

## ‘*Trichophyton indotineae*’ is an inaccurate and pejorative term

While India and increasingly many other nations across the world grapple with the rise in recalcitrant dermatophytic skin infections<sup>1-3</sup>, another pressing concern that has risen out of this situation is the inappropriate naming of the novel species as *Trichophyton (T.) indotineae*. The region-specific nomenclature prejudicially impacts the perceptions of clinicians and public alike, ignoring the exhortations of World Health Organisation (WHO), American Society of Microbiology and others.<sup>4</sup>

The species name *T. indotineae* was introduced based on isolates from just two patients, one Indian and one Nepalese, in whom the isolated fungus had previously been identified as *Trichophyton mentagrophytes* Internal Transcribed Spacer (ITS) genotype VIII/*T. interdigitale*.<sup>5</sup> This term has recently become a subject of much debate, especially amongst dermatologists from the Indian subcontinent.<sup>6,7</sup> The two notable concerns include the pejorative connotation of the term ‘*indotineae*’ and the lack of background information of its origin, as well as of the previously prevalent terms used to describe it in the past few years in the said article.

Naming newly described pathogens or diseases after locations/countries has been unfortunately quite common in the past. Examples abound, including Spanish flu, Delhi boil, Madura foot, West Nile virus, New Delhi metallo-beta-lactamase-1-producing Enterobacteriaceae, *etc.*<sup>8</sup> Such names may conceivably have been helpful a few decades ago, but in today’s hyper-connected world, these convey little meaning and are arguably harmful. In most cases, they have been proven to be demonstrably incorrect and often lead to considerable misinformation, stigma, and racial prejudice. This can ultimately harm science by politicising it and tarnish whole countries or regions and their populations for no fault of theirs, especially when their origin is unclear. In a landmark and welcome decision, scientists attending the International Botanical Congress in Madrid in July 2024 have proposed a change of names for more than 200 plants, fungi, and algae species that have a common word with a negative racial connotation. They also voted to create a committee

to deal with the ethics of names for newly described plants, fungi, and algae.<sup>9</sup> As mentioned earlier, the American Society for Microbiology and the WHO have also highlighted the detrimental effects of such naming conventions and have urged scientists to move towards names based on scientific characteristics rather than geography.<sup>4,10</sup>

In fact, it is inappropriate to name the species *T. indotineae* because the origin of this dermatophyte species is currently unknown. Strains now referred to as *T. indotineae* had been detected not just in India but also in other countries like Australia, Oman, and Iran much before the epidemic-like situation of multidrug resistant, often extensive tinea started generating interest in the mid-2010s.<sup>11</sup> Currently, not just India but countries like Bangladesh, Nepal, Sri Lanka, United Arab Emirates, Iraq, Iran, *etc.*, are also battling chronic, treatment-resistant, often extensive dermatophytosis.<sup>12,13</sup> Uhrlass *et al.*<sup>14</sup> in 2022 have provided a comprehensive overview of the global spread and impact of *T. indotineae* identified in over 30 countries across the globe making it a potential public health concern due to its easy transmissibility and phenomenal rise in migration and travel. This species has currently been detected in 42 countries, a fact that argues against the accuracy of the term in the current context too [Figure 1 and Supplementary table]. Süß *et al.*<sup>15</sup> with co-authors of this article too have used a similar term with a negative connotation like ‘Indian genotype’ in the past to describe *T. mentagrophytes* ITS genotype VIII. However, they too have discontinued using the name India/Indian after having been pointed out the geopolitical implications and the potential for stigmatisation, even if inadvertently. Resentment against the term *indotineae* has been more palpable in the past 2–3 years as the number of countries reporting *T. indotineae*, aka, *T. mentagrophytes* ITS genotype VIII, is steadily rising.

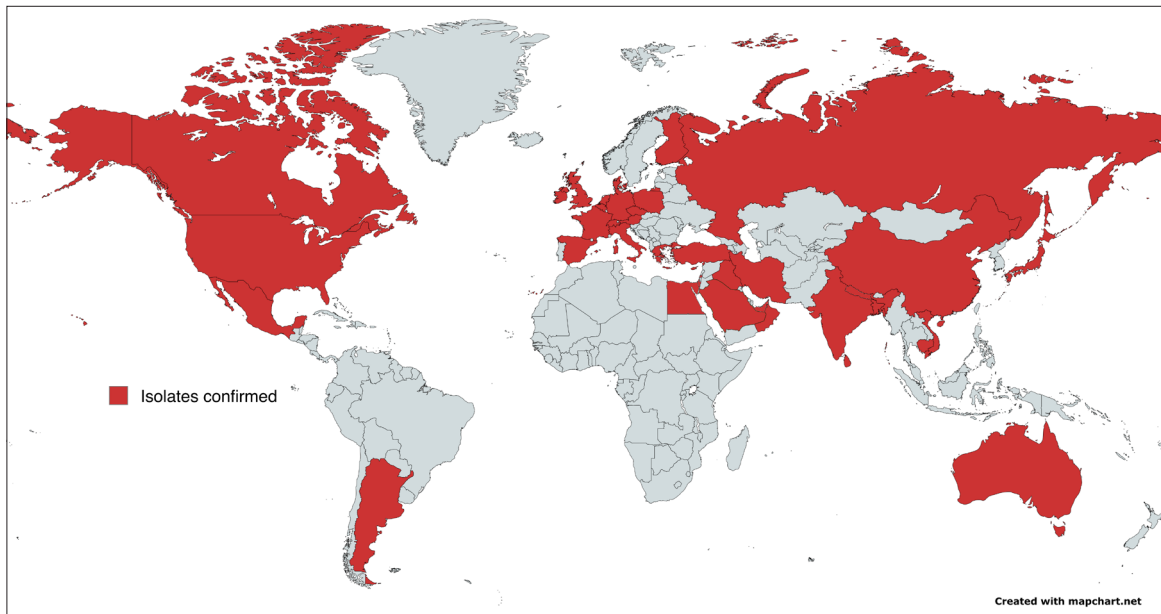
A brief review of the origin and previous names used to describe the new species would be expected to be the norm when the new term, a new species in this case, has clinical implications. The glaring absence of this information while describing *T. indotineae* would potentially confuse clinical

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**Figure 1:** *T. mentagrophytes* ITS genotype VIII/*T. Indotineae*.

dermatologists around the world who are not expected to appreciate microbiological nuances of pathogens and their taxonomy. Since they would form the majority of the personnel handling dermatophytosis resulting from infection with this particular pathogen, not mentioning *T. mentagrophytes* ITS genotype VIII, a term in use before the introduction of *T. indotineae*, is an unfortunate oversight. Some of the co-authors have been inclined to call this oversight an act of 'ignorism', a relatively newly introduced term which others have found to be abrasive and hence has been removed for the sake of courtesy.<sup>16</sup> However, we do feel that such publishing practices are avoidable as they give a lopsided opinion and may add insult to injury. Several debates have ensued among workers between 2016 and until very recently regarding the appropriateness of calling the implicated pathogen *T. mentagrophytes* ITS genotype VIII or whether to call it *T. interdigitale*.<sup>6,17-19</sup> The omission of this particular genotype, a term that had gained momentum in the past few years and is molecularly identical to *T. indotineae*, has understandably perturbed workers who favoured the term. This genotype which has now been named '*T. indotineae*', possibly had a zoophilic origin but 'anthropisation' is suggested to have occurred during its early evolution.<sup>20,21</sup>

In conclusion, we would like to respectfully question the somewhat hurried and inappropriate choice of the suffix '*indotineae*' in describing this new species, especially as (1) its origin is not clearly known yet, (2) it is now clear that it existed in several other countries before it came into the spotlight as the causative agent of treatment recalcitrant dermatophytoses in India<sup>22</sup> and (3) it has now been documented in over 40 countries, where in every case it is not certain that the primary infection originated in India.

The purely morphological identification of *T. mentagrophytes* genotype VIII is not possible, the classification is based on molecular biological typing based on sequencing of the internal transcribed spacer (ITS) region of the fungus' rDNA.<sup>23</sup> Numerous genotypes of *T. mentagrophytes* have been reported over the last 10 years. Currently, at least 15 different genotypes are distinguished within the *T. mentagrophytes*/*T. interdigitale* complex.<sup>24,25</sup> There are probably even significantly more if you look at the currently published genotypes, whose numbering ranges from I to XXXI, so at least 31 genotypes have been described.<sup>14,19,26,27</sup> Ultimately, these can only be distinguished by sequencing the ITS region of the rDNA. Genotypes I and II correspond to *T. interdigitale*, genotype III and III\* to feline strains, there is a specific genotype for rabbits. Recently, a new genotype (*T. mentagrophytes* ITS genotype VII) causing tinea cruris and tinea pubogenitalis has been described.<sup>28-31</sup> If genotype VIII is named '*T. indotineae*', a specific name should also be assigned to the genotype VII which also seems to be an anthropophilic species. However, we encourage careful consideration before naming because a possible route of transmission (probably sexual) may also inflict unintended offense.<sup>32,33</sup> Furthermore, this kind of naming may confuse dermatologists and others who are clinical caregivers and have minimal exposure to mycology nomenclature.<sup>34</sup> Therefore, given the problem of naming, it would be preferable to retain *T. mentagrophytes* genotype VIII or *T. mentagrophytes* VIII, at least temporarily. This would be permissible within the rules of nomenclature without causing an unintended offense to individuals in specific regions or countries. However, calling it just *T. mentagrophytes* (or *T. mentagrophytes*/*T. interdigitale* complex) would lead to a total lack of clarity regarding the nomenclature.<sup>35</sup> It has to

be mentioned, that just now, Švarcová et al. have proposed to classify *T. indotineae* as *T. mentagrophytes* var. *indotineae* (or *T. mentagrophytes* ITS genotype VIII) to avoid more splitting of the *T. mentagrophytes/T. interdigitale* complex and taxonomic confusion.<sup>36</sup>

Perhaps, an international committee or a body should be in place to assess contentious names. Until then such pejorative terms should be discouraged and more neutral terms should be used. In the end, we hope that the stakeholders take due cognizance of our disapproval and 'T. indotineae' is given a non-region-specific name which would better align with the principles of scientific neutrality and fairness while promoting accurate and unbiased communication within the global scientific community.

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