The petrified corpse: First study on the preservation status of the skin

To the Editor: Petrification is a particular method for the artificial preservation of bodies that found wide application in Italy, notably in the 19th century. This technique allowed researchers to maintain the exact features of the deceased, preserve tissue, internal organs, and hair, mostly in a state of stone hardness. This mechanism was based on the replacement of biologic liquids with chemical preservatives mainly obtained through intravascular injections.[1] Each scientist, such as Efisio Marini, Girolamo Segato, and Paolo Gorini, developed a different formula to petrify bodies. Paolo Gorini (1813-1881) was one of the most important experts and performed petrification on hundreds of cadavers, including that of Giuseppe Mazzini.[2] He used 2 formulas, hereby reported as "a sulfuric acid solution in the proportion of 10% or an alcohol-saturated solution of mercuric bichloride and muriate of calcium in the proportion that the volume of the first is 10 times that of the second."[3]

The purpose of this work is to verify for the first time the preservation status of tissues following petrification by Gorini's method.

Our study was carried out on an already petrified body of an unknown individual affected by a widespread bullous skin manifestation (Fig 1, *A* and *B*) held in the Paolo Gorini Museum of Lodi (northern Italy). A superficial fragment of skin free of lesions was taken from the lateroplantar region of the right foot (Fig 1, *C*). The material was similar to a skin biopsy acquired by using the shave biopsy technique and, therefore, consisted mainly of a thin layer of hyperkeratotic epidermis with little underlying dermis. The analysis was performed on microscopic slides after the inclusion of samples in epoxy resin.[4] Resin embedding is an alternative technique used in the study of mummified tissues,

Fig 1. **A**, A petrified body in anatomic position. **B**, Close-up view of face affected by a vesicular and bullous manifestation. **C**, The fragments of skin biopsied from the lateroplantar region of the foot.

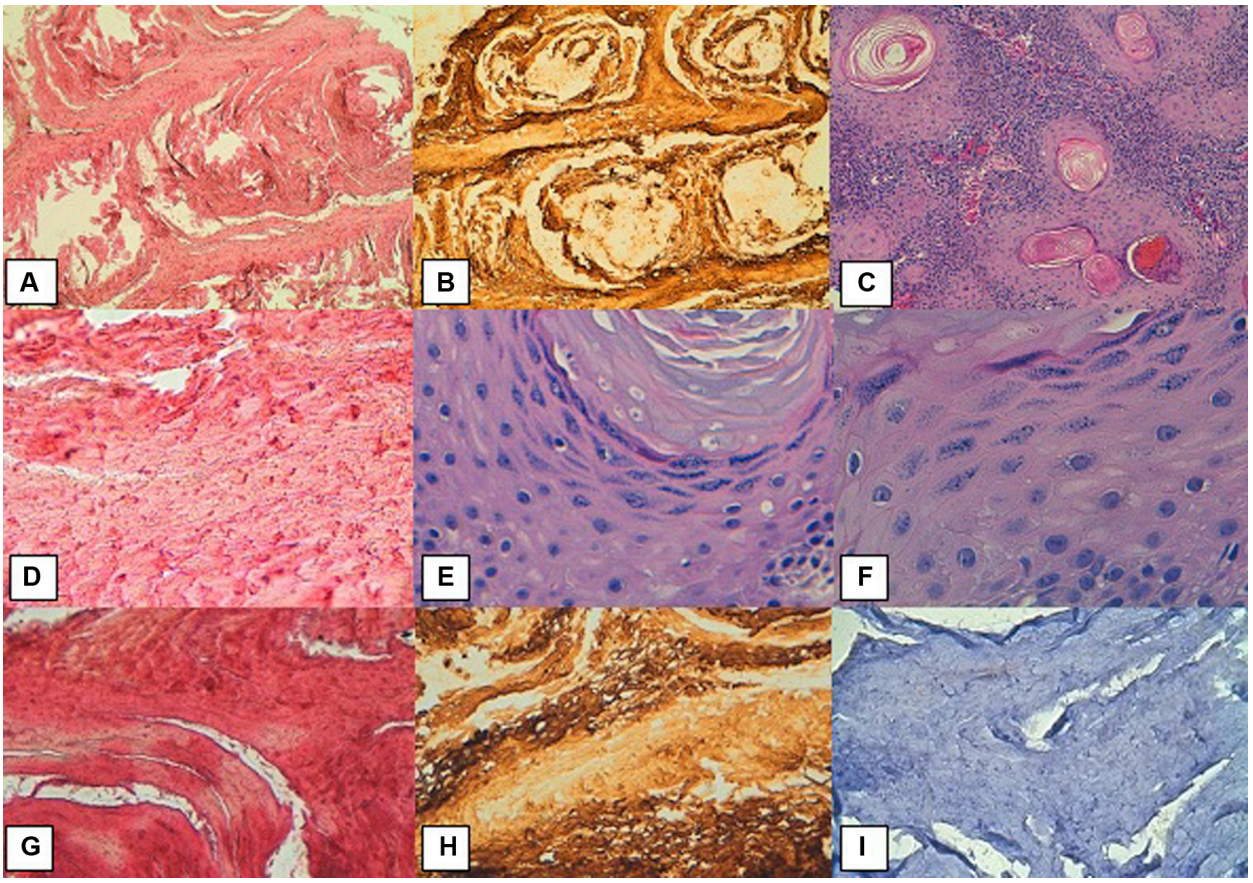

Fig 2. **A**, Compact epidermal tissue, tangentially cut by using the shave biopsy technique, with a different degree of keratinization (higher in the most superficial layers). The layers of epidermis are not easily discernible because of the particular process of tissue preservation. The stratum corneum is detachable from the stratum granulosum and spinosum that are still present. Stratum basale and dermis are absent. **B**, Immunohistochemical (IHC) staining of compact epidermal tissue, with hyperkeratotic superficial layers intensely stained with anti-cytokeratin. In comparison, the basal layers are weakly stained. **C**, Fresh skin collected from an adult that was tangentially cut by using the shave biopsy technique. As in the petrified sample, the epidermal layers are not orthogonally orientated and the dermis is practically absent. **D**, Compact epidermal tissue tangentially cut by using the shave biopsy technique, in which the shadow of nuclei of the stratum spinosum are still recognizable. **E** and **F**, Fresh skin collected from an adult that was tangentially cut by using the shave biopsy technique. These images enable comprehension of the diversity of the general appearance and of the thickness between the 2 tissues because of the completely different conservation techniques. In petrified tissues, the epidermal layers and keratinocytes have remarkably decreased thicknesses and dimensions than fresh tissues; the x40 magnification of petrified epidermis (**D**) is similar to the x20 magnification in fresh epidermis (**E**). **G**, Compact epidermal tissue in which the superficial hyperkeratotic structures are identifiable and tangentially oriented with respect to the deep layers. Superficial dermal tissue is absent. **H**, IHC staining of compact epidermal tissue, with hyperkeratotic superficial layers intensely stained with anti-cytokeratin, at higher magnification than **B**. **I**, IHC staining of compact epidermal tissue with superficial hyperkeratose layers for vimentin. IHC staining was negative for vimentin, confirming the absence of superficial dermal connective tissue. *IHC*, Immunohistochemical. (**A** and **C-F**, Hematoxylin-eosin; **B** and **H**, cytokeratin; **G**, Masson trichome; **I**, vimentin; original magnification: **A**, **E**, **G**, **H**, ×20; **B**, **C**, ×10; **D**, **F**, **I**, ×40.)

the other technique being rehydration of samples and inclusion in paraffin. After resin embedding, a stain with hematoxylin-eosin and Masson trichrome was performed. Other sections were immunohistochemically stained with cytokeratin antibodies (AE1, AE3) and vimentin.

Histologic investigations (Fig 2) revealed a discretely preserved epithelial tissue, with a structure that is still recognizable on the tangential sections (Fig 2, *A*, *D*, *G*). In particular, the epithelial layers are hyperkeratotic, partly consisting of the easily detachable epithelia of the stratum corneum and, to a lesser extent, epithelia of the deeper, more cohesive layers of the stratum granulosum and spinosum, which are still possible to distinguish, especially because of the hematoxylin-eosin stain (the shadow of the nuclei). From the histochemical investigations, the epithelial tissue was found to be positive for cytokeratins and negative for vimentin (Fig 2, *B*, *H*, *I*).

In the literature, the preservation status of natural or embalmed mummified bodies has often been discussed.[5] In this respect, however, historic petrified specimens have never been analyzed. This first study demonstrates that petrification guaranteed good tissue preservation, maintaining the skin's histologic, histochemical, metachromatic, and antigenic characteristics. Positivity for cytokeratin alone and negativity for vimentin demonstrate the reliability of immunohistochemical results, which often in paleopathology show false positives. With a good level of skin preservation, histologic investigations can be carried out on fragments of skin affected by lesions and used to diagnose the dermatologic pathology, possibly smallpox or pellagra, that the person once had.

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Improving Wikipedia skin disease content

To the Editor: Medical articles on Wikipedia receive 10 million daily views,[1,2] and Wikipedia's top 500 skin-related articles received more than 16 million views during August 2018 alone.[3] An editing partnership between the evidence-based medicine organization Cochrane (www.cochrane.org) and Wikipedia was initiated in 2014. Cochrane Review Groups, Centers, and Fields engage with Wikipedia to recruit and train editors and share high-quality Cochrane Review evidence in Wikipedia articles. This research letter evaluates the most-viewed dermatologic articles on Wikipedia and describes the impact that trainees and dermatologists volunteering for the Cochrane Skin Wikipedia Initiative can have by enhancing the content of Wikipedia articles.

Five trainees were recruited to improve applicable Wikipedia articles as part of the Cochrane Skin Wikipedia Initiative. The trainees learned Wikipedia editing and received an introduction to sharing medical evidence on Wikipedia, mentorship from an experienced Wikipedia medical editor, and an up-to-date list of 85 skin-related Cochrane systematic reviews to improve existing Wikipedia articles. The project was supervised by a board-certified dermatologist. Wikipedia statistics were cross-sectionally evaluated and descriptive data on dermatologic articles were recorded.[1,4] The project was waived from institutional review board review.

Each change made to medical Wikipedia articles results in the notification of many editors, including physicians with WikiProject Medicine, a group of