

Studies on Tyrosinase Related Protein-1

Alon Frank ¹

Rangaprasad Sarangarajan, PhD ²

Raymond Boissy, PhD ²

¹University of Cincinnati College of Medicine, second-year medical student

²University of Cincinnati College of Medicine, Department of Dermatology

Oculocutaneous albinism, OCA, is a class of diseases wherein a gene encoding for an enzyme involved in the melanin biosynthetic pathway is mutated or deleted. This defect results in varying degrees of depigmentation and loss of visual acuity. OCA1 is due to a mutation in the tyrosinase (TYR) gene, OCA2 is due to mutations in the P gene, and OCA3 is associated with a mutation in the tyrosinase related protein- 1 (TRP- 1) gene. Although OCA3 has been identified in individuals of African American and African descent, it has never been identified in other subpopulations. Considering TRP-1's role in melanin biosynthesis and its presence in all normal melanocytes, TRP-1 mutations should be expected to occur universally.

The aim of this research was to determine mutations in the TRP-1 gene in a group of patients with noticeable cutaneous hypopigmentation and congenital nystagmus who had normal TYR and P genes. These patients would represent Caucasians and Asians with OCA3, a yet unidentified cohort of individuals. In brief, exons 2-8 of TRP-1 from these patients were amplified by polymerase chain reaction (PCR). The resultant PCR products were analyzed for mutations in the TRP-1 gene by single stranded conformational polymorphism analysis (SSCP). Three consecutive exons from one of the test patients were not amplified by PCR, suggesting a large deletion in the TRP-1 gene. This patient represents the first Caucasian OCA3 patient reported to have a unique nucleotide lesion. SSCP analysis also revealed an aberrant banding pattern for exon 5 of TRP-1 gene in the remaining patients tested. This is indicative of other mutations in TRP-1 gene yet to be identified.