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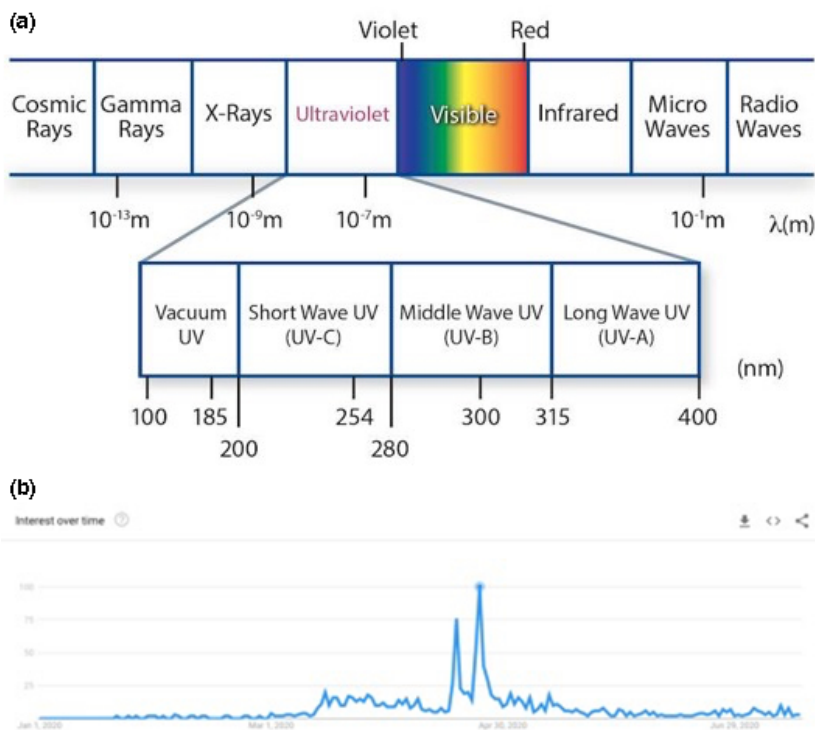
## Shedding light on the myths of ultraviolet radiation in the COVID-19 pandemic

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The rapidly evolving knowledge base surrounding the COVID-19 pandemic has led to anxiety and cognitive dissonance. Misinformation about the role of ultraviolet (UV) radiation has spread rapidly, including statements from the President of the USA in April 2020. Myths related to SARS-CoV-2 and UV radiation are being widely shared on social media,<sup>1</sup> with #uvKillsCovid19 and #UVdisinfection emerging as new search terms on Twitter. It has erroneously been claimed that sunlight and tanning beds, which contain UVA and UVB, eradicate COVID-19 via UV radiation.<sup>2</sup>

However, UVA and UVB are poorly virucidal. The sunlight that reaches earth contains only UVA and UVB, and is ineffective in eradicating SARS-CoV-2. UVC is a shorter wavelength (Fig. 1), and is absorbed by atmospheric ozone, but manmade sources exist. Even a very brief exposure to UVC induces photodimerization of thymine, therefore disrupting nucleic acid replication and rendering micro-organisms nonviable.<sup>3</sup>

Analysis of Google Trends shows that the search term 'sunlight coronavirus' had exponential growth in April 2020 (Fig. 1b), with a relative search index of 100 on



**Figure 1** (a) The electromagnetic spectrum with ultraviolet (UV) highlighted. (b) Interest over time for search term 'sunlight coronavirus' on Google Trends.

24 April 2020. The search 'sunlight kill coronavirus' is one of the highest trending Google searches related to COVID-19 globally.

Tanning salons have tried to remain open in several countries during the pandemic by claiming that their devices destroy SARS-CoV-2. Tanning beds use UVA for immediate tanning and UVB for delayed tanning, emitting no UVC whatsoever,<sup>4</sup> thus this claim is erroneous.

Meanwhile, UV disinfection lamps have been marketed as hand sanitizers.<sup>2</sup> These germicidal lamps use UVC and are toxic to the human skin and cornea, potentially causing radiation dermatitis, skin cancer and visual impairment.

Germicidal irradiation using UVC may have a role in the fight against COVID-19 as a useful mechanism to disinfect and reuse personal protective equipment as well as for sterilization of medical instruments.<sup>5</sup> UVC germicidal bulbs may also be useful in the disinfection of air and water but should not be used in any application with potential exposure to humans.

Multiple myths are circulating about the role of UV radiation against SARS-CoV-2. It is important to highlight the ineffective nature of UVA and UVB and the potentially harmful nature of UVC.

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## Verrucous pemphigus or postpemphigus acanthomata?

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We read with interest the manuscript entitled 'Verrucous variant of pemphigus foliaceus' by Ohashi *et al.*, recently published in *Clinical and Experimental Dermatology (CED)*.<sup>1</sup> The authors described a 53-year-old man who had erosive lesions on the trunk, which were initially treated with prednisolone and ciclosporin after a clinical diagnosis of pemphigus was made. However, the patient then developed keratotic papules and plaques on the chest and abdomen, which had histological and immunofluorescence features compatible with pemphigus foliaceus (PF). These verrucous plaques persisted for many years in spite of aggressive immunosuppressive treatment including methylprednisolone, ciclosporin, intravenous immunoglobulin and plasma exchange. The authors mentioned previous reports of acanthosis nigricans (AN)-like hyperkeratotic lesions occurring during or after re-epithelialization in patients with pemphigus and pemphigoid. The AN-like lesions tended to regress, unlike the lesions described in the *CED* article, and the authors hypothesized that it was an altered response to epidermal injury.

In 1997, we reported a series of 52 pemphigus cases [47 pemphigus vulgaris (PV), 5 PF] from South India of whom 13 patients (10 PV, 3 PF) developed verrucous lesions on healing.<sup>2</sup> We called these lesions 'postpemphigus acanthomata' as they resembled the acanthomata (verrucous lesions) following eczema described by Williams.<sup>3</sup> Clinically, they appeared as hyperpigmented, verrucous plaques with irregular borders resembling seborrhoeic keratosis and were distributed mainly on the trunk. Multiple acanthomata were seen in most cases. These lesions lasted at least 6–12 months and involuted only after complete remission of the pemphigus was achieved. Histopathology revealed hyperkeratosis, acanthosis, papillomatosis and intraepidermal clefting. Two patients had direct immunofluorescence results, which showed the characteristic intercellular fluorescence of pemphigus. These findings were similar to those reported by Ohashi *et al.*<sup>1</sup>

Our conclusion was that acanthomata can, not uncommonly, occur in patients with pemphigus in apparent clinical remission. However, the patients in the Ohashi *et al.* study<sup>1</sup> showed histopathological and immunofluorescence activity and hence may suggest active disease. The presence of persistent verrucous lesions could portend a poorer prognosis and indicate a more recalcitrant variant of pemphigus, as reported by Ohashi *et al.*

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