

Gold in the News

Prostate Cancer Treatment Turns to Gold

According to ABCOnline, Victoria's Ballarat Hospital is testing a new treatment for prostate cancer that uses grains of gold.

Ten men are participating in the Australian trial, which involves inserting three rice-sized pieces of 24-carat gold into the prostate using ultrasound. Dr Andrew See, from the Ballarat-Austin Radiation Oncology Centre, says the technique saves money and makes radiotherapy treatment more accurate.

He says the gold itself is not a cancer cure. "They're inert, without any radioactivity, don't do anything at all for the cancer," he said. "What it does enable us to do is to act like a global positioning device. What we do when men come for treatment is we can accurately detect within one or two millimetres the centre of where the prostate is, thereby fine-tuning our external treatment." Dr See says the grains of gold can cost up to \$300 each but it is money well spent. "With this technique, we can achieve what can be done with considerable infrastructure upgrade that would normally cost up something in the order of \$3 [to] \$5 million," he said. "So the advantage of this technique is it's a quick, simple, effective way of actually saving cost to the community."

<http://www.abc.net.au/news/newsitems/200411/s1251214.htm>

Bio-barcoding Using Gold Nanoparticles

Combining magnetic and gold nanoparticles with strands of DNA could allow the early detection of Alzheimer's disease, according to a paper in the Proceedings of the National Academies of Sciences and reported in New Scientist magazine.

At the moment identifying and tracking Alzheimer's disease currently relies on brain imaging and psychological testing. But recent studies have revealed several biochemical markers that may provide the basis for a living diagnosis. These include tiny proteins called amyloid-beta-derived diffusible ligands (ADDLs), which exist at elevated levels in the brains of Alzheimer's patients. A team at Northwestern University in Chicago, Illinois, US, has now used a technique called bio-barcoding for detecting ADDL's. The bio-barcoding technique involves the ADDLs becoming sandwiched between two different antibodies. One antibody is attached to a 1000-nanometre-diameter magnetic particle and the other is fixed to a 30-nanometre-diameter gold particle. The gold nanoparticle also has thousands of short segments of DNA attached to it - the so-called barcoding DNA. Once the ADDLs are firmly attached to both types of the nanoparticle, they are drawn off using the magnetic particle. The separated mixture will contain all of the magnetic

nanoparticles initially added but only those gold particles that became attached to the other side of an ADDL protein. The DNA snippets attached to the gold nanoparticles are then chemically released from the gold particles and counted, giving a hugely amplified signal of the original protein.

<http://www.newscientist.com/article.ns?id=dn6946>

New Gold Technology Takes Hospital Laboratory to HIV/AIDS Patients

PointCare Technologies Inc., is the developer of the world's first portable hematology instrument for managing antiretroviral therapy in AIDS/HIV patients. Their new product, the PointCARE monitoring system uses a novel, patented method of identifying cells, such as CD4 cells, using gold-coated microparticles. "The use of gold allowed us to produce the first alternative to fluorescence in flow cytometry. The system is very compact, immediately ready for use and gives results on the scene," said Petra Krauledat, president and chief executive officer of PointCare Technologies, Inc. The PointCARE system is the first portable CD4/hematology system that is a fully automated and easy-to-use alternative to manual flow cytometry. All data are automatically analyzed without the need to pipette reagents or blood, eliminating subjective interpretation.

For more information see:

<http://www.pointcaretechnologies.com/index.html>

Gold 'Bow-tie' Concentrates Light

In the January 2005 issue of Physical Review Letters, researchers from Stanford University have reported the development of an extremely small gold 'bowtie' nanoantenna that focuses visible and near-infrared light to extremely small, intense spots about 20 nanometers in diameter. The bowtie nanoantenna is made from a pair of 75-nanometer long gold triangles separated by a gap of about 20 nanometers. The device combines a lightning-rod-like effect present at sharp metallic points with the tendency of metal nanoparticles to attract electrons between them to capture nearby light and concentrate it in the gap. Because these effects confine the light to a very small area, the light is more than one thousand times more intense than a beam focused using conventional optics. Practical applications of the technology include both microscopy and lithographic manufacturing processes.

For more information see: http://www.trnmag.com/Stories/2005/020905/Nano_triangles_concentrate_light_Brief_020905.html

Gold Helps Clean Water

Palladium on gold nanoparticles

New research from Rice University's Center for Biological and Environmental Nanotechnology finds that nanoparticles of gold and palladium are the most effective catalysts yet identified for remediation of one of the USA's most pervasive and troublesome groundwater pollutants, trichloroethene or TCE. TCE, which is commonly used as a solvent to degrease metals and electronic parts, is one of the most common and poisonous organic pollutants in groundwater. Human exposure to TCE has been linked to liver damage, impaired pregnancies and cancer.



In the CBEN experiments, Professor Michael Wong and collaborators compared the effectiveness of four varieties of catalysts: bulk palladium, palladium powder on an aluminum oxide support base, pure palladium nanoparticles and a hybrid nanoparticle developed by Wong that consists of a gold nanoparticle covered with a thin coat of palladium atoms. Tests in Wong's lab have found that the gold-palladium nano-catalysts break TCE

down about 100 times faster than bulk palladium catalysts.

"We've documented the efficiency of these catalysts in breaking down TCE, and the next step is engineering a system that will allow us to get at the polluted groundwater," said Joe Hughes, professor of civil and environmental engineering at Georgia Institute of Technology and a co-leader of CBEN's environmental research programs. "The scale of TCE contamination is enormous, so any new scheme for TCE remediation has got to clean large volumes of water very quickly for a just a few pennies."

Hughes, Wong and their collaborators hope to develop a device that would include a cylindrical pump containing a catalytic membrane of the gold-palladium nanoparticles. The device would be placed down existing wells where it would pump water through continuously, breaking TCE into non-toxic components.

The research, conducted by engineers at Rice and the Georgia Institute of Technology, will appear next month in the journal *Environmental Science and Technology*, a publication of the American Chemical Society.

For more information see <http://www.physorg.com/news3158.html>

South African Gold Catalyst Development

On February 8th 2005, the South African based research organisation Mintek announced that the first new commercial product developed by the Project AuTEK consortium, formed by South Africa's three major gold mining houses, AngloGold Ashanti, Gold Fields and Hamony, will be a gold based catalyst to be used in gas masks. Currently gas masks use hopcalite which deactivates readily and even more significantly under humid conditions, but a canister with a gold catalyst to remove carbon monoxide by oxidising it would be lighter and smaller. AuTEK, which collaborates with 19 universities internationally, started discussions with catalyst manufacturers about production of gold based catalysts on commercial scale late last year. "We expect commercialisation in the first quarter of 2007," Elma Van der Lingen, Head of Project AuTEK said. Speaking at the AuTEK breakfast held during the Mining INDABA Conference in Cape Town, David Thompson, Consultant to World Gold Council, said "New markets based on new technologies for gold will lead to significant new demand for gold. New gold catalysts and new gold materials are particularly promising technical development areas".

<http://www.miningweekly.co.za/min/utilities/search/?show=63214>