

# Chemicals in tattoo inks need closer scrutiny

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As tattoos have grown in popularity, so have complaints of adverse side effects associated with both their application and removal. A new study, done by chemistry students at Northern Arizona University, looked at the chemical composition of a variety of tattoo inks to better understand their potential health risks.

The findings, presented at the 229th national meeting of the American Chemical Society, the world's largest scientific society, suggest that closer regulation of the tattoo industry may be warranted, according to the researchers.

Although inks used in tattoos are subject to regulation by the U.S. Food and Drug Administration as cosmetics and color additives, the agency has not traditionally regulated them, letting the task fall to local jurisdictions, according to a fact sheet issued by the FDA Office of Cosmetics and Colors [www.cfsan.fda.gov/~dms/cos-204.html](http://www.cfsan.fda.gov/~dms/cos-204.html). This effectively gives a tattoo artist license to inject whatever he or she deems appropriate under the skin, according to the researchers.

"Tattoos are no longer limited to the rough and rowdy," says Haley Finley-Jones, an undergraduate chemistry student and lead author of the study. "With the growing popularity of tattoos among young people, it is vital that we develop a better understanding of this form of self expression."

The new research — a joint effort between Finley-Jones and Leslie Wagner as part of an undergraduate research project directed by Jani Ingram, a professor of chemistry at NAU — has two main goals: to

characterize the diversity of tattoo inks, and to determine if any inks pose health threats in the form of heavy metals or other potentially dangerous chemicals.

Overall, the study covers 17 inks from five different manufacturers. "We chose to study five different brands of black ink as it is the most common color used in tattoos," Finley-Jones says. The researchers also are testing three different brands of red, blue, yellow and white ink. Tattoo artists frequently mix inks to achieve the desired color, so the researchers selected their samples based on the most likely base colors.

Because there have been no previous studies, they are using analytical techniques that can test for a wide variety of chemical components, rather than looking for a specific group of compounds.

"At this point in the study, we have determined that the inks do in fact vary in composition from manufacturer to manufacturer and from color to color," Wagner says. The researchers also have found some indication of the presence of metals, and are in the process of running more tests to verify the identity of the metals.

A number of potential health problems might be stemming from the lack of oversight, according to the researchers. There have been a variety of claims that tattoo inks cause adverse effects in people, including allergic reactions to ink components, a burning sensation during the course of MRIs, and the migration of inks to different tissues in the body, such as the lungs.

It is unclear, however, what the specific causes of these reactions might be, and the only way to gain better understanding is to know what chemicals make up the inks, the researchers say. Finley-Jones and Wagner expect that the variation found in their testing and the potential presence of toxic metals will encourage regulators to begin monitoring

the tattoo ink industry more closely.

There are other problems with unknown compositions of tattoo inks. For example, surgery to remove tattoos is becoming more widespread, and not knowing the composition makes the procedure more difficult. "Once the components of a tattoo ink have been identified, doctors removing the inks can use their knowledge of the chemical characteristics of the components to select a treatment that will be most effective and, hopefully, the least painful for the patient," Wagner says.

Source: American Chemical Society

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