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Easing Fears About the Smallest Things

02.01.2007 | Faculty, Research, Science, Health University of Dayton researchers have taken a step in easing fears about the medical use of some carbon nanoparticles 8,000 times smaller than a blade of hair.

Diamond nanoparticles - newer, smaller members of the carbon family - may someday be used as nanorobots to carry drugs to certain parts of a damaged cell, where larger nanoparticles in the carbon family cannot reach; or as stronger coatings for bones and joints.

Certain nanoparticles already are used in cosmetics, stain-resistant pants, and ointments. The debate continues about whether the nanoparticles in these products are safe.

But the group's findings, published online in a December issue of the American Chemical Society's Journal of Physical Chemistry B, stated that diamond nanoparticles are not toxic or will not change various rodent cell types. The group, which included the Air Force Research Laboratory and NanoCarbon Research Institute (url: <http://www.wpafb.af.mil/AFRL/>), also found that the cells can survive on nanodiamond-coated surfaces.

Amanda Schrand, a UD graduate student working under Saber Hussain at the Air Force Research Laboratory's Human Effectiveness Directorate, cautioned that widespread medical use of the diamond nanoparticles is years away. What started with the group's trials on rodent skin, lung and nerve cells must evolve to animal and human trials before Food and Drug Administration approval.

"But, this opens up interest to other researchers who now have the option of seeing how nanodiamonds work (in products)," she said. "The objective of this study was to examine the possible biological (toxicity) of the most recent addition to the carbon family."

Diamond nanoparticles produced in bulk are much cheaper than some previously studied carbon nanotubes, according to Liming Dai (url: <http://www.udayton.edu/engineering/?URL=http%3A//academic.udayton.edu/LiMingDai>), a University of Dayton chemical and materials engineering and chemistry professor.

The Dayton Area Graduate Studies Institute and the Oak Ridge Institute of Science and Education funded the group's research, along with partial support from the New Energy and Industrial Technology Development Organization, in Japan.

UD ranks second among all universities and colleges in the nation for industry- and government-funded materials research. Among Catholic universities nationally, UD is first in the amount of non-medical research it performs.

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