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A novel chemically-modified-curcumin "normalizes" dermal collagen in type I diabetic rats

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Abstract

Objective: To determine the effect of a novel chemically-modified-curcumin (CMC 2.24, phenylaminocarbonyl-curcumin) on accelerated aging of collagen in skin of type I diabetic rats.

Methods: As described by us previously, adult male rats (n=10) rats were rendered type I diabetic by streptozotocin injection. Half were orally administered CMC 2.24 (30mg/kg, 1/day); the other diabetics (n=5) and the non-diabetic-controls (n=5) were administered vehicle alone. After 3 weeks, all rats were sacrificed, skin dissected, weighed, thickness measured, and skin samples were extracted (4°C) to generate salt-soluble, acetic-acid-soluble, and insoluble fractions (hydrolysates of each were analyzed for hydroxyproline). Other samples were analyzed for the Matrix Metalloproteinases, MMP-2 & MMP-8, by gelatin zymography & western blot, respectively.

Results: As expected, diabetes reduced skin thickness (atrophy) associated with increased levels/activity of collagenolytic enzymes (MMP-2 & 8) and decreased levels of newly synthesized (salt-soluble, un-crosslinked) collagen. Oral administration of CMC 2.24, although it did not reduce the elevated blood glucose levels in the diabetics, did "normalize" the measures of collagen synthesis and degradation. There were no adverse effects associated with CMC 2.24 treatment.

Conclusions: CMC 2.24 appeared to reduce collagen-destructive-proteinases (MMP-2 & 8) and increase newly synthesized collagen in skin even in the presence of persistent hyperglycemia in diabetic rats, an animal model of accelerated connective tissue aging. The same compound is currently being tested, and showing evidence of efficacy, as a topical agent in skin lesions.

Biography

Muna S. Elburki is a PhD student in the Dept. of Oral Biology and Pathology, Stony Brook Medicine, State University of New York at Stony Brook. She received her master's degree in Periodontics in 2004 from the University of Manchester, United Kingdom, and she has held a faculty position at the School of Dental Medicine (after receiving her DDS degree) in Benghazi, Libya. Her research focuses on "novel Chemically-Modified-Curcumins as MMP inhibitors: a potential therapeutic in diabetes associated connective tissue breakdown".