Gold used as safe driver of cancer drug

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The cancer drug cisplatin could be significanly improved by gold nanoparticles, says Dr. Nial Wheate.

(PhysOrg.com) -- Gold nanoparticles can be used as delivery vehicles for platinum anticancer drugs, improving targeting and uptake into cells, according to research published in this month's edition of the international journal *Inorganic Chemistry*.

Researchers at the University of Sydney's Faculty of Pharmacy investigated the appropriateness of different sized gold nanoparticles as components of platinum-based drug delivery systems such as cisplatin.

The researchers studied the cancer drug's controlled synthesis, reproducibility, consistency of drug loading and stability.

According to Dr. Nial Wheate, senior lecturer in pharmaceutical chemistry and leader of the project, the effectiveness of the cancer drug

cisplatin could be significantly improved by gold nanoparticles, which selectively pick up and drive the platinum-based drug into solid cancer tumors.

Dr. Wheate says the team conducted multiple testing regimes on the gold nanoparticles:

"For any new drug to get approval for human clinical trials, it must demonstrate not only efficiency but also the capability of being reproducibly manufactured and stable in storage," he says.

"Developing and making a drug is a lot like building and designing a car. You have to test and retest it for durability and all the safety features.

"Previously, we have shown that platinum drugs can be attached to gold nanoparticles and that cellular uptake and effectiveness levels are greatly improved.

"But we needed to be sure that the benefits of the drug would be consistent. We believed when developing gold nanoparticles as platinum drug-delivery vehicles, it was essential they were reproducible and stable to ensure consistent and safe doses were administered to patients."

Cisplatin is the leading metallodrug used in the systemic treatment of solid tumors.

"To date, however, its use has been limited by severe toxic side effects, attributed to the indiscriminate accumulation of the drug in both normal and cancerous tissue," says Dr. Wheate.

Cisplatin is currently used to treat several types of cancers including testicular, ovarian, bladder, oesophageal, lung, and cervical cancers and melanomas.

Provided by University of Sydney