A novel expression based, non-invasive method to differentiate atopic dermatitis and psoriasis

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Psoriasis and atopic dermatitis (AD) are two of the most prevalent chronic inflammatory skin diseases in the world. Currently, diagnosis of psoriasis and AD is conferred based on the combination of a visual exam and a review of medical history. In some instances, the overlapping clinical characteristics and disease manifestations make it difficult to distinguish between psoriasis and AD, so a skin biopsy is collected for pathological analysis. While effective, skin biopsies are invasive and have the potential for complications in dermatological diseases already characterized by abnormalities in the skin barrier. Here, we describe a non-invasive method to differentiate AD and psoriasis by comparing the expression of key genes involved in disease pathogenesis in AD and psoriasis. Epidermal skin samples were non-invasively collected from the skin of the patients with moderate to severe AD (n=20) or moderate to severe psoriasis (n=20) using the DermTech Smart Sticker™. RNA was isolated and analyzed by quantitative real-time PCR for the expression of IL-13, IL-23, IL-17A, S100A8, S100A9, CXCL9, CXCL10, CCL17, CCL18, CCL27, TLSP, and NOS2. Upregulation of IL-13, CCL17, IL-17A, and NOS2 exhibited the greatest differences between psoriasis and AD. When combined, Receiver Operating Characteristic (ROC) Curve analysis of the data set generated an AUC of 0.94 that can be used to differentiate the two disease conditions. Overall, this study demonstrates the potential utility of non-invasive skin sampling to differentiate AD and psoriasis patients based on a molecular signature from a set of four genes. The ability to distinguish the two disease conditions provides a valuable asset in the hands of physicians for clinical decision-making and can be utilized for the personalized treatment of AD and psoriasis patients.