IN BRIEF

CYTOSKELETON

Structure and functional role of dynein's microtubule-binding domain

Carter, A. P. *et al. Science* **322**, 1691–1695 (2008)

Dyneins are minus-end-directed motors that move along microtubules. They consist of an AAA+ ATPase domain that is separated from the microtubule-binding domain (MTBD) by a coiled-coil stalk region. Based on the crystal structure of the MTBD of mouse cytoplasmic dynein and a portion of the coiled-coil stalk, Carter *et al.* show that the MTBD and ATPase domain communicate through conformational changes and shifts in the registry of the α-helical coiled coils of the stalk. Surprisingly, functional studies suggest that the directionality of dynein movement is an inherent property of the MTBD rather than the ATPase domain, which exerts force parallel to the direction of the stalk.

LIPIDS

Direct observation of the nanoscale dynamics of membrane lipids in a living cell

Eggeling, C. *et al. Nature* 21 Dec 2008 (doi:10.1038/nature07596)

Cholesterol-mediated lipid interactions are thought to have functional roles in membrane-associated processes, such as signalling, but lipid nanodomains (or rafts) have been difficult to study *in vivo*. The authors used stimulated emission depletion (STED) fluorescence microscopy, in combination with fluorescence correlation spectroscopy, to study fluorophore-labelled lipids in the plasma membrane of living cells. The nanometre-sized detection area used with STED allowed the discrimination between single lipid molecules that diffuse freely and those that are hindered. Unlike phosphoglycerolipids, sphingolipids and glycosyl phosphatidylinositol (GPI)-anchored proteins were transiently trapped in the plasma membrane. Cholesterol depletion reduced the transient trapping of sphingolipids and GPI-anchored proteins, which suggests that this approach might be used to quantify the nanoscale dynamics of lipids in cellular membranes.

NUCLEAR ORGANIZATION

The A- and B-type nuclear lamin networks: microdomains involved in chromatin organization and transcription

Shimi, T. *et al. Genes Dev.* **22**, 3409–3421 (2008)

Using a combination of high-resolution confocal microscopy and fluorescence correlation spectroscopy, the authors show that A- and B-type lamins form separate but interconnected meshworks (or microdomains) in the nuclear lamina and the nucleoplasm. Silencing the expression of lamin A/C or B2 had no effect on the structural organization of the other lamins. By contrast, silencing the lamin B1 gene dramatically changed the A- and B-type lamin meshworks, which suggests that lamin B1 is crucial for their organization. The absence of lamin B1 also induced the formation of nuclear blebs, which contained A- but not B-type lamins and euchromatin. Surprisingly, the euchromatin was not actively transcribed, despite the presence of activated RNA polymerase II and histone marks that are typical for active gene transcription. These findings link the organization and regulation of chromatin with specific lamin microdomains.