ADVANCED SCIENCE RESEARCH CENTER
THE GRADUATE CENTER
CITY UNIVERSITY OF NEW YORK

FACT SHEET

Media contact: Tanya Domi, 212-817-7283, tdomi@gc.cuny.edu
Paul McQuiston 212-413-3307, paul.mcquiston@asrc.cuny.edu

Lay Summary

Ulijn, Rein V., et. al. June 9, 2017. Polymeric peptide pigments with sequence-encoded properties. *Science*.

Researchers from across the City University of New York (CUNY) have developed a technique to produce materials that mimic some of the properties of melanin — a biopolymer that produces coloring and pigmentation in most animal, marine, and plant life. This advance is encouraging because, in addition to pigmentation, melanin has a variety of other useful properties, including the ability to provide protection from cancer-causing UV rays, act as an energy conductor, and absorb light. The researchers believe these melanin-like materials will allow for those beneficial properties to be translated for use in a variety of products, including cosmetics, biomedicines, and, potentially, energy and image development.

Biopolymers are long chains of molecules found in various living organisms. Most biopolymers, like DNA and proteins, have a variety of ordered structures — each dictating a distinct property or function of the biopolymer. Melanin, however, has a level of structural disorder essential to producing its various properties and functions. Previous attempts to create melanin-like materials in the laboratory were stymied because formation of this class of biopolymers relies on chemical-oxidation processes difficult to reproduce and control, i.e., chaotic molecular structures.

The researchers — centered at the Advanced Science Research Center at the Graduate Center, CUNY (ASRC) — deduced the key to controlling a chaotic molecular process is to start from a highly organized system. They used tripeptides — simple proteins composed of just three amino acids known for their spontaneous formation of organized structures — to guide the development of melanin-like materials in the lab. By manipulating the amino acid sequence of the tripeptides, the research team could precisely control the molecular structure of the pre-polymer, which subsequently led to guided oxidation and formation of melanin-like materials with a variety of pigment shades, shapes, and UV absorption properties.

This new lab protocol allowed the research team to reliably achieve this disorderand to direct the process so the resulting melanin-like material express specific targeted properties (such as depth of pigmentation) and functions (such as conductivity).

The peptides used as starting points for developing these melanin-like materials have low barriers to application and are easily scaled, which will allow the ASRC research team to begin pursuing commercialization of this new technology, including near-term possibilities in cosmetics and biomedicine.