



AESTHETIC AND COSMETIC DERMATOLOGY (LASERS SEPARATE CATEGORY)

THE EFFECT OF EXPOSURE TO PM_{2.5} ON SKIN PHYSIOLOGICAL FUNCTION

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Introduction: According to the US Environmental Protection Agency, particle pollution, especially fine particles (defined as ≤ 2.5 μm in diameter [PM 2.5]), contains microscopic solids or liquid droplets that are so small that they can get deep into the lungs and cause serious health problems. Like airway epithelial cells, epidermal cells are among the first cell populations exposed to chemical pollutants, and, as the first line of defense against environmental stressors, are an important source of barrier protection and pro-inflammatory mediators. This suggests that PM 2.5 particles may be damaging to the epidermis and compromise its function.

Objective: The purpose of the present study was to investigate the effects of PM 2.5 particles on skin barrier function, cell morphology, physiology, and inflammatory response.

Methods: Reconstructed skin models were treated with three concentrations of PM 2.5 after which skin were tested for changes in transepithelial electrical resistance (TEER), morphology, and the presence of inflammatory mediators.

Results: Skins treated with PM 2.5 particles showed a reduction in TEER. Histological hematoxylin and eosin (H&E) staining showed thickened stratum corneum with vacuolation of nuclei in the living layer, and Ki-67 staining showed a loss of viable cells. An increase in IL-1 α and MMP-1 expression in basal media was observed by ELISA immunoassay.

Conclusion: Through changes in TEER and histological staining, we found that skins treated with PM 2.5 particles showed compromised skin barrier integrity. An increase in cellular proteins was also observed, which would indicate a possible inflammatory response. Through our in vitro model, we can observe the changes in skin physiology induced by exposure to PM 2.5 and in the future, look for ways to protect against the detrimental effects.

