

iBio Seminars Part III:
Making Rafts in cell membranes

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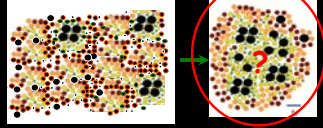
in collaboration with

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Functional Rafts : A working hypothesis

pre-existing organization induced rafts



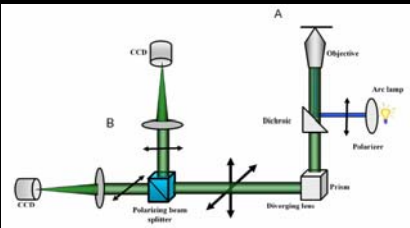
Sorting or Signaling Function

What makes nano-clusters?

What induces functional domains?

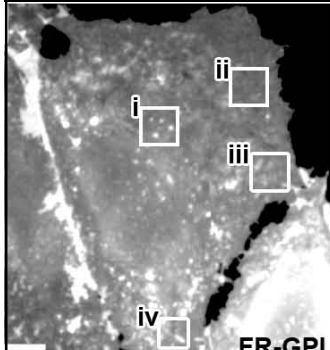
Mayor and Rao, *Traffic* (2004)

High resolution FRET imaging

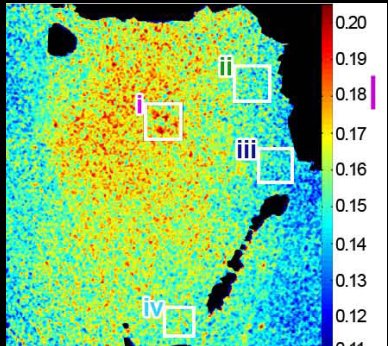


High resolution ~ FRET imaging at 300 nm spatial resolution

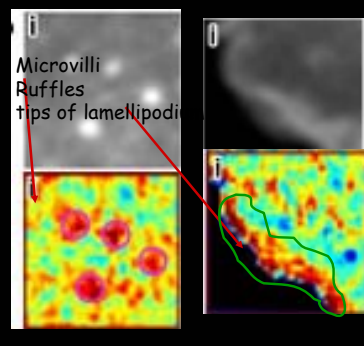
Spatial distribution of nanoclusters



Spatial distribution of nanoclusters



Nanoclusters are depleted in specific structures at the cell surface



Nanoclusters are depleted in ruffles

Depleted of clusters

Microvilli
Ruffles
tips of lamellipodium

[Ruffling Movie](#)

Nanoclusters are enriched in flat regions of cell membranes

Depleted of clusters Enriched in clusters

Microvilli
Ruffles
tips of lamellipodium

Flat-cell scapes
lamellum behind lamellipodium

Flat-scapes of the cell membrane exhibit a patchwork of nanocluster-rich regions

Role of the actin-cytoskeleton in nanocluster distribution

- Localization of nanoclusters with specific type of actin organization
- Actin perturbation dramatically modifies nanocluster distribution
- Inhibition of actin-polymerization activity, inhibits nanocluster formation and breakup

Functional Rafts : A role for actin?

pre-existing organization induced rafts

Sorting or Signaling Function

'The supported bilayer'

Jacobson, *Science*, 1999
Ritchie et al, *Mol/Memb. Biol.* 2003

Membrane Skeleton Fence

