ACNE, ROSACEA, AND RELATED DISORDERS (INCLUDING HIDRADENITIS SUPPURATIVA)

EVALUATION OF TRIFAROTENE PENETRATION IN HUMAN SKIN TISSUES BY MALDI-FTICR MSI

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Introduction: Trifarotene is a first in class selective topical retinoid.

Objectives: to assess its distribution, quantitation and penetration profile in human facial and abdominal skin.

Materials and Methods: Ex-vivo study to obtain the distribution, quantitation and penetration profiles of Trifarotene using quantitative high-resolution matrix-assisted laser desorption/ionization Fourier-transform ion cyclotron resonance mass spectrometry imaging (MALDI-FTICR MSI) in fresh frozen abdominal and facial skin samples. One abdominal skin sample and one facial skin sample each received 5 mg/cm^2 of Trifarotene and one abdominal skin sample served as a control. Each sample (facial, abdominal treated and abdominal control) was obtained from three different donors.
Eleven MALDI imaging acquisitions at a spatial resolution of 50µm were performed using a CASI (Continuous Accumulation of Selected Ion) acquisition method in positive ion mode to image Trifarotene in human skin (five sections per treated tissue and one section per vehicle tissue). An image of the vehicle section sprayed with Trifarotene was performed for TEC (Tissue Extinction Coefficient) evaluation. Based on distribution and quantitation, penetration profiles were constructed.

Results: For the facial skin, Trifarotene was detected in the epidermis (0.437 µg/g of tissue), the dermis (0.236 µg/g of tissue), in the sebaceous glands (0.296 µg/g of tissue) and in the hair follicles (0.850 µg/g of tissue). For the abdominal skin, the compound was weakly detected; few pixels were observed with no specific localization.
Trifarotene detection was below the limit of quantification in the epidermis of the abdominal tissue whereas a significant signal was detected in facial tissue. Modelling indicated that the transfollicular pathway was the primary route of Trifarotene cutaneous penetration.

Conclusions: Trifarotene was mainly detected in the facial human skin and that could be explained by the penetration into the pilosebaceous unit that are numerous in the face.