Synopsis of Original Research Paper

Development of melanin synthesis inhibitor targeting MATP localized in melanosomal membrane

Tomoya Yasujima

Graduate School of Pharmaceutical Sciences, Nagoya City University

Melanin is produced from tyrosine by tyrosinase localized in melanosomes in melanocytes present at the cutaneous epithelium. There are also many reports indicating that various amino acid-related compounds other than tyrosine are involved in controlling melanin synthesis. Based on these, it may be likely that transport of amino acid-related compounds for the supply or elimination at the melanosomal membrane by a transporter is involved in melanin synthesis as the rate-determining step. Solute Carrier (SLC) 45A2, which has been identified as a causative gene for Oculocutaneous Albinism Type 4 (OCA4), is for a transporter that operates for translocation of small molecules across biological membranes. It is also notable that the OCA4 patients are present at a quite high frequency among the Japanese. Thus, the designated genetic polymorphism of SLC45A2 has already been indicated to be linked to a major type of OCA, but the mechanism behind that remains to be elucidated. We, therefore, attempted to investigate into that possibility and successfully identified putrescine, an amino acid-related compound as a substrate of SLC45A2. Putrescine has been reported to suppresses melanin synthesis by inhibiting tyrosinase. Based on these, it would be possible to hypothesize that melanin synthesis is impaired in OCA4 patients because of its extensive accumulation into melanosomes due to the dysfunction of SLC45A2. Therefore, elucidation of the function of SLC45A2 and its role in the synthesis of melanin in relation to OCA4 should be of great help in the development of melanin synthesis inhibitor.