

Epithelial or mesenchymal: where to draw the line.

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Source: BioScience Trends . Jun2010, Vol. 4 Issue 3, p130-142. 13p. 4 Color Photographs, 4 Graphs.

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Abstract:

Epithelial and mesenchymal cells represent two of the main differentiated cell types in all vertebrates. However, the boundary between them 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 epithelial and fibroblasts. The epithelial cells were also examined for their responses to TGF β 1 stimulation. All of the "markers" were expressed in both epithelial and mesenchymal cells. Some epithelial markers, such as CLDN5, OCLN, DSG1 and TJP1, were expressed at higher levels in fibroblasts than in epithelial cells. In comparison, mesenchymal markers showed more fidelity, but CTNNA1 was still significantly higher in epithelial cells than in mesenchymal cells. Furthermore, TGF β 1 up-regulated epithelial markers such as CTNNA1 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 differentially, none of them shows a consistent pattern across species to make them universal markers. Nonetheless, some markers may be better markers than others for a specific cell type. The information provided here is expected to serve as a reference for basic and clinical researchers in the fields of epithelial-mesenchymal transition, molecular cell typing and cancer research.

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Epithelial or mesenchymal: where to draw the line, form accumulates anthropological dualism.