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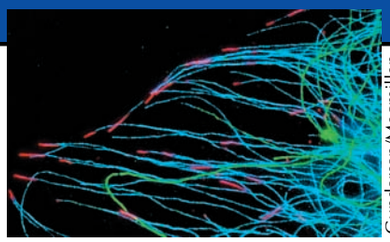
# Formin a link to microtubules

A protein more often linked to effects on the actin cytoskeleton has been implicated in the polar stabilization of microtubules. Gregg Gundersen (Columbia University, New York, NY) and colleagues show that mDia1 and mDia2, two formins related to fly Diaphanous and budding yeast Bni1, can induce the formation of stable detyrosinated microtubules that may help polarize cells.

Gundersen had earlier found that the Rho-GTPase induces the formation of stable microtubules, so he set out to find the relevant Rho effector. He tested a series of Rho mutants that had varying abilities to interact with different effectors and to induce stable microtubules. The one effector whose Rho interactions correlated perfectly with stable microtubule induction was mDia.



Gundersen/Macmillan

**Dia favors accumulation of stable (green) over unstable (blue) microtubule.**

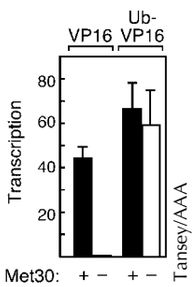
Expression of mDia2 induced formation of stable capped microtubules, and mDia2 cosedimented with taxol-stabilized microtubules. Gundersen suspects that Dia is not itself capping microtubules, but is a scaffold for other capping proteins. Once capped, stable microtubules are gradually detyrosinated, and this modification, says Gundersen, may bias transport to the leading edge of the cell. ■

Reference: Palazzo, A.F., et al. 2001. *Nat. Cell Biol.* 3:723–729.

# Transcription gets a licence

Ubiquitination of some transcriptional activators may be necessary both to make them functional activators and to signal their destruction, according to a recent study from William Tansey (Cold Spring Harbor Laboratory, Cold Spring Harbor, NY) and colleagues. Tansey suggests that ubiquitination is a temporary licence for transcription that preprograms destruction into the very activation process, thus keeping activators under tight control.

Tansey has been trying to unite the proteolysis and transcription fields ever since he noticed that the determinants of ubiquitination and transcription activation were often overlapping or even inseparable. Selling this idea took some time. "It's counterintuitive," he says. "You have proteins that are destroyed not when they are no longer needed but when they are at their most active. People have some trouble with this idea."




**VP16 needs either Met30 ubiquitin ligase (left) or fused ubiquitin (right) for activity.**

In the new experiments, Tansey found that a specific ubiquitin ligase was necessary for the VP16 transcriptional activation domain to activate transcription, and that this requirement could be circumvented by fusing a single ubiquitin (which does not signal destruction) to the activator.

One thing that ubiquitin may be doing, not necessarily related to actual destruction, is recruiting the proteasome. Stephen Johnson and colleagues (University of Texas Southwestern Medical Center, Dallas, TX) recently reported that the 19S regulatory particle of the proteasome is required for efficient transcription elongation, perhaps in some kind of chaperone role.

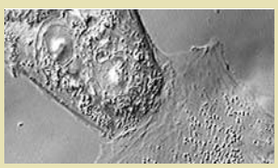
As for destruction, Tansey does not know how tightly it is coupled with transcription. "Are transcription factors truly a disposable thing—a one-shot deal?," he asks. Further studies are needed to answer this question and to determine just how many different transcription factors are licensed by this mechanism. ■

References: Salghetti, S.E., et al. 2001. *Science*. 10.1126/science.1062079 http://www.sciencemag.org/cgi/content/abstract/1062079
Ferdous, A., et al. 2001. *Mol. Cell.* 7:981–991.

# Touching cells transform

The cytoskeleton of an epithelial cell is converted to a fibroblast-like morphology upon contact with a fibroblast. So say Edward Bonder (Rutgers University, Newark, NJ) and colleagues, who present what they hope will be the beginning of a lengthy study of the interactions between heterotypic cell types.

The main conclusion so far, says Bonder, is that "even though you have nontypical contacts there is still recognition," leading to a structural transformation. Such heterotypic contacts occur frequently during development, such as when fibroblast-like neural crest cells migrate over the epithelial layer of the neural tube, or when fibroblasts directly contact an overlying epithelium before laying down an intervening barrier of basal lamina.



Bonder/NAS

**Epithelial cell (top) meets fibroblast (bottom).**

The intial cytoskeletal organization is very different in fibroblasts and epithelial cells. Fibroblasts have actin-filament bundles pointed out to the cell's leading edge and protruding into lamellae, whereas epithelial cells have an arc of actin running parallel to the leading edge. Upon contact of the two cell types, little change is seen in the fibroblast, but the epithelial cell converts to a more fibroblast-like organization.

Despite expressing different cadherins, the two cell types appear to form adhesion complexes that contain β-catenin. The transient association is terminated when the fibroblast wheels on its axis and marches off in another direction. Although such interactions may serve primarily to keep two tissue layers separate, they may also be essential to cement that separation by inducing the formation of more permanent barriers such as the basal lamina. ■

Reference: Omelchenko, T., et al. 2001. *Proc. Natl. Acad. Sci. USA*. 98:8632–8637.