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SMART: An Internet study of users experiences of synthetic tanning

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ABSTRACT

Aims: Socio-cultural values placed on skin tanning equating with health and attractiveness, along with recommended avoidance of excessive UV exposure has fuelled the manufacture, sale and dissemination of synthetic tanning agents. These agents are synthetic analogues of the naturally occurring melanocyte-stimulating hormones (α-MSHs) which stimulate darkening pigmentation of the skin. Despite health marketability and online consumerism, user focused research to date is limited.
Methods: The study presents a unique phenomenological study of user experiences as described on a popular melanotan web resource. Seven themes containing 91 categories were generated from the 467 discussion threads analysed using the Empirical Phenomenological Psychological (EPP) five step method.
Results: Melanotan use is covert by nature and grounded in intentions to achieve a natural looking tan. Positive outcomes outweigh potential risk perceptions in users, despite awareness of lack of regulation of synthetic tanning products and absence of user instructions. Products are marketed online as 'lifestyle choices', sold as 'research chemicals' and labelled 'not for human use' to avoid regulation. A host of acute and chronic side effects, and options for pharmaceutical management of histamine and dermatological responses were described.
Conclusions: Findings illustrate the importance of cyber forums in advocating tentative and calculative approaches to injecting preparation, dosage, photo therapy, loading and maintenance regimes using Melanotan I and II.
Implications: Determination of how to respond effectively to market forces and cyber communities of users necessitates continued researcher, clinician, policy maker and practitioner dialogue, along with ongoing surveillance of trends of sale, supply and use.

1. Introduction

Contemporary public health challenges increasingly centre on the proliferation and consumerism of novel image enhancement products driven by distinct aesthetic and health ideals (Brennan, Van Hout, & Wells, 2013; Cash & Smolak, 2001; Conrad, 2007; Grogan, 2007; Mataix, 2012; McVeigh, Evans-Brown, & Bellis, 2012). One particular area of interest is the ideal of bronzed or tanned skin. Tanning responses are defined as increased cutaneous pigmentation after solar UV light exposure, and are grounded in protective, reparative and cosmetic functions (O'Leary, Diehl, & Levins, 2014; Prior, Fenwick, & Peterson, 2014). Reasons for tanning and sociocultural influences on tanning are positively associated with appearance orientation in both males and females (Boniol, Autier, Boyle, & Gandini, 2012; Cash, Grasso, & Mitchell, 2005; Lazovich & Forster, 2005; Lostritto et al., 2012; Prior et al., 2014). Although skin cancer is one of the most preventable types of cancer, many individuals continue tan purposefully (Harrington et al., 2011; Mosher & Danoff-Burg, 2010; Nolan & Feldman, 2009; Warthan, Uchida, & Wagner, 2005). Positive body image benefits when tanned are immediately salient when compared to the more distant prospect of skin cancer (Hillhouse & Turrisi, 2002). High risk tanning behaviours and associated incidence of melanoma has increased more rapidly than other cancers in recent years (O'Leary et al., 2014).

Research suggests comparisons between excessive tanning and behavioural addictions by virtue of shared excessive engagement in (outdoor and artificial) tanning activities and substance dependence, continuation despite negative consequence and tanning past the point of desired appearances (Harrington et al., 2011; Hillhouse et al., 2012; Mosher & Danoff-Burg, 2010; Nolan & Feldman, 2009; Potenza, 2006; Warthan et al., 2005). Tanning frequency is associated with problematic tanning, tanning dependence and presence of psychiatric disorders characterised by anxiety, preoccupation with deficits in appearance, or obsessive and intrusive thoughts about tanning (Ashrafioun & Bonar, 2014; Mosher & Danoff-Burg,

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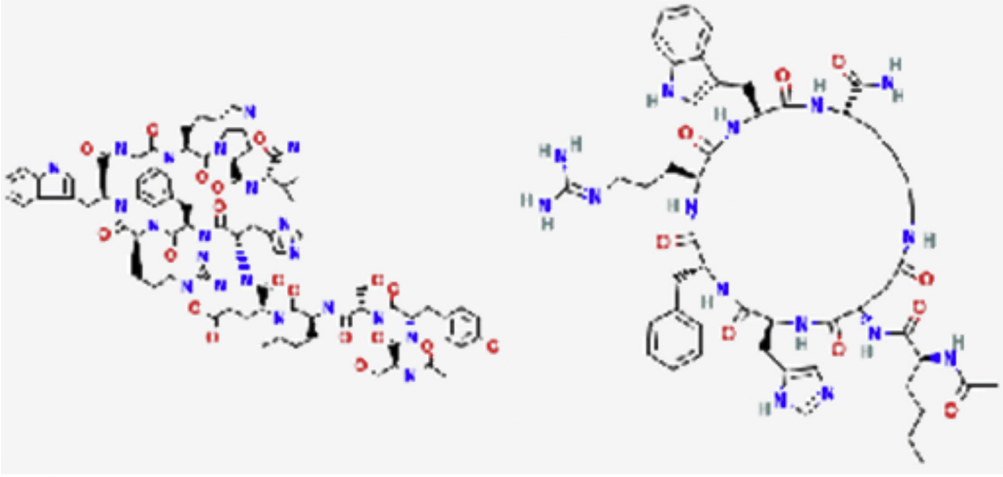

Fig. 1. Melanotan I and II.

Source: www.melanotanforum.com accessed March 24th 2014.

2010; Nolan, Taylor, Liguori, & Feldman, 2009). Current assessment tools include the modified Tanning-DSM and the Tanning CAGE (Warthan et al., 2005). Excessive tanning has been correlated with certain demographics, such as being young, white and female (Dennis, Kim, & Lowe, 2008; Harrington et al., 2011; Heckman, Egleston, Wilson, & Ingersoll, 2008; Mosher & Danoff-Burg, 2010; Poorsattar & Hornung, 2007; Warthan et al., 2005). Ultraviolet (UV) exposure from the sun or UV-emitting tanning devices (Boniol et al., 2012) is a causal factor in development of cutaneous malignant melanoma, basal and squamous cell carcinomas (Boniol et al., 2012; Colantonio, Bracken, & Beecker, 2013; Wehner et al., 2012), and is increasing among young adults and young women (Lostritto et al., 2012).

Public concerns for these risks associated with UV exposure (El Ghissassi et al., 2009; Langan, Nie, & Rhodes, 2010; Monfrecola, Fabbrocini, Posteraro, & Pini, 2000) have stimulated the development and cyber marketing of sunless synthetic tanning agents (Cousen, Colver, & Helbling, 2009; Evans-Brown, Dawson, Chandler, & McVeigh, 2009; Evans-Brown, Kimergård, & McVeigh, 2009; Fitzgerald, Fryer, Dwyer, & Humphrey, 2006; Hadley & Dorr, 2006; Kanayama, Hudson, & Pope, 2012; Paurobally, El Hayderi, Richert, Andre, & Nikkels, 2013; Paurobally, Jason, Dezfoulian, & Nikkels, 2011; Rhodes & Langan, 2011). These unregulated and untested chemicals are chosen by users to circumvent the known risks associated with UV exposure and contain a-melanocyte-stimulating hormone (a-MSH) synthetic analogues, which promote melanogenesis or pigmentation of the hair and skin in mammals (Henninge, Pepaj, Hullstein, & Hemmersbach, 2010; Hueso-Gabriel, Mahiques Santos, Terrádez Mas, & Santonja López, 2012; O'Leary et al., 2014). Potent a-MSH analogues were first synthesised for photo protective effects in the 1980s, with in vitro and in vivo studies indicating potential benefits (Langan et al., 2010). The first regulated and tested a-MSH analogue [Nle4-D-Phe7]-was called 'afamelanotide' which stimulates tanning by increasing production of eumelanin through interaction with the melanocortin 1 receptor (MC1R) (Barnetson et al., 2006). Further studies are underway in terms of prevention of actinic keratoses and squamous cell carcinoma in photosensitive subjects and organ-transplant recipients, for vitiligo, solar urticaria and polymorphous light eruption (O'Leary et al., 2014).

However, since 'afamelanotide', multiple unregulated a-MSH analogues are available for interested users amid a surge in demand for artificial tanning (O'Leary et al., 2014). Melanotan I was the first of these unregulated chemicals with a structure reportedly identical to 'afamelanotide', and with names often used inter changeably (O'Leary et al., 2014). Melanotan I acts on melanocytes to stimulate melanin production, which is the body's pigment responsible for a photo protection of the skin (Dorr et al., 2004). It is currently under phase I and II clinical trials for the treatment of photosensitivity disorder and non-melanoma skin cancer. Melanotan II has emerged in recent years (O'Leary et al., 2014; Sivyer, 2012). Melanotan I and II are more than 1000 times more potent than endogenous a-MSH due to resistance to enzymatic breakdown (Hadley & Dorr, 2006; Langan et al., 2010). However, Melanotan II increases pigmentation at lower cumulative doses than Melanotan I, with greater levels of side effects relating to effects on satiety and sexual stimulation (Mahiques-Santos, 2012; Mataix, 2012; Nelson, Bryant, & Aks, 2012; Ong & Bowling, 2012; Paurobally et al., 2013; Strange, 2009). See Fig. 1. A third variant of Melanotan II is 'bremelanotide' which was originally developed to enhance libido, and now due to its hypertensive properties is currently under study for uses in haemorrhagic shock (Evans-Brown, Dawson, et al., 2009; Evans-Brown, Kimergård, et al., 2009).

There is a lack of research addressing the long term effects of Melanotan I and II despite clinicians reporting concerns around its use relating to increased skin pigmentation, rhabdomyolysis, systemic toxicity with sympathomimetic symptoms, renal dysfunction and reversible encephalopathy syndrome (Javed, Yarrow, & Hemmington Gorse, 2013; Kaski, Stafford, Mehta, Jenkins, & Malhotra, 2013; Nelson et al., 2012). Dysplastic changes in existing nevi, eruptive atypical melanocytic nevi or appearance of new lesions and freckles following melanotan use are common (Burian, 2013; Cardones, Rand, & Richnik, 2009; Cousen et al., 2009; Ferrandiz-Pulido, Fernandez-Figueras, Quer, & Ferrandiz, 2011; Hueso-Gabriel et al., 2012; Javed et al., 2013; Langan, Ramlogan, Jamieson, & Rhodes, 2009; Langan et al., 2010; Ong & Bowling, 2012; Paurobally et al., 2011; Reid, Fitzgerald, Fabre, & Kirby, 2013; Sivyer, 2012; Thestrup-Pedersen & Sondergaard, 2010). Cases of malignant melanomas have also been reported (Ellis, Kirkham, & Seukeran, 2009; Paurobally et al., 2011, 2013). Hueso-Gabriel et al. (2012) have stated that individuals with melanoma risk factors are more likely to suffer onset and transformation of melanocytic nevi, and risk of melanoma development as consequence of Melanotan use. However, O'Leary et al. (2014) comment on the difficulties in presenting causality between Melanotan use and melanoma development as users are typically engaging in high risk UV related behaviours. Identified melanotan user groups include aesthetically driven females, body dysmorphics and male