

Simple non-invasive assessment of advanced glycation endproduct accumulation.

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AIMS/HYPOTHESIS: The accumulation of AGE is thought to play a role in the pathogenesis of chronic complications of diabetes mellitus and renal failure. All current measurements of AGE accumulation require invasive sampling. We exploited the fact that several AGE exhibit autofluorescence to develop a non-invasive tool for measuring skin AGE accumulation, the Autofluorescence Reader (AFR). We validated its use by comparing the values obtained using the AFR with the AGE content measured in extracts from skin biopsies of diabetic and control subjects. **METHODS:** Using the AFR with an excitation light source of 300-420 nm, fluorescence of the skin was measured at the arm and lower leg in 46 patients with diabetes (Type 1 and 2) and in 46 age- and sex-matched control subjects, the majority of whom were Caucasian. Autofluorescence was defined as the average fluorescence per nm over the entire emission spectrum (420-600 nm) as ratio of the average fluorescence per nm over the 300-420-nm range. Skin biopsies were obtained from the same site of the arm, and analysed for collagen-linked fluorescence (CLF) and specific AGE: pentosidine, N(epsilon)-(carboxymethyl)lysine (CML) and N(epsilon)-(carboxyethyl)lysine (CEL). **RESULTS:** Autofluorescence correlated with CLF, pentosidine, CML, and CEL ($r=0.47-0.62$, $p\leq 0.002$). In 32 of 46 diabetic patients (70%), autofluorescence values were above the 95% CI of the mean value in control subjects, and correlated with age, diabetes duration, mean HbA(1)c of the previous year and creatinine levels. **CONCLUSIONS/INTERPRETATION:** The AFR offers a simple alternative to invasive measurement of AGE accumulation and, to date, has been validated in non-pigmented skin. The AFR may prove to be a useful clinical tool for rapid risk assessment of AGE-related long-term complications in diabetes mellitus and in other conditions associated with AGE accumulation.

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