

Letter to the Editor

Nanotechnology and public health

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Nanotechnology is a new revolution in technology; being used in different parts of life such as self-cleaning paints, dirt repellent fabrics, the destruction of cancer cells without harming the person, biosensors that can detect even a single bacterium, odorless socks due to the destruction of bacteria, germ-free refrigerators, disinfection etc. In this article, we consider in the perspective of public health the possible risks of this new technology, which is starting to appear in all areas of our daily lives.

The risks of nanotechnology in public health:

At present it is not exactly known whether nanotechnology engineering contains measurable risks in terms of public health. In this context, studies are being carried out regarding the nanoparticles used in medicine such as quantum dots, carbon nanotubes, or titanium dioxide. Neither the particles will reach the brain and other organs and how the particles will affect health, nor is it known whether waste of products will pass into the soil, groundwater and food chain. These issues are the focus of the present study.

According to the results obtained from studies on animals; granulomas, necrosis, peribronchial and interstitial inflammations have been reported in the

lungs of mice inhaling carbon nanotubes. In fish, the fullerenes reach the central nervous system through the axon of the olfactory nerve and the cardiovascular system has been reported to reduce the levels of glutathione. In experiments made on rats, carbon nanotubes have been shown to increase the risk of vascular thrombosis. The exposure of humans by inhalation of carbon nanotubes, is likely to produce a variety of health problems in the cardiovascular and central nervous system.¹ Experts working with The International Agency for Research on Cancer (IARC), reported that multi wall carbon nanotubes are potential carcinogens for humans.²

Environmental issues are another concern associated with nanotechnology. Although many nanomaterials exist naturally, the release of these substances into the environment has considerably increased since the development of nanotechnology engineering, which allowed them to be artificially synthesized. Environmental release of these nanomaterials may be deliberate or unintentional by decay or as release from water treatment plants. The type, dissolution, precipitation and decay characteristics of the nanomaterials are the essential factors affecting their dissemination in the environment. Nanotoxicology data on some types of

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bacteria, plants and multicellular animals are gradually increasing. However, it is clear that we need a long time to understand the macro effects of nanomaterials on ecosystems.³

Today, the health of employees working in the manufacture of nanotechnological products which has been increasing in the industry, became a concern of current occupational health professionals. Until adequate toxicological data on the effects of nanomaterials on human health are obtained, they should be considered as potentially harmful substances and prudence regarding their use and distribution is important. Nanomaterials in the workplace and employees subjected to exposure to nanomaterials should be identified and health and safety risks should be managed by commencing the risks to employees.⁴

Although there are high expectations for nanomedicine and numerous applications exist, reliability is still uncertain. Present developments show that nanotechnology will hold an important place in the future of medicine. It can be used in disease screening, prevention, diagnosis and treatment of many diseases that currently does not have good prognosis. In Turkey, Bilkent University National Nanotechnology Research Center (UNAM) a project- started in 2006 with the first studies as Phase I. It started to form a corporate identity in 2011.⁵ However, in our country, nanotechnology and nanomedicine research, projects, studies etc. are few yet. More studies of scientists and nanomedicine researchers are required.

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