Correspondence

Comment on: 'Structural and functional differences in skin of colour'

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Dear Editor,

We congratulate Drs Iwuala and Taylor for their recent review in *Clinical and Experimental Dermatology*. In support of this work, biochemical studies conducted on human volar forearms rather than faces were referenced. We would like to share aspects of our own research studying largely the facial skin of women living in South Africa, which we feel are relevant to the discussion on the differences in the structure and function of the stratum corneum (SC) in differently pigmented skin types.

In contrast to the studies discussed in the review,[1] we found no differences in SC cohesion between black Africans and white populations, on either the face or forearm. Additionally, at a single point measurement on the face (30 mm vertically beneath the outer edge of the eye) we observed no difference in basal transepidermal water loss (TEWL), barrier integrity or barrier recovery.[2] Consistent with this finding, we also could not find any differences in the levels or types of ceramides between the two ethnic groups when we measured the 12 major classes of SC ceramides after tape stripping, lipid extraction and mass spectrometry-based lipidomics[3] (Fig. 1a). As with the lack of change in the levels of intercellular ceramides, there was also no difference in the results of Nile red/involucrin-based measurement of corneocyte maturation.[4] Mass spectrometry-based proteomically-determined corneocyte envelope proteins and related enzymes (transglutaminases and lipoxygenases) were also similar (not shown).[3] When using 1/TEWL evaluations to extrapolate SC thickness we observed that the SC was indeed thicker for black Africans on the sun-exposed cheek but not on the sun-protected postauricular (PA) test site.[2] Related to this, we observed a trend of overall decreased kallikrein and cathepsin protein mass levels with significant decreases in kallikrein 5 and cathepsin V levels in black Africans (Fig. 1b).[3] Nevertheless, the SC was more hydrated in the black Africans, which was consistent

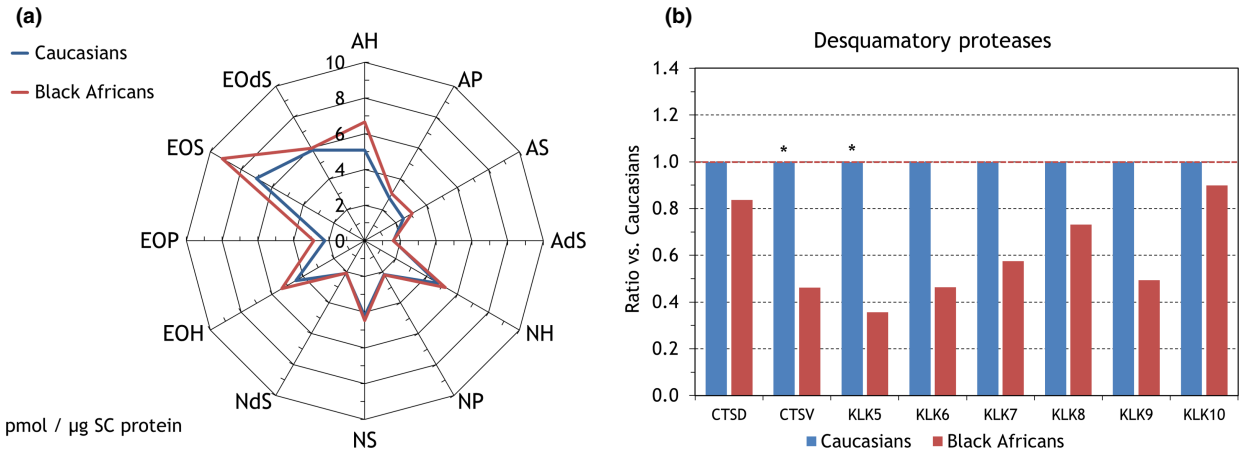

Figure 1 (a,b) Age-matched women were studied: black African (38.2 ± 2.3 years old) and white women (44.6 ± 3.1 years old). Nine consecutive tape strippings were taken on the right cheek 30 mm vertically below the outer edge of the eye. The first tape stripping was analysed by mass spectrometry shotgun lipidomics, and all nine strippings were pooled and analysed by mass spectrometry-based proteomics.[3] (a) Comparison of the 12 most common types of ceramides (EOS, EOP, EOH, EOdS, AH, AP, AS, AdS, NH, NP, NS, NdS) in black African and white women living in South Africa. (b) Comparison of protein mass level of desquamatory proteases in black African and white women living in South Africa. The proteins are listed as gene names and expressed as fold change vs. white women. *$P < 0.05$. CTSD, cathepsin D; CTSV, cathepsin V; KLK, kallikrein (5–10).

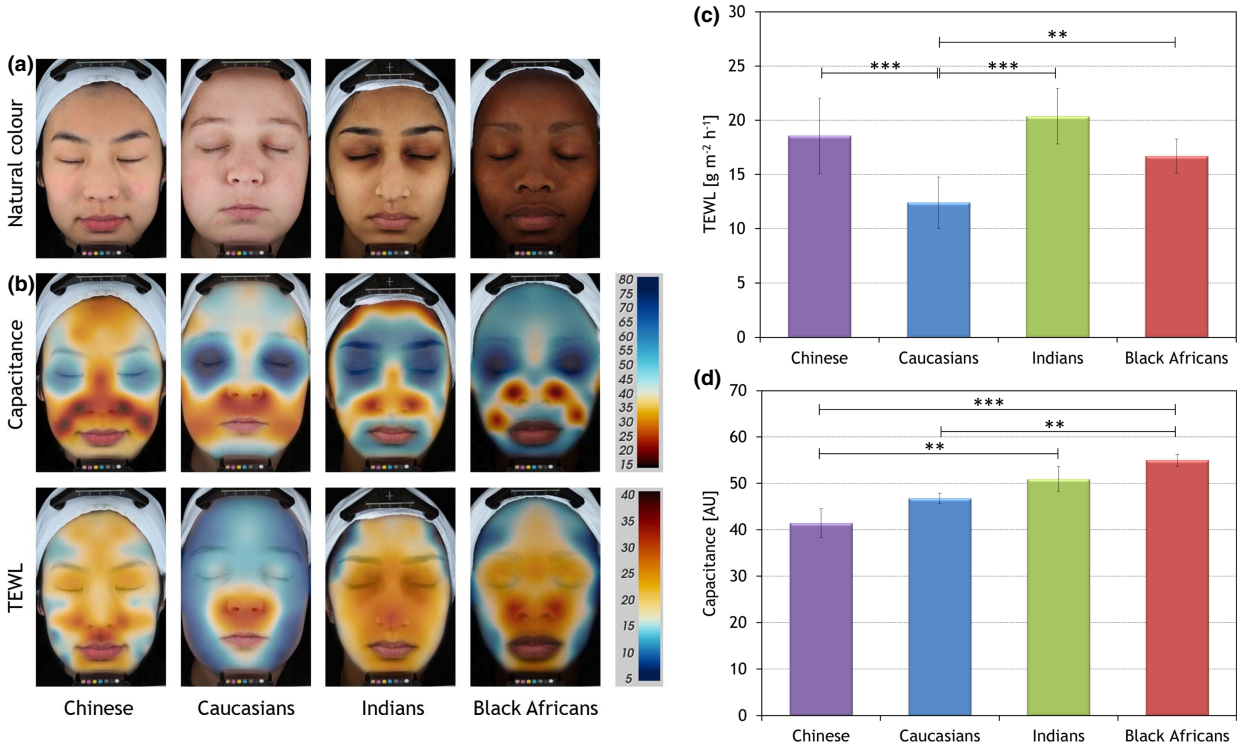

Figure 2 (a,b) Continuous transepidermal water loss (TEWL) and capacitance facial colour maps projected to a selected study participant per ethnicity, mean values of each group. From left: 16 age-matched (21.8 ± 1.1 years old) women of different ancestry: Chinese, white, Indian, black African. Colour code for Corneometer values [15–80 arbitrary units (AU)] and TEWL values (5–40 g/m^2/h) shown on the colour scales on the right. Blue colour represents good skin condition and red colour impaired skin condition. Limit skin condition (40 AU for capacitance values and 16 g/m^2/h for TEWL) is set to white. (a) Unmapped subjects. (b) Mapped subjects. Top row: Corneometer data, bottom row: TEWL data. (c,d) Comparison of overall (c) basal TEWL and (d) capacitance values for the four ethnic groups. Results represent mean ± SEM, $n = 4$ per group, individual means have been averaged from 30 facial measurements. $^{**}P < 0.01$, $^{***}P < 0.001$. More details for the 30 individual testing sites are in the original publication.[5]

with their increased pyrrolidone carboxylic acid (PCA) levels.[4]

We have also developed a continuous colour mapping approach to visualizing facial skin hydration and TEWL at 30 selected facial sites and applied it to four differently pigmented ethnic groups (Fig. 2a,b).[5] The results demonstrate the complexity of these facial skin parameters' capacitance (overall capacitance: black African > Indian > white > Chinese (Fig. 2d); overall TEWL: Indian > Chinese > black African > white (Fig. 2c).[5] Moreover, these results demonstrate that on the face the precise measuring site is crucial in determining any potential ethnic skin difference in these parameters.

In conclusion, we concur that pigmented women of African descent have a thicker SC on the sun-exposed cheeks but we did not find the same on sun-protected PA sites (estimated by 1/TEWL measurements), and in addition, although these women have an overall increase in TEWL, on certain facial sites TEWL may be similar to that of other ethnicities. We did not find decreases in SC cohesion, in the 12 main classes of ceramide types and their total levels or corneocyte maturation assessed by Nile red/involucrin measurements but we did find reductions in mass spectrometry-determined desquamatory enzyme mass levels. It is the latter finding that we believe is more related to any potential skin dryness in our study population.

We hope the authors consider these findings a useful accompaniment to their article.

Conflict of interest

AVR currently consults for No7 Beauty Company (Member of Walgreens Boots Alliance), DSM Nutritional Products Limited, GlaxoSmithKline Consumer Healthcare Limited and Union Swiss; RV is an employee of DSM Nutritional Products Limited. The other authors have no conflicts of interest to disclose.

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Purposeful inclusion of skin of colour in published literature for improved dermatology education: a call to action

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Dear Editor,

Despite efforts to increase diversity in medicine, there remains a lack of racial and ethnic diversity among dermatologists within the USA. This fact, compounded by a growing volume of varied skin tones in the USA, has led to an underrepresentation in dermatological knowledge pertaining to those with skin of colour (SOC).[1] Dermatology is currently the second least diverse medical speciality in the USA.[2] In a field relying heavily on skin inspection, skin tone is an important consideration within the clinical presentation. Better understanding of these clinical presentations, along with improved patient–provider relationships, more robust educational experience for clinicians, and greater approachability and trustworthiness of institutions, can all be accomplished with increased SOC content in high-impact dermatological literature.[3]

With the objective of evaluating the representation of published articles related to patients of SOC in *Clinical and Experimental Dermatology* (*CED*), we developed six categories (Tier 1A–E and Tier 2) with prespecified criteria for assessing diversity in the literature (Table 1). We included 52 dermatology journals selected by their impact factor and Scopus rating, while excluding wound care, burn and dermatopathology journals.

Across all 52 academic dermatology journals included in our study, the mean percentage of SOC articles published was 16.3% (range 2.04%–61.81%). *CED* ranked 13th, with 24.47% of articles published from 2018 to 2020 including patients with SOC. The majority of SOC publications in *CED* originated from Asia (71.2%), followed by Europe (5.3%) and South America (4.88%). This was consistent with the other journals, as the majority (56.90%) of SOC articles originated from Asia. Using our six categories, we classified 71% of the SOC articles published in *CED* as Tier 1B, which were articles or case reports submitted from dermatologists in SOC countries (Fig. 1). This was higher than the average of 61.88% SOC articles classified as Tier 1B in the 52 journals.[4]

As the rankings suggest, the inclusion of SOC publications in *CED* is exemplary. Considering that the journal represents the UK population, in which only a small minority is considered SOC, the journal is on par with its SOC representation in research literature. Nevertheless, there are small areas of improvement. The abundance of Tier 1B articles, the majority of which were case reports, demonstrates decreased diversity in type of SOC publication. Although case reports provide useful information, there is missed value in failing to publish SOC content of other paper types. As a journal that places emphasis on dermatology education, *CED* should ensure it continues the exemplary inclusion of SOC publications in the future,

Table 1 Tier classification of articles on skin of colour.

Tier	Description
1A	Topic includes skin type, race or ethnicity
1B	Region with majority of population has Fitzpatrick skin types III–VI
1C	Topic includes socioeconomic disparities relevant to under-represented SOC populations
1D	Topic includes issues of inclusion in dermatology
1E	Case reports with text/images representing a patient with SOC in a non-SOC country
2	Topic includes pigmentary skin and hair diseases relevant to Fitzpatrick skin types III–VI

SOC, skin of colour.