Impact of amino acids on UV absorbance and other properties of melanin-like materials

Despite decades of research, melanin is still poorly defined in terms of chemical structure and properties. In human physiology two distinct classes of melanin are responsible for the coloration of skin and hair: eumelanin and pheomelanin. The presence of elevated levels of pheomelanin in an individual's skin is a risk factor making an individual more prone to develop melanomas. The role of melanin, beneficial or detrimental, in existing melanomas is uncertain. Similarly, melanin is suspected to have an impact on degenerative conditions like Parkinson's disease, Alzheimer's disease, or Lewy body dementia. Given the growing and global incidence of melanoma and degenerative diseases any improved understanding of melanin materials could be valuable in evaluating the impact of melanin on these conditions. Earlier observations from our laboratory have indicated that the *in vitro* synthesis of melanin leads to a colloidal, hybrid material consisting of dark-colored, eumelanin-like substances and an invisible substance. This non-colored substance exhibits strong absorbance capabilities around 280nm and broad, weaker absorbance between 300 and 400nm making it an excellent absorber of UVA and UVB radiation. We have initiated a program to systematically evaluate the impact of the presence of amino acids during the melanin synthesis process on the UV absorbance and other properties of melanin materials. A wide variety of precursors are used to generate melanin materials in the presence of representative amino acids and the color and UV absorbance is monitored during the synthesis. For select precursor/amino acid combinations large scale reactions are set up to generate enough material for more extensive characterization in terms of color, UV absorbance, FT-IR spectroscopic evaluation and physical stability tests in the presence of HCl or salts.