Editorial

Gold in Biology and Medicine

Gold has been reported to have a number of interesting biological interactions. Recent work at the University of Massachusetts by Dr Derek Lovley demonstrated that gold could be extracted from aqueous solution using microbes known as extremophiles. Biological species of this type could be used to recover gold from some of the waste from gold processing.

We have published papers on uptake of gold species by plants. Work at Massey University in New Zealand by Robert Brooks and his coworkers (*Gold Bull.*, 2000, **33**, 134) demonstrated gold assimilation by root crops, and carrot was shown to be a good candidate for use as a means of recovering gold from mine tailings in an operation called 'phytomining'.

Gold was used for medicinal purposes in ancient China (*Gold Bull.*, 2001, **34**, 24), and soluble gold complexes continue to be used in more modern times for the treatment of rheumatoid arthritis (*Gold Bull.*, 1996, **29**, 53, 87). There is now promise of developments in gold chemistry which could lead to new applications in medicine. In this issue we include descriptions of gold(III) hydroxo complexes which have been found to display significant cytotoxic effects on cancer cell lines.

Recent work in the National University of Singapore by a multidisciplinary research team led by Associate Professor Leung Pak Hing has produced a new class of complexes specially designed for gold-based drugs for cancer treatment. A route has been devised to the synthesis of enantiomerically pure phosphine ligands which can be used

to prepare gold complexes with antitumour activity. Two compounds have shown promise as cures for lymphoma, leukemia and liver cancer. Laboratory tests have shown that when these gold phosphine complexes are used on mice injected with human cancer cells they stopped the cancer from spreading. The use of fluorescent gold compounds to locate tumours has been suggested, following studies on the properties of appropriate systems by Professors John P Fackler and Chad Mirkin at Texas A&M and Northwestern Universities, respectively.

Research into relevant materials science and electronics topics is also defining medical uses for gold in, for example, gold-coated stents and microchip drug delivery systems linked to sensors, so altogether we can expect an increasing number of applications for gold in medicine in the future.

We are continuing to encourage contributions to the generation of new knowledge related to biomedical, pharmaceutical and dental applications as part of the World Gold Council's GROW Programme. Readers with relevant ideas may apply for funding, as described on page 27 of this issue.

A handwritten signature in black ink that reads "David Thompson." with a horizontal line underneath.

David Thompson
Technical Editor