A novel mutation of COL7A1 in a Chinese family with dystrophic epidermolysis bullosa pruriginosus

H Tiao1,2, X Hong2, W Wang1,3, X Wang4, C Liu2, W Tang1, C Yuen5, B Wang2, A Huang1, C Wei6, J Zhao2, J Dong2,3, M Zhao2, S Guo1, A An Jolene1, M Parsons4 and J McGrath1

Background: Dystrophic epidermolysis bullosa pruriginosus (DEB-P) is a rare subtype of dystrophic epidermolysis bullosa (DEB) characterized by chronic skin itching. We report here a novel mutation of COL7A1 in a Chinese family with DEB-P.

Methods: A 21-year-old male presented with redundant dorsal and gluteal skin folds, pruritus, and scars. A genetic diagnosis was made by the mutation of COL7A1 gene encoding type VII collagen, fibrosis, and pruritus, which was caused by the mutation of COL7A1 gene encoding type VII collagen fibers, resulting in the destruction of the anchoring structure of the epidermis and dermis. Methods: Histopathological examination and blood sample for the whole-exon sequencing (WES) were performed on the proband. Then we collected blood samples from other affected family members. Informed consent was obtained from all participants.

Results: Characteristic clinical manifestations such as papules, pruritus, and scratches were found in the proband and his family members. Whole exome sequencing revealed a novel heterozygous mutation of COL7A1 in exon 69 c.5767G>A, p.G1922E, which has never been reported before, was detected in all patients in the family, but not in the unaffected members of the family or healthy controls. Conclusion: Our study suggests that c.5767G>A may influence the phenotypic manifestation of COL7A1.

Dermatofibromas are common benign skin lesions, the etiology of which is poorly understood. We identified two unrelated pedigrees in which there was autosomal dominant transmission of multiple dermatofibromas. Whole exome sequencing revealed a rare shared mutation (p.Lys679Met) has an allele frequency of 0.0002 and is predicted to be a damaging variant. Recombinant human Lys679Met FXIII-A demonstrated reduced fibrin crosslinking activity. Immunostaining with α-smooth muscle actin and α-integrins, more prominently for Lys679-Met FXIII-A than the wild type. In addition, both the Lys679Met variant may lead to a conformational change in the FXIII-A protein that enhances adhesion, proliferation, and type I collagen synthesis.

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UV-endoruence and photolyase DNA repair enzymes increase cystein gene expression after UVB induced downregulation

E Kollin,1, A Rosenthal1 and R Møy1
1 Virginia Commonwealth University School of Medicine, Los Angeles, California, United States, 2 Dermatology and Cutaneous Surgery, University of Miami Miller School of Medicine, Miami, Florida, United States and 3 The Moffitt Cancer Center, Moffitt-Longo-Chupp Facial Plastics & Dermatology, Beverly Hills, California, United States

Background: The purpose of this study is to determine gene expression changes induced by UVB and assess the effect of topical UV endonuclease and photolyase in recovery from these changes. Methods: Non-invasive, adhesive patch skin biopsies were performed on the right and left post-auricular area of 48 subjects before and 24-hours after UVB exposure using an excimer laser (308nm). Subjects then applied DNA repair enzymes (UV-endonuence from Anacystis nidulans) to the right post-auricular area only daily for 2 weeks. Subjects returned 2 weeks later for repeat biopsies. RNA was isolated and assessed by reverse transcriptase followed by quantitative PCR to assess gene expression changes.

Results: 7/18 assessed genes demonstrated significant downregulation of (Vitamin A, Programmed Cell death Protein, Small Proline Rich Protein) or upregulation (Interferin Families 1/2) 24-hours following UVB exposure. UV-endoruence (p = 0.015) and photolyase (p = 0.048) were also assessed for their ability to reverse UVB-induced DNA damage and decreases in the cystatin gene family. Conclusion: These results suggest that UVB exposure decreases or increases gene expression and that DNA repair enzymes demonstrate efficacy in reversing these changes. Topical DNA repair enzymes can increase cystein gene expression and may be used for skin cancer prevention for select patients. This study has clinical implications for future skin cancer prevention.