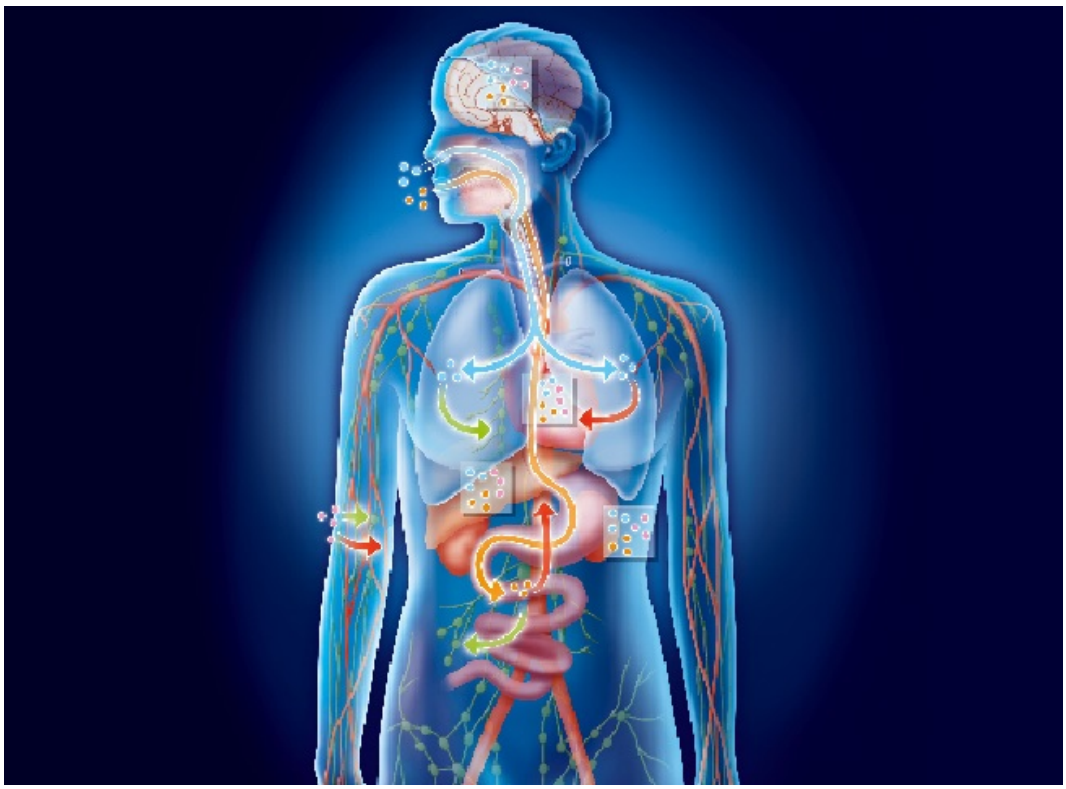
Nano bodies

Last update: 22 February 2017



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What do sunscreen, deodorant, smartphone batteries and tennis rackets have in common, besides being everyday items? They are all likely to contain nanomaterials. These very small objects–from 1nm to 100nm–are increasingly used for industrial, commercial and medical purposes. The number of products containing them leapt fivefold from 2006 to 2011. Nanotechnology may be revolutionary, but is not without risks.

The ever-increasing amounts of nanomaterials going into household waste pose a serious threat to human health and ecosystems. Indeed, engineered nanomaterials are entering landfill sites, incinerators and wastewater treatment facilities that are not designed to filter out particles as tiny as a millionth of a millimetre in size. As a result, nanoparticles are ending up in sewerage sludge used as agricultural fertiliser and in sewage plant effluent that flows into rivers and lakes, as well as in recycled goods.

Because they can more easily penetrate skin and cells than larger compounds, nanomaterials may carry serious health risks from cancer causing properties in

lungs and toxic effects to the nervous system; their antibacterial properties could also harm ecosystems. And yet, waste containing nanomaterials is disposed of along with conventional waste, with no special precautions or treatment. While state-of-the-art waste treatment plants may collect a large share of nanomaterials from waste, less efficient processes used in much of the world mean a significant amount is likely released into the environment as exhaust gas from incineration, as ash applied on roads, as treated wastewater or leaches into soil and water sediment.

The presence of nanomaterials in the dried and composted wastewater sludge that is often spread on farmland as fertiliser poses a particular concern. In France, half the national wastewater sludge is used for agricultural fertilisation. The potential transformation of engineered nanomaterials in soil, their interactions with plants and bacteria and their transfer to surface water has never been studied in depth.

A report, *Nanomaterials in Waste Streams* calls for more work on the risks and impacts of nanomaterials entering waste streams. The report evaluates four waste treatment processes–recycling, incineration, landfilling and wastewater treatment–based on research carried out in Canada, Germany, France and Switzerland– and recommends the adoption of best available technologies and state-of-the-art processes to reduce risk. That is why there are serious concerns about the effectiveness of waste treatment processes that use sub-standard technologies, such as incinerators with insufficient flue gas treatment or uncontrolled landfills.

More research is needed into the type and amount of nanomaterials entering waste streams, what happens to them inside treatment facilities and the potential impacts of residual waste containing nanomaterials. The OECD also urges greater safety measures for workers at recycling facilities.

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Visit www.oecd.org/environment/waste/

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References

Nanomaterials in Waste Streams http://dx.doi.org/10.1787/9789264249752-en