"DECIPHERING THE MECHANISMS OF HUMAN PIGMENTATION WITH THE ELECTRON MICROSCOPE."

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The organelles of the endocytic pathway serve many 'housekeeping' functions such as taking up nutrients; controlling signaling pathways and degrading unwanted macromolecules. Aside these tasks, endocytic organelles can also be exploited for specific functions in certain circumstances. The major goals of our research are to gain a better understanding of the biogenesis and functions of two such specialized endosomal organelles: exosomes, which are secreted from multivesicular bodies, and the lysosome-related organelles of pigment cells called melanosomes responsible for pigmentation of the skin. Both light and electron microscopy have moved cell biology into a new era. Yet subcellular structures and organelles, their specific morphological and compositional characteristics, their intimate details and possible connections can only be seen by high resolution transmission electron microscopy (TEM). We have exploited and developed electron microscopical methods and correlative light to electron microscopy to unravel novel trafficking pathways and to understand how different molecular machineries evolve together to control trafficking events that lead to the biogenesis of pigment granules in melanocytes. Altogether these integrated studies provide for conceptual working models to analyze the modifications of intracellular trafficking occurring during cell transformation, the cellular basis of lysosomal diseases and intercellular communication in health and disease. They will also hopefully contribute to the development of novel therapeutic strategies to overcome pigmentary disorders.

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