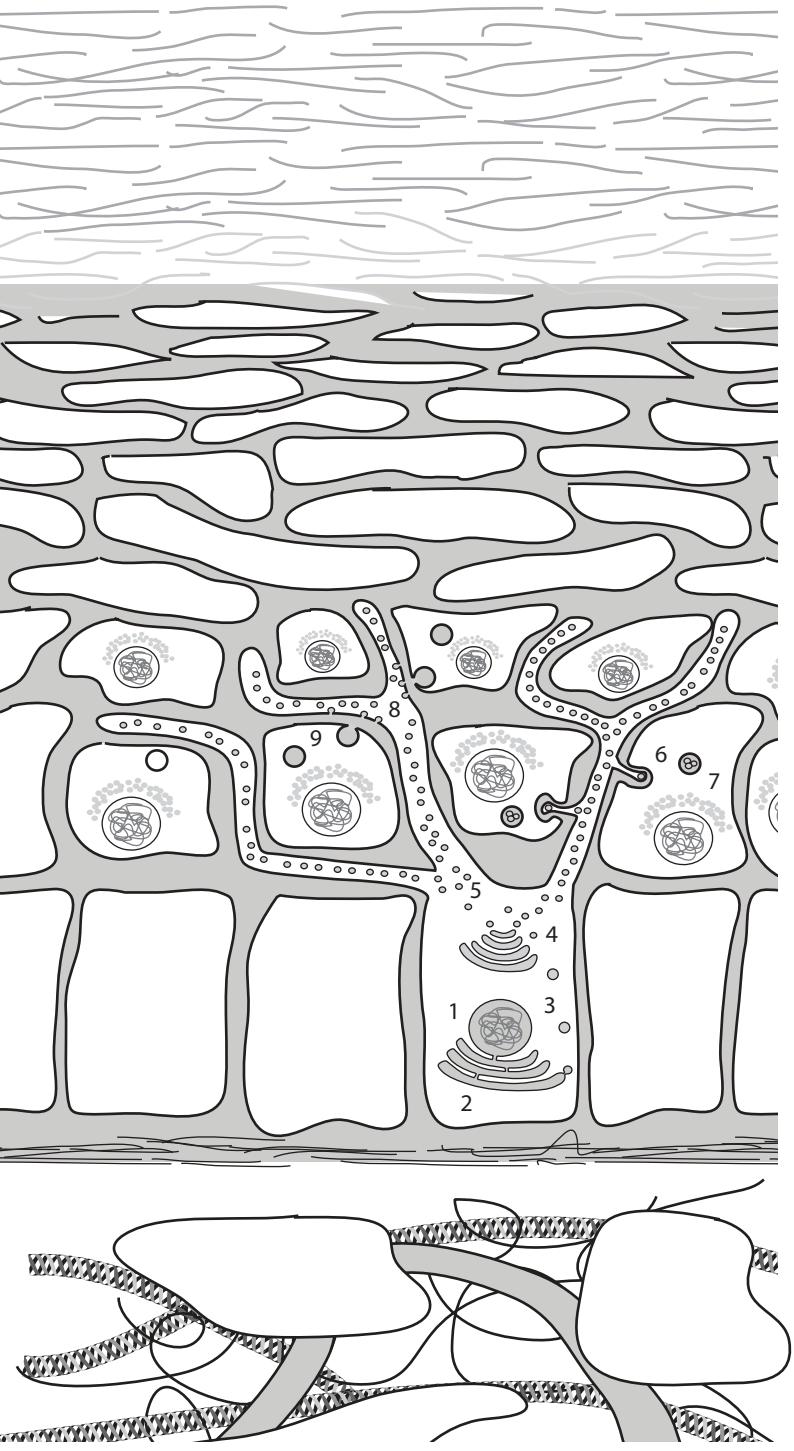
Photoprotection of Keratinocytes by Melanin transfer from Melanocytes



1. Chromatin genes for melanin production are transcribed within the nucleus forming RNA transcript.

2. RNA transcript passes through nuclear pore and is translated by rough endoplasmic reticulum.

3. Transport vesicles transport precurer melanin compounds from rough endoplasmic reticulum to Golgi complex (4). Transport vesicles fuse with first sac of Golgi apparatus for sorting and modification purposes.

4. The process continues as Transfer vesicles transfer products to the next sacs.

5. Vesicles containing melanin (Melanosomes) pinch off of Golgi Apparatus and migrate into dendrites (”branches”) of melanocyte. Melanin continues to develop within dendrites.

   Roughly 40 keratinocytes are in contact with dendrites of a single melanocytes There are several likely processes by which melanin is incorporated into keratinocytes. Two of them are mentioned here.

6. First is by keratinocytes ingesting portions of dendritic processes by a receptor mediated endocytosis from melanocyte dendrites.

7. Once in an endosome, melanin is “unpacked” and distributed around the perinuclear area. Now chromatin has photoprotection from harmful UV radiation.

8. The other mechanism is by exocytosis of melanin into the extracellular spaces.

9. Once in extracellular spaces, keratinocytes ingest the melanin by phagocytosis (perhaps endocytosis). Once in a phagosome (or endosome), the melanin is unpacked and distributed around the apical perinuclear area.

   This process is controlled by the keratinocytes by a cell signaling process. When there is an increase in UV light exposure, the keratinocytes signal the processes described here.