

GMS6061 The Nucleus

Spring 2003

Format

Short ("chalk") talk and discussion

Faculty

John Aris, Associate Professor, Anatomy and Cell Biology

Brian Burke, Professor, Anatomy and Cell Biology

Steve Sugrue, Professor and Chair, Anatomy and Cell Biology

Sankar Swaminathan, Associate Professor, Medicine and Molecular Genetics & Microbiology

Tuesdays and Thursdays

1 - 3 PM

Room CG-41

Date	Topic	Faculty
1-7	Reprogramming the somatic cell nucleus	Aris
1-9	Translation in the nucleus and mRNA surveillance	Aris
1-14	mRNA Export	Aris
1-16	Nuclear domains	Aris
1-21	Speckles - function and dynamics	Sugrue
1-23	Small interfering RNA (siRNA)	Sugrue
1-28	Nuclear pore complex	Burke
1-30	Nuclear lamina and disease	Burke
2-4	PML body	Swaminathan
2-6	Nuclear dynamics	Aris

Tues, 7 Jan

Topic: Reprogramming the somatic cell nucleus

Review:

Wilmut, I., N. Beaujean, P. A. de Sousa, A. Dinnyes, T. J. King, L. A. Paterson, D. N. Wells and L. E. Young, 2002, Somatic cell nuclear transfer. *Nature*. 419:583-6

Paper:

Kim, J. M., A. Ogura, M. Nagata and F. Aoki, 2002, Analysis of the mechanism for chromatin remodeling in embryos reconstructed by somatic nuclear transfer. *Biol Reprod*. 67:760-6

Thurs, 9 Jan

Topic: Translation in the nucleus and mRNA surveillance

Reviews:

Hentze, M. W., 2001, Protein synthesis. Believe it or not-translation in the nucleus. *Science*. 293:1058-9

Wilkinson, M. F. and A. B. Shyu, 2002, RNA surveillance by nuclear scanning? *Nat Cell Biol.* 4:E144-7

Paper:

Iborra, F. J., D. A. Jackson and P. R. Cook, 2001, Coupled transcription and translation within nuclei of mammalian cells. *Science.* 293:1139-42

Supplementary material

Tues, 14 Jan

Topic: mRNA Export

Review:

Dreyfuss, G., V. N. Kim and N. Kataoka, 2002, Messenger-RNA-binding proteins and the messages they carry. *Nat Rev Mol Cell Biol.* 3:195-205

Paper:

Fischer, T., K. Strasser, A. Racz, S. Rodriguez-Navarro, M. Oppizzi, P. Ihrig, J. Lechner and E. Hurt, 2002, The mRNA export machinery requires the novel Sac3p-Thp1p complex to dock at the nucleoplasmic entrance of the nuclear pores. *EMBO J.* 21:5843-52

Thurs, 16 Jan

Topic: Nuclear Domains

Lecture format

Tues, 21 Jan

Topic: Nuclear Speckles

Review:

Spector, D.L., and S.M. Gasser. 2003. A molecular dissection of nuclear function. *EMBO Rep.* 4:18-23

Paper:

Sacco-Bubulya, P., and D.L. Spector. 2002. Disassembly of interchromatin granule clusters alters the coordination of transcription and pre-mRNA splicing. *J Cell Biol.* 156:425-36

Tues, 23 Jan

Topic: RNAi

Review:

Hannon, G.J. 2002. RNA interference. *Nature.* 418:244-51

Paper:

Martinez, J., A. Patkaniowska, H. Urlaub, R. Luhrmann, and T. Tuschl. 2002. Single-stranded antisense siRNAs guide target RNA cleavage in RNAi. *Cell.* 110:563-74

Tues, 28 Jan

Topic: Nuclear Pore Complex

Review:

Wente, S.R. 2000. Gatekeepers of the nucleus. *Science*. 288:1374-7

Paper:

Cronshaw, J.M., A.N. Krutchinsky, W. Zhang, B.T. Chait, and M.J. Matunis. 2002. Proteomic analysis of the mammalian nuclear pore complex. *J Cell Biol.* 158:915-27

Tues, 30 Jan

Topic: Nuclear Lamina and Disease

Review:

Burke, B., and C.L. Stewart. 2002. Life at the edge: the nuclear envelope and human disease. *Nat Rev Mol Cell Biol.* 3:575-85

Paper:

Pendas, A.M., Z. Zhou, J. Cadinanos, J.M. Freije, J. Wang, K. Hultenby, A. Astudillo, A. Wernerson, F. Rodriguez, K. Tryggvason, and C. Lopez-Otin. 2002. Defective prelamin A processing and muscular and adipocyte alterations in Zmpste24 metalloproteinase-deficient mice. *Nat Genet.* 31:94-9

Tues, 4 Feb

Topic: PML Bodies

Review:

Everett, R.D. 2001. DNA viruses and viral proteins that interact with PML nuclear bodies. *Oncogene*. 20:7266-73

Paper:

Everett, R.D., P. Freemont, H. Saitoh, M. Dasso, A. Orr, M. Kathoria, and J. Parkinson. 1998. The disruption of ND10 during herpes simplex virus infection correlates with the Vmw110- and proteasome-dependent loss of several PML isoforms. *J Virol.* 72:6581-91

Tues, 6 Feb

Topic: Nuclear Dynamics

Review:

Misteli, T. 2001. Protein dynamics: implications for nuclear architecture and gene expression. *Science*. 291:843-7

Paper:

Dundr, M., U. Hoffmann-Rohrer, Q. Hu, I. Grummt, L.I. Rothblum, R.D. Phair, and T. Misteli. 2002. A kinetic framework for a mammalian RNA polymerase in vivo. *Science*. 298:1623-6

News of the Week

Supplementary Material