

Instrumentation for the measurement of autofluorescence in human skin (Proceedings Paper)

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Paper Abstract

A setup to measure skin autofluorescence was developed to assess accumulation of advanced glycation endproducts (AGE) in patients noninvasively. The method applies direct blacklight tube illumination of the skin of the lower arm, and spectrometry.

The setup displays skin autofluorescence (AF) as a ratio of mean intensities detected from the skin between 420-600 nm and 300-420 nm, respectively. In an early clinical application in 46 and control subjects matched for age and gender, AF was significantly increased in the patients ($p = 0.015$), and highly correlated with skin AGE's that were determined from skin biopsies in both groups.

A large follow-up study on type 2 diabetes mellitus, ongoing since 2001 with more than 1000 subjects, aims to assess the value of the instrument in predicting chronic complications of diabetes. At baseline, a relation with age, glycemic status and with complications present was found. In a study in patients with end stage renal disease on dialysis AF was a strong and independent predictor of total and cardiovascular mortality.

A commercial version of this AGE-reader is now under development and becomes available early 2005 (DiagnOptics B.V., Groningen, The Netherlands). One of the remaining questions, that will be answered by measuring so-called Excitation-Emission Matrices (EEM's) of the skin tissue in vivo, is whether a more selective choice of wavelengths is more strongly related to clinical characteristics. An experimental instrument to measure these EEM's was, therefore, developed as well. Clinical measurements are underway of EEM's in patient groups with diabetes mellitus and in healthy volunteers.

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