Hair dyeing poised for first major transformation in 150 years

March 2 2011

Technological progress may be fast-paced in many fields, but one mundane area has been almost left in the doldrums for the last 150 years: The basic technology for permanently coloring hair. That's the conclusion of an analysis of almost 500 articles and patents on the chemistry of permanent hair dyeing, which foresees much more innovation in the years ahead, including longer lasting, more-natural-looking dyes and gene therapy to reverse the gray. The article appears in ACS's journal *Chemical Reviews*.

Robert Christie and Olivier Morel note that hair dye already is a multibillion dollar international industry, poised for even greater expansion in the future due to the graying of a global population yearning to cling to appearances of youth. Most permanent hair coloring technology, however, is based on a 150-year-old approach that uses p-phenylenediamine (PPD), a chemical that produces darker, browner shades when exposed to air. Concern over the safety of PPD and other hair dye ingredients, and demand for more convenient hair dyeing methods, has fostered an upswing in research on new dyes and alternative hair coloring technologies.

The scientists describe progress toward those goals. Future hair coloring techniques include nano-sized colorants, for instance. Composed of pigments 1/5,000th the width of a human hair, they will penetrate the hair and remain trapped inside for longer-lasting hair coloration. Scientists also are developing substances that stimulate the genes to produce the melanin pigment that colors hair. These substances promise

to produce a wider range of more natural-looking colors, from blond to dark brown and black, with less likelihood of raising concerns about toxicity and better prospects for more natural results. Other new technologies may stop graying of the hair or prevent its formation altogether, the scientists say.

More information: "Current Trends in the Chemistry of Permanent Hair Dyeing" *Chemical Reviews.*

Provided by American Chemical Society