

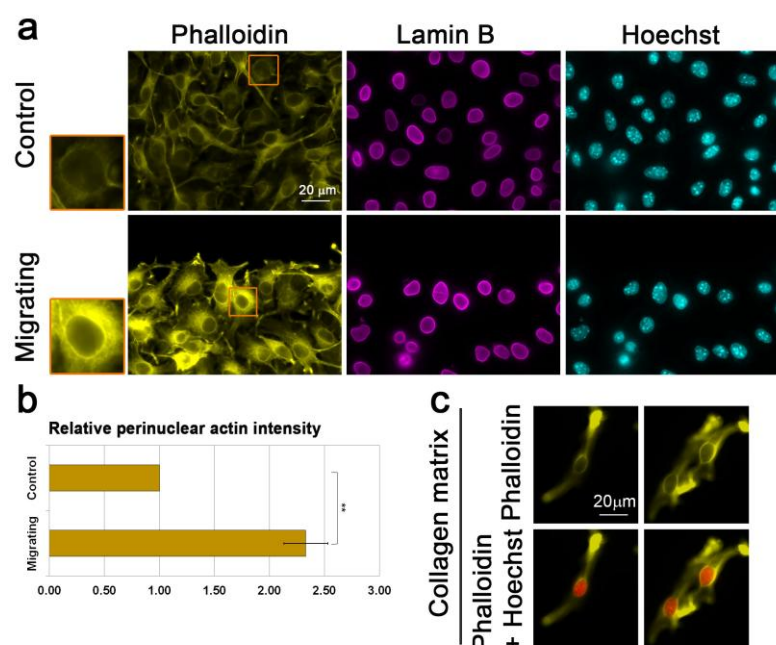
# Bridging perinuclear actin to the nucleus: new insights into cytoskeletal-nuclear integration

Gabi Gerlitz, Yuval Hadad, Andrea Fracchia, Dagmawit Babele, and Amit Ben-Shushan

Department of Molecular Biology, Faculty of Life Sciences, Ariel University, Ariel 40700, Israel.

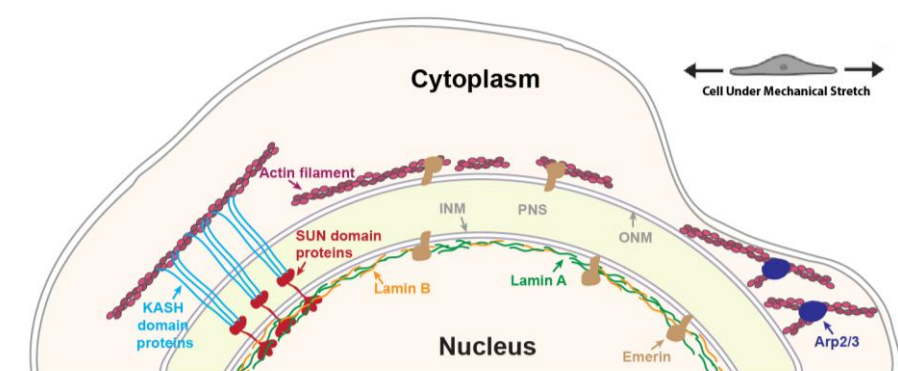
## A. The perinuclear actin rim

**Perinuclear actin rim:** A migration cues and stress-responsive structure involved in cell migration that is triggered by  $Ca^{2+}$  influx that activates INF2.

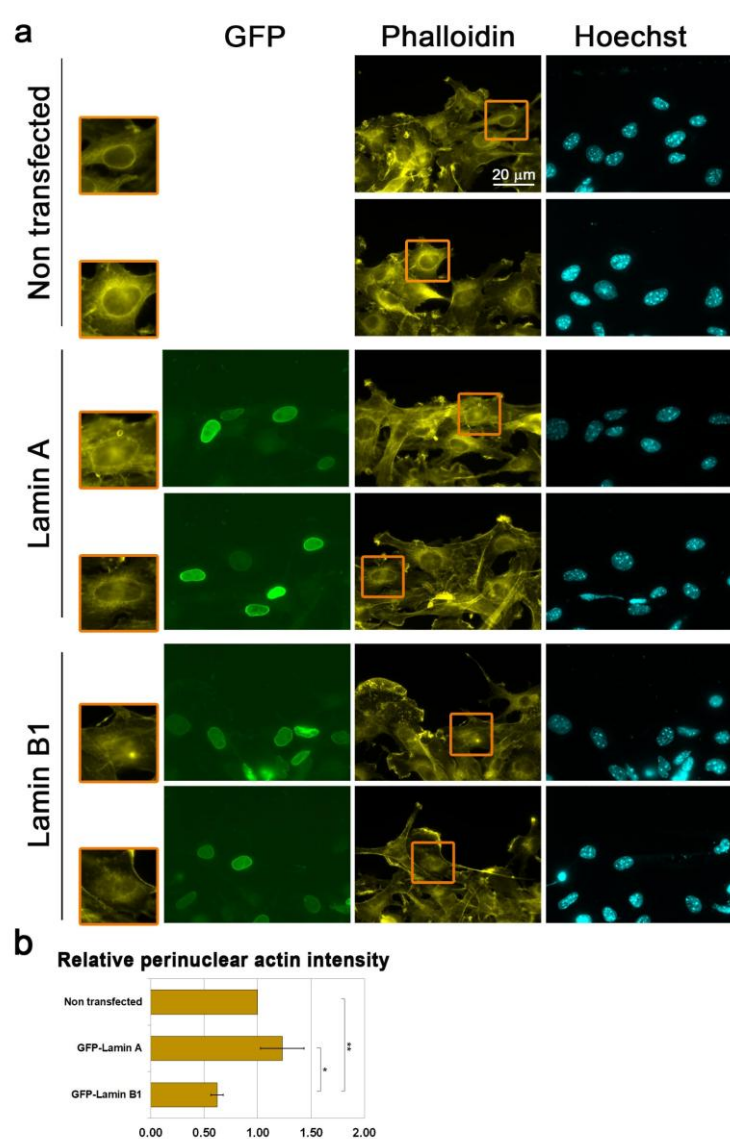


## B. Mechanism of actin rim interaction with the nucleus

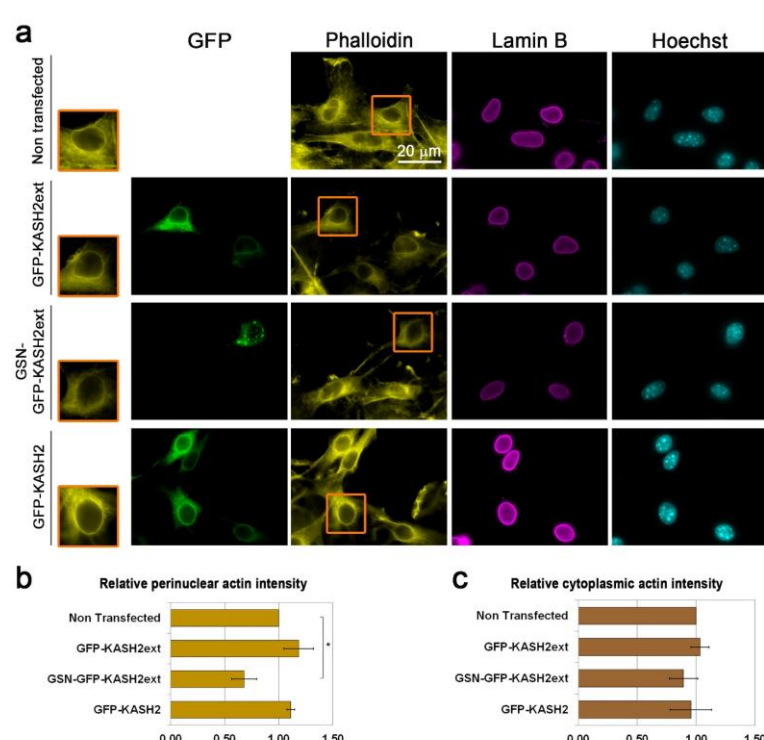
It is currently unclear how the perinuclear actin rim is physically coupled to the nuclear envelope (NE). Possible linkers:



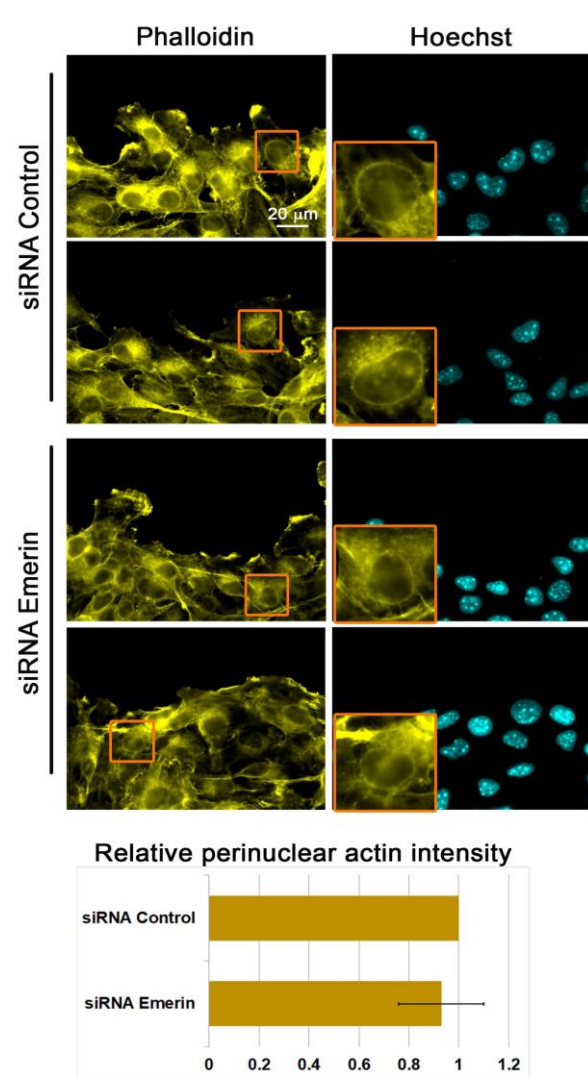
**Nuclear lamina importance:** Lamin B1 interferes with rim formation, while Lamin A does not affect it:



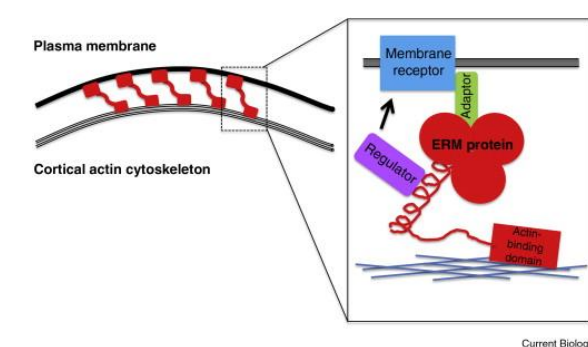
The **LINC Complex** - canonical linker of the nucleoskeleton and cytoskeleton, **found not to be required for rim assembly:**



**Emerin:** Despite its actin-binding domain, **Emerin is not required for the perinuclear actin rim:**



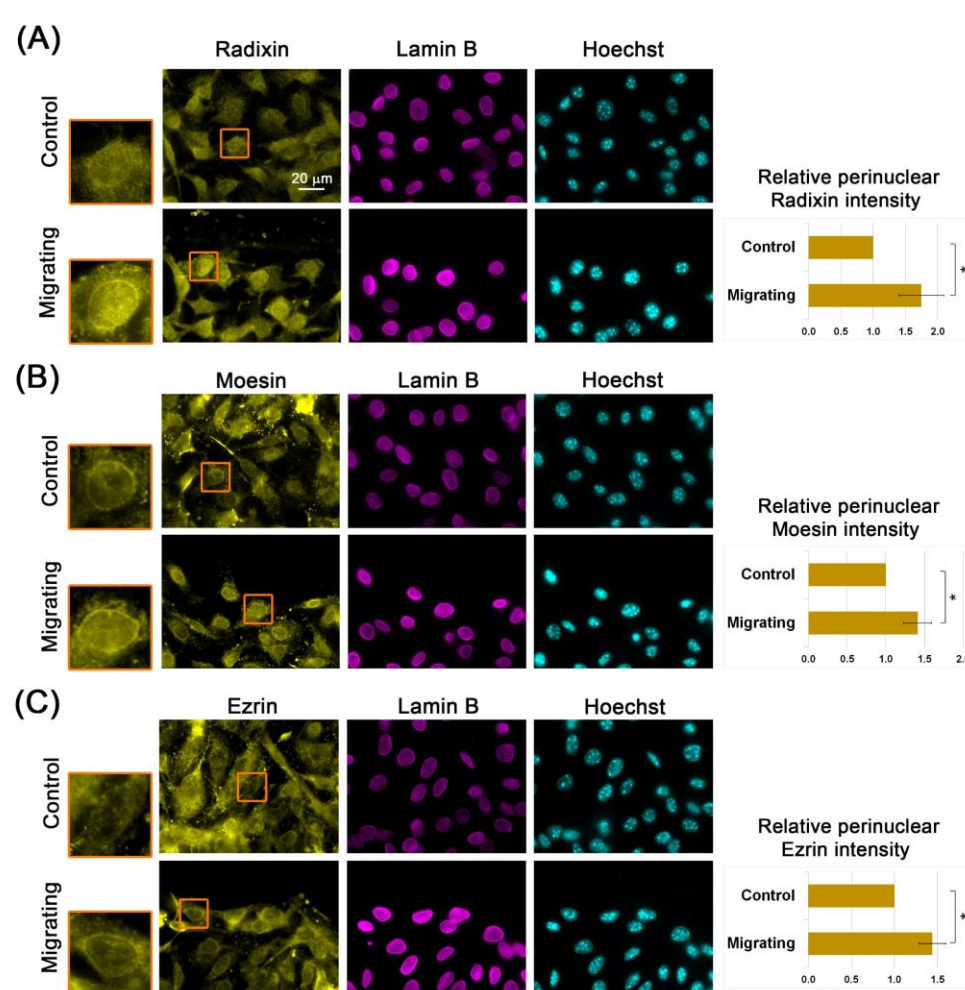
## C. ERM proteins serve as potential anchors



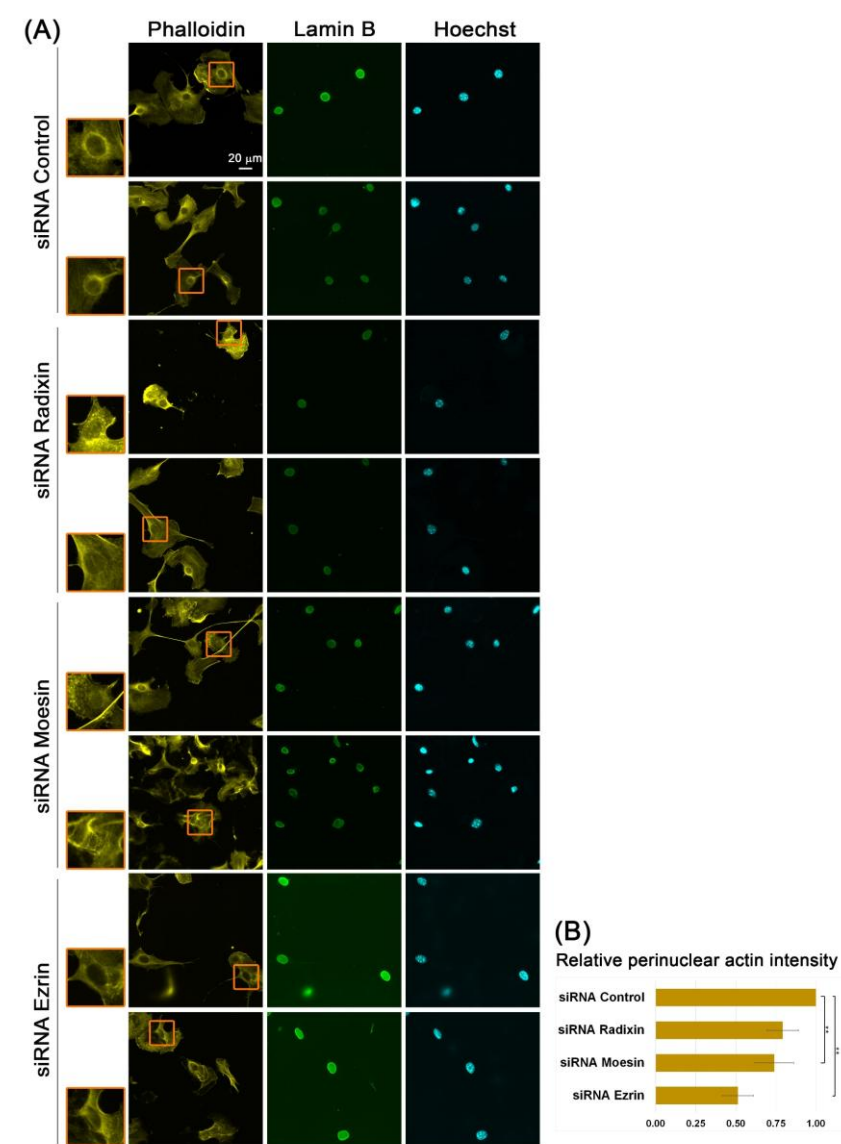
McClatchey, A. I. ERM proteins. *Curr. Biol.* 22, R784-R785.

The **ERM protein family** (Ezrin, Radixin, and Moesin) functions as a **molecular linker** between the actin cytoskeleton and the **plasma membrane**.

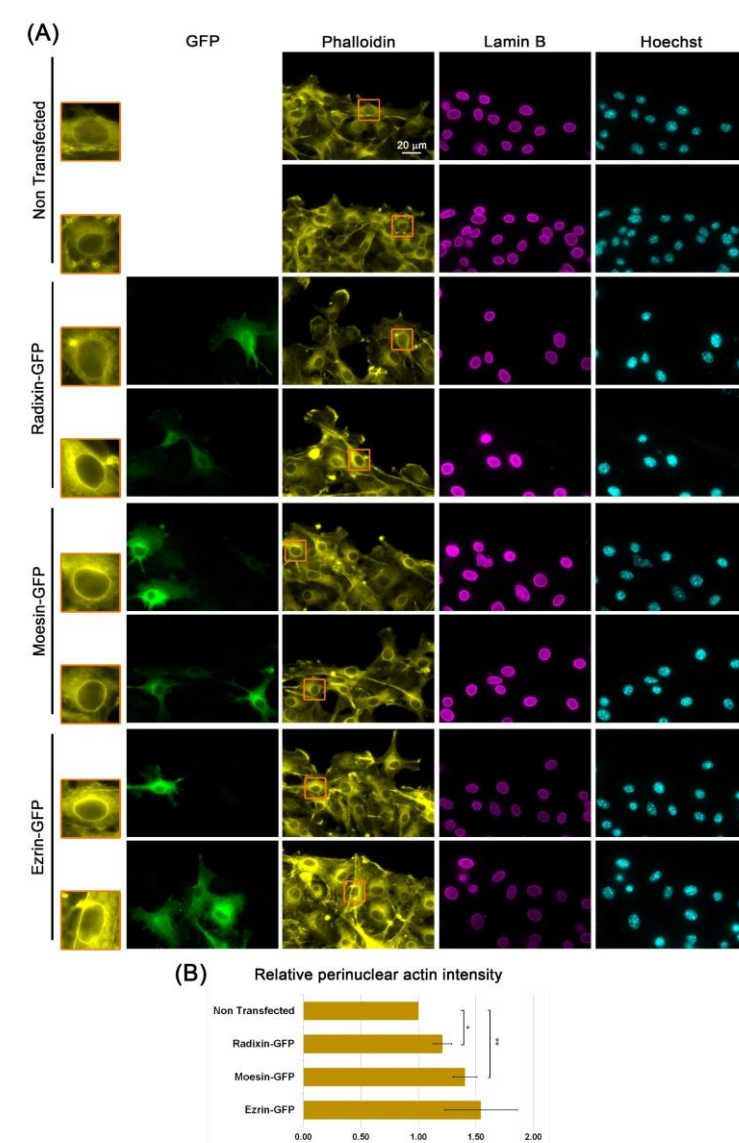
ERM proteins **localize to the Nuclear Envelope:**



**ERM knockdown impairs perinuclear actin rim intensity:**

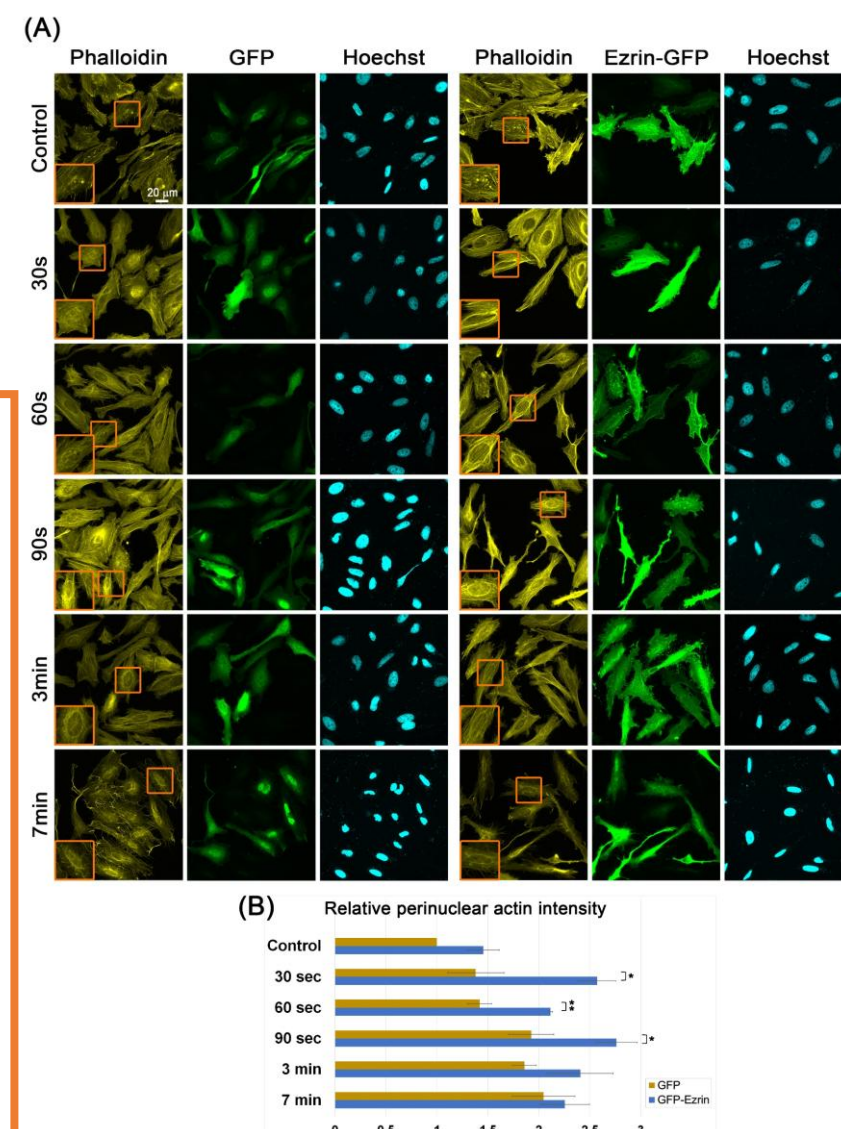


**ERM overexpression enhances actin rim intensity:**



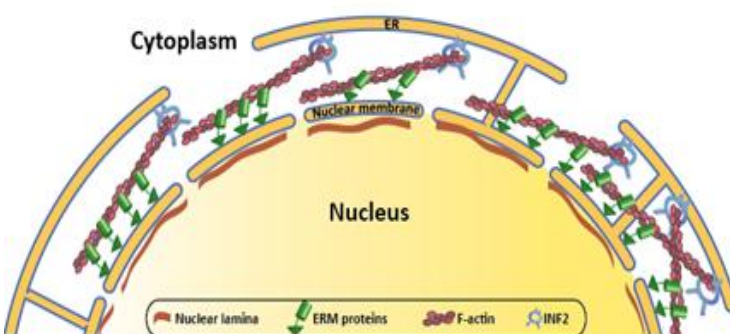
## D. ERM-Mediated Rim Formation: Beyond Melanoma

**Ezrin overexpression promotes perinuclear actin rim formation in HeLa cells:**



## Conclusions

Our findings suggest that ERM proteins function as anchors for the perinuclear actin rim to the nuclear envelope, while Lamin B1 opposes it.



Hadad, Y., Fracchia, A., Babele, D., Ben Shushan, A. & Gerlitz, G. (2026) ERM proteins support perinuclear actin rim formation. *Front. Cell Dev. Biol.* 13, 1579946.