CATEGORY: Biochemistry
TITLE: The Characterization of Human Epidermal Stem Cells
NAME: Stefan Vitorovic
COUNTRY: United States of America

The role of Notch signaling in the regulation of growth and differentiation of epithelial stem cells is poorly understood. While specific markers for epidermal stem cells have not yet been identified, members the Notch signaling pathway have been reported to be differentially expressed in the human epidermis. This study sought to demonstrate the presence and distribution of Notch and its ligands, Delta and Jagged, in human keratinocytes, and thereby characterize this subpopulation.

Human neonatal foreskin samples were used to obtain isolated epidermal cells. Cells that were shown to be negative for connexin43, a gap junction protein, and positive for keratin14, a basal marker, were classified as presumptive stem cells (PSC). This sorted subpopulation was shown to be small and agranular by flow cytometry analysis. After two weeks in cell culture, PSC revealed a proliferative potential three times greater than non-sorted cells. The PSC exhibited increased expression of Delta and Jagged ligands than the general population. Additionally, RT-PCR confirmed the presence of Jagged and Delta in keratinocytes; however, only Jagged was detected in immunohistochemistry tests. Members of the Notch family were identified by immunohistochemistry in the epithelium and also at the protein- and mRNA-level. The data suggests that variations in the expression of members of the Notch signaling pathway could potentially be used as markers for stem cells of the epithelium; however, further research is necessary to make definitive conclusions, which would provide better insight into Notch regulatory pathways. This understanding could one day allow for the eventual treatment of epithelial damage caused by various skin diseases, injuries, or burns.