Epithelial or mesenchymal: where to draw the line.

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Abstract:
Epithelial and mesenchymal cells represent two of the main differentiated cell types in all vertebrates. However, their distinction is not always absolutely clear. Dozens of molecules have been used as markers for each cell type, while emerging evidence questions their validity. The aim of this study was to compare the molecular phenotype of these two cell types. Twenty-two molecular markers were evaluated by quantitative PCR and immunofluorescence in six lines of human and rat fibroblasts. The epithelial cells were also examined for their responses to TGFβ1 stimulation. All of the "markers" tested were found in both epithelial and mesenchymal cells. Some epithelial markers, such as CLDN5, OCLN, DSG1 and TJP1, were higher in fibroblasts than in epithelial cells. In comparison, mesenchymal markers showed more fidelity, but CDH2 and MMP9 were still significantly higher in epithelial cells than in mesenchymal cells. Furthermore, TGFβ1 up-regulated epithelial CTNNB1 and CTNND1, but suppressed mesenchymal markers such as S100A4, FGF1 and FGF2. In conclusion, no gene expression is cell-type restricted. Although some of these "markers" are expressed more in one cell type than in the other or differently localized, none of them shows a consistent pattern across species to make them universal markers. Nonetheless, some molecules appear to be better markers than others for a specific cell type. The information provided here is expected to serve as a reference for both basic and clinical researchers in the fields of epithelial-mesenchymal transition, molecular cell typing and cancer.

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