OPTICAL BIOPSY OF MELASMA FOR THE DIAGNOSIS, PROGNOSIS AND THERAPEUTIC DECISION USING IN VIVO NON-INVASIVE HARMONIC GENERATION MICROSCOPY

Ming-Liang Wei1*, Wei-Hung Weng1, Yuan-Ta Shih1, Guan-Liang Lin1, Yi-Hua Liao2 and Chi-Kuang Sun1,3

1National Taiwan University, Molecular Imaging Center, Taiwan
2National Taiwan University Hospital and National Taiwan University College of Medicine, Department of Dermatology, Taiwan
3National Taiwan University, Graduate Institute of Photonics and Optoelectronics, Taiwan

E-mail: b89205102@gmail.com

KEY WORDS: Melasma, melanin, third harmonic generation microscopy, nonlinear microscopy, virtual biopsy, clinical imaging, optical biopsy.

ABSTRACT
Melasma is a common skin disease on the face of hyperpigmentation disorder of melanin and has been the great concern for mid-aged women for the sake of unsightliness. The prevalence rates of melasma, affecting over 5 million people in the U.S., is up to 40% in some females of Southeast Asian populations, and it has brought a huge demand in the field of aesthetic medicine. Although there are many therapies available for the treatments of melasma, melasma is often a therapeutically challenging disease because there is a great variance concerning efficacy of depigmenting treatments from person to person. Since the quantity and distribution of melanin are the main factors of the therapeutic decision and outcome of melasma, dermatologists desire the information of melanin in skin in order to better assess the responses of treatments and to finally eke out their cure.

Harmonic generation microscopy (HGM) is a nonlinear optical microscopy for in vivo label-free optical virtual biopsy of human skin. [1] HGM obtains the desired information from epidermis to dermis for dermatologists, and the enhanced contrast induced by melanin in HGM makes it a valuable technique to realize long-term tacking of melanin, melanocyte, and melanophage distributions in living skin. In this study, thirty Asian women, between 30 to 65 years old and having symmetrically distributed melasma on the cheeks, were recruited, and we propose a method using HGM to long-term tack melanin, melanocyte, and melanophage distributions for the therapy of melasma and to help the dermatologists to improve their curing strategy. This work is sponsored by NHRI Taiwan under NHRI-EX104-9936EI.