Tobacco Smoke and Chloracne: An Old Story Comes to Light

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In this issue of Dermatology, Patterson et al. [1] report the formation of localised open comedones following occluded cigarette smoke exposure near the nasal cavity due to infrequently changed gauze following rhinectomy. A relationship between cigarette smoke and acne is frequently observed; however, its mechanism of action is still not well understood. Although acne is a very common skin condition, its aetiology remains somewhat elusive, and the sequence of events leading to acne lesions has to be revisited, an idea developed by Saurat [2] in a recent review. There are various forms of acne, and so different sequences of events are likely. A severe form of acne, known as ‘chloracne’ and leading to the formation of metabolising acquired dioxin-induced skin hamartoma (MADISH) [3, 4], is clearly associated with the exposure of chemicals such as polychlorinated dibenzo-p-dioxins and dibenzofurans [5–7], and does not require the presence of Propionibacterium acnes [8]. The main feature of these chemicals is the activation of aromatic hydrocarbon receptor (AhR). Cigarette smoke contains various polycyclic aromatic hydrocarbons (PAH) such as naphthalene, anthracene or benzo(a)pyrene, some of which are relatively potent AhR agonists, and yields a concentration of approximately 1,500 ng PAH per cigarette [9]. Given the high potency of certain of these PAH and the number of cigarettes smoked daily, it seems reasonable to state that many smokers have a permanent activation of the AhR signalling pathway in their skin. Such a strong and sustained activation of this pathway may be able to alter the differentiation of sebaceous gland progenitor cells (Lrig1 cells?) towards an epithelial type, leading to MADISH formation at the expense of sebogenesis [3, 10], an event described as ‘the comedone switch’ and which is a hallmark of MADISH development [2, 4]. The case reported by Patterson et al. [1] describes a very unusual situation where the contact of cigarette smoke to the skin is maintained in a local area under occlusion over a long period of time, and comedones appear precisely in this area.

References