Formation of BLOC-2 and BLOC-3 and their roles in the trafficking of tyrosinase proteins
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Biogenesis of lysosome-related organelles complexes (BLOCs) have been shown to mediate the trafficking of melanocyte-specific gene products from their site of synthesis in the trans-Golgi network to their site of action in the melanosome, which is the organelle responsible for skin pigmentation. Mutations in the BLOCs result in a form of oculocutaneous albinism called Hermansky-Pudlak syndrome (HPS), which is also characterized by a bleeding diathesis and pulmonary fibrosis. BLOC-2 is known to contain at least HPS 3, HPS 5 and HPS 6. BLOC-3 is known to contain at least HPS 1 and HPS 4. Initially, this study aimed to confirm the known members of the BLOC-2 and BLOC-3 complexes. Secondly, known members of BLOC-2 and BLOC-3 were localized in the melanocyte, and colocalized with melanocyte-specific proteins. Lastly, additional novel candidate proteins for the BLOC-2 and BLOC-3 complexes were assessed. The molecular weights for HPS 1,3,5 and 6 were identified by western blot analysis. Indirect immunofluorescence allowed for the localization of BLOC-2 and BLOC-3 within melanocytes, and the colocalization of BLOC-2 and BLOC-3 with melanocyte-specific proteins, specifically tyrosinase and tyrosinase-related protein 1 (Tyrp1), which are involved in melanin biosynthesis. Immunoprecipitation studies were conducted to determine candidate binding partners to BLOC-2, which were found to consist of a myosin regulatory light chain and cytoskeleton-associated protein. A candidate binding partner for BLOC-3 was also found, heat shock protein 60 (hsp60). These findings provide additional possible mechanisms for BLOC-2 and BLOC-3 in melanogenesis.