**Supplementary information S3. Mechanocoupling by tight junctions.**

Tight junctions in endothelia and zonulae occludens in epithelia act as diffusion barriers between apical and basolateral membranes. Zonulae occludens are subapical intercellular junctions, associated with an actin belt located just above the zonulae adherens. Zonulae occludens and zonulae adherens are physically linked during their formation, by the zonula occludens (ZO) proteins (ZO1, ZO2 and ZO3), and functionally linked via signalling molecules including several polarity complexes and actin cytoskeletal modifiers. Even though there is no direct evidence for transmission of forces generated by actomyosin through tight junctions, ZO proteins have a major role in regulating actomyosin contractility at cell–cell junctions as well as in monolayer collective cell behaviours. The direct interaction between ZO1 and α-catenin is required for the coordinated assembly of zonulae occludens and zonulae adherens. ZO depletion in MDCK kidney epithelial cells strongly increases tissue contractility by altering the cell shape and organization of junctional actomyosin bundles which become organized in mini-sarcomeres assembled parallel to the zonulae adherens. These act as independent contractile units applying forces at tricellular junctions where the adherens junction mechanotransducer proteins vinculin and α-catenin are specifically recruited. This increase in contractility is regulated by a Shroom3–Rho kinase and leads to an overall reduction in cell movements within monolayers. In an independent siRNA screen targeting the main molecular components of the intercellular adhesome in MCF10A mammary grand cells, ZO1 silencing appeared to induce the highest increase in cell traction and intercellular tension leading to rapid cell migration and deformation within the collective. Silencing of other ZO proteins and others components of tight junctions such as claudins and JAM-A also promoted collective cell migration in epithelia, but in a different way, with a decrease in physical forces, but unchanged kinematics. In contrast to epithelia, in endothelial cells ZO1 depletion leads to a redistribution of active myosin II from junctions to stress fibres, reduced tension on VE-cadherin and loss of junctional vinculin and PAK2, and induced vinculin dissociation from the VE-cadherin–catenin complex. Although the exact effect on collective cell behavior has not been described, this leads to a decrease in wound closure.

**References**


