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## Fluorescence Detection and Diagnosis of Non-Melanoma Skin Cancer at an Early Stage

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### Abstract:

**Background:** The occurrence of non-melanoma skin cancer (NMSC), including actinic keratosis (AK) is increasing all over the world. The detection and diagnosis of NMSC is not optimal in clinical practice. Complementary methods for detection and accurate demarcation of NMSC at an early stage are needed in order to limit the damage caused by tumours.

**Objective:** The purpose of the present study was to use a large area skin fluorescence detection system to detect early NMSCs (clinical visible as well as non-visible lesions) in the face, neck, chest, back and hands of patients treated with UV and outdoor workers.

**Methods:** Fluorescence detection with a purpose-made digital camera and software (Dyaderm®) combined with 5-aminolevulinic acid (5-ALA) encapsulated in liposomes.

**Results:** In 93 consecutively referred patients positive skin fluorescence was detected in 61 patients. After histological examination the positive fluorescence appeared to be correlated to benign lesions in 28 patients (sebaceous gland hyperplasia in 22 patients) and to (pre-) malignant lesions in 33 patients (actinic keratosis in 29, BCC in 3 and SCC in 1 patient). False negative fluorescence was found in only one lesion. In five patients the FD technique used in this study appeared to be more sensitive for the identification of (pre-) malignant lesions than the clinical examination. This is in contrast with FD techniques used in previous studies.

**Conclusion:** Diagnostic skin fluorescence using liposomal encapsulated 5-ALA and a specialised computerised detection and visualisation system offers the possibility for detection of NMSC at an early, pre-clinical stage. The technique is well suited to examine large areas of skin. It also identifies areas of most interest for performing confirmatory skin biopsies, as well as pre-operative assessment of boundaries of skin malignancies, and finally, the technique is applicable in the control and follow-up of skin cancer treatment.

Key-words: Actinic keratosis, 5-aminolevulinic acid, Fluorescence detection, Liposomes, Skin cancer