

THE INNERVATION OF HUMAN SWEAT GLANDS AND EPIDERMIS IS REDUCED IN DIABETES AND VARIES BY GENDER AND SITE, HBA1C

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Objective: We sought to assess sweat gland and epidermal innervation in healthy control and diabetic subjects using different axonal markers, and to assess the role of gender, age and glycemic control on innervations dermis.

Methods: 71 healthy controls, 42 DM subjects had SG numbers and 400 DM subjects had intraepidermal innervation. The innervation density assessed using an unbiased validated stereological technique in skin biopsy sections from the distal leg (d.leg), distal thigh (d.thigh) and proximal thigh (p.thigh). Innervation was assessed using the panaxonal marker, PGP9.5, as well as the adrenergic marker tyrosine hydroxylase (TH), and the cholinergic marker, ChAT.

Results: Among DM subjects there was a 60% and 79% decrease in PGP9.5 staining in SGs respectively at the d.leg ($p<0.05$) and d.thigh ($p<0.05$) compared with controls. D.leg TH fibers were similarly reduced by 69% in DM compared with controls while d-leg ChAT fibers were reduced by 80% ($p<0.05$). Female subjects had higher SGNFD compared to male subjects, at all sites, though there was no effect of age on SGNFD. SGNFD and IENFD were strongly correlated at all sites. Higher A1c values were associated with lower SGNFD and IENFD.

We conclude that measures of sweat gland innervation have potential to assess adrenergic and cholinergic innervation as well as markers of axonal degeneration. DM subjects had lower innervation in SGs and epidermis. Female gender correlated with higher innervation densities while A1C value was negatively correlated. There was no age related decrement in SG innervation among control subjects.