

Q: Write a factcheck of the following claim using the scientific publications. Mention these publications in the factcheck when you give arguments, percentages or estimates, and also list the same sources below the factcheck under "Sources". For writing style follow a similar layout of the factcheck given in Style Example: headline, lead (80 words summary), claim, verdict, source of verdict, why is this true / not true, conclusion, sources. Give a balanced perspective of the evidence, instead of just saying the claim is true or false. Start the evaluation of the evidence with a brief and simple account of the mechanisms and molecules that are supposed to be at play. Be concise but use easy to understand language. This is the claim [A properly applied tattoo does not spread hazardous substances through the body]

Claude:

Here is a draft factcheck of the claim "A properly applied tattoo does not spread hazardous substances through the body":

Does tattooing spread hazardous substances through the body? The evidence is mixed.

Tattooing involves injecting ink containing pigments and other chemicals into the skin. Some pigments and contaminants may migrate to lymph nodes or other organs, but the extent depends on the chemical properties and particle sizes. Simple pigments like carbon black appear more likely to remain in the skin.

Claim:

A properly applied tattoo does not spread hazardous substances through the body.

Verdict:

Misleading. Some hazardous substances likely spread through the body to a small degree, but the health risks are unclear.

Source of the claim: Unknown.

While tattoo inks have become safer in recent decades, some evidence suggests even modern tattooing may disseminate small amounts of substances:

- Organic pigments like azo compounds can decompose into aromatic amines and other compounds when exposed to light. Traces of tattoo pigments have been found in lymph nodes, suggesting migration [1].
- Insoluble particles like carbon black appear more likely to remain in the skin, while smaller molecules may diffuse to lymph and possibly blood [2].
- In mice, up to 60% of a red pigment disappeared from the skin over weeks, likely entering lymph [3]. Tattoo pigments in humans also fade over years.

- PAHs and metals sometimes contaminate tattoo inks. These may theoretically spread through the body, but little evidence exists in humans [2].

However, the health risks from tattoo ink ingredients that migrate from the skin are likely very small. Systemic toxicity has not been shown. But the long-term effects of low-dose exposure are unknown [1,4].

Conclusion:

Some tattoo ink ingredients likely enter lymph and possibly circulate more widely in the body. But the health risks of modern tattooing appear very low for most people. Claims that tattooing does not spread any hazardous substances are misleading.

Sources:

[1] Bäumlér, W. (2015). Absorption, distribution, metabolism and excretion of tattoo colorants and ingredients in mouse and man: the known and the unknown. In *Tattooed Skin and Health* (Vol. 48, pp. 176-184). Karger Publishers.

[2] Laux, P., Tralau, T., Tentschert, J., Blume, A., Dahouk, S. A., Bäumlér, W., ... & Luch, A. (2016). A medical-toxicological view of tattooing. *The Lancet*, 387(10016), 395-402.

[3] Engel, E., Vasold, R., Santarelli, F., Maisch, T., Gopee, N. V., Howard, P. C., ... & Bäumlér, W. (2010). Tattooing of skin results in transportation and light-induced decomposition of tattoo pigments—a first quantification in vivo using a mouse model. *Experimental dermatology*, 19(1), 54-60.

[4] Kluger, N., & Koljonen, V. (2012). Tattoos, inks, and cancer. *The Lancet Oncology*, 13(4), e161-e168.