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Human skin fibrosis: up-regulation of collagen type III gene transcription in the fibrotic skin nodules of lower limb lymphoedema

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Abstract in English, French

Objectives: To investigate the cellular and molecular pathophysiology involved in the development of fibrotic skin of grade-3 lymphoedema patients with a focus on collagen types.

Methods: Fibrotic and normal skin biopsy samples obtained from grade-3 lymphoedema patients and normal individuals, respectively, were analysed by histopathology, quantitative real-time PCR and immunohistochemistry to examine collagen gene expression.

Results: Histopathologic analysis revealed epidermal changes such as orthokeratosis, hypergranulosis and irregular acanthosis in the skin biopsies. The thickened dermis contained nodules of haphazardly arranged thick collagen bundles. Real-time PCR data showed significant (P-value 0.0003) up-regulation of Collagen type I and type III gene transcripts in the fibrotic skin of patients resulting in 38.94-fold higher transcription of Collagen type III alpha-1 gene than of Collagen type I alpha-1 gene. Semi-quantification of the per cent of haematoxylin-DAB-stained area of immunohistochemistry images also showed significant ($P < 0.0001$) enhancement of both collagen proteins in the fibrotic skin of patients vs. normal human skin.

Conclusions: Gene transcript analysis revealed significant up-regulation of Collagen type III vs. Collagen type I in fibrotic skin of limb nodules from patient biopsies. Histopathological and immunohistochemical analysis also revealed enhancement of Collagen types I and III in fibrotic vs. normal skin. The findings of this preliminary study indicate the potentially significant involvement of Collagen type III in the development of the fibrotic skin of grade-3 lymphoedema patients.

Keywords: analyse de transcription génétique; connective tissue disorders; fibrose; fibrosis; filariose lymphatique; gene transcript analysis; integrative medicine; lymphatic filariasis; lymphoedema; lymphœdème; médecine intégrative; troubles du tissu conjonctif.