscape.

Paper:


Optional:
Taddei A, Hediger F, Neumann FR, Gasser SM.

4. Tuesday, January 20:

Topic:
DNA damage and repair foci: formation, dynamics and function.
Review:


Paper:


Optional:

5. Thursday, January 22:

Topic:
Transcription: spatiotemporal aspect. Novel approaches that allow visualization of transcription dynamics in cell.

Review:

Paper:


Optional:
Actin-dependent intranuclear repositioning of an active gene locus in vivo.
Dundr M, Ospina JK, Sung MH, John S, Upender M, Ried T, Hager GL, Matera AG.

6. Tuesday, January 27:

Topic:
Centromere/kinetochore: An overview of centromere/kinetochore structure/replication and epigenetic modifications of centromeric chromatin

Review:
Epigenetic regulation of centromeric chromatin: old dogs, new tricks?

Paper:
Dynamics of inner kinetochore assembly and maintenance in living cells.

Centromeric chromatin exhibits a histone modification pattern that is distinct from both euchromatin and heterochromatin.

7. Thursday, January 29:

Topic:
NPC-kinetochore: An overview of nuclear pore complexes (NPCs) with a discussion of how NPC constituents serve double duty at the kinetochore during mitosis.

Review:

Cheeseman IM, Desai A. Molecular architecture of the kinetochore-microtubule interface.

Paper:

Optional:

8. Tuesday, February 3:

**Topic:**
LINC-complex: An overview of this newly discovered structure in the nuclear envelope and its implications to cell biology.

**Review:**


**Paper:**


Optional:

9. Thursday, February 5:
**Topic:**
Laminopathies: How a class of diverse diseases has shed light on unexpected roles for the nuclear envelope.

**Review:**


**Paper:**


**Optional:**