

The invisible killer lurking in our consumer products

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Our consumer products can be filled with nanomaterials, but they do not show up in lists of ingredients. Credit: MostPhotos/Tatiana Mihailova

Consumer products such as food, cosmetics and clothes might be filled with nanomaterials, unbeknownst to us. The use of nanomaterials

remains unregulated and they do not show up in lists of ingredients. This is a cause of concern since nanomaterials can be more dangerous than COVID-19 in the long term if no safety action is taken: They are tricky to measure, they enter the food chain, and most alarmingly, they can penetrate cells and accumulate in organs.

Thanks to applications of nanotechnology, many diseases could soon be eradicated; additionally, engineers are developing materials that are 100 times stronger than steel, batteries that last 10 times longer than before, [solar panels](#) that yield twice as much energy than old ones, advanced skin care products, and self-cleaning cars, windows and clothes.

Nanotechnology has the potential to become the next industrial revolution. The [global market](#) for nanomaterials is growing, estimated at 11 million tons at a market value of 20 billion euros. The current direct employment in the [nanomaterial](#) sector is estimated between 300,000 and 400,000 in Europe alone.

Yet, nanomaterials and their use in consumer products can be problematic. A new study published in *Nature Communications* today sheds light on possible harms and what happens to them when they enter an organism. An international team of researchers developed a sensitive method to find and trace nanomaterials in blood and tissues, and traced nanomaterials across an aquatic [food](#) chain, from microorganisms to fish, a major source of food in many countries. This method can open new horizons for taking safety actions.

"We found that that nanomaterials bind strongly to microorganisms, which are a source of food for other [organisms](#), and this is the way they can enter our [food chain](#). Once inside an organism, nanomaterials can change their shape and size and turn into a more dangerous material that can easily penetrate cells and spread to other organs. When looking at different organs of an organism, we found that nanomaterials tend to

accumulate especially in the brain," says lead author Dr. Fazel A. Monikh from the University of Eastern Finland.

According to the researchers, nanomaterials are also difficult to measure: Their levels in an organism cannot be measured only by using their mass, which is the standard method for measuring other chemicals for regulations. The findings emphasize the importance of assessing the risk of nanomaterials before they are introduced to [consumer products](#) in large amounts. A better understanding of nanomaterials and their risks can help [policy makers](#) to introduce stricter rules on their use and on the way they are listed in product ingredient labels.

"It could be that you are already using nanomaterials in your food, clothes, cosmetic products, etc., but you still don't see any mention of them in the ingredient list. Why? Because they are still unregulated and because they are so small that we simply can't measure them once they're in products," Dr. Fazel A. Monikh says.

"People have the right to know what they are using and buying for their families. This is a global problem that needs a global solution. Many questions about nanomaterials still need to be answered. Are they safe for us and the environment? Where will they end up after we're done using them? How can we assess their possible risk?" Dr. Fazel A. Monikh says.

More information: Particle number-based trophic transfer of gold nanomaterials in an aquatic food chain. *Nature Communications* (2021). doi.org/10.1038/s41467-021-21164-w

Provided by University of Eastern Finland

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