Pioneering Cancer Diagnosis and Therapy using Metal Loaded Nanoparticles

Imagine tiny particles so small they're invisible to the naked eye, yet powerful enough to potentially revolutionize cancer diagnosis and treatment. That's precisely what researchers at Spago Nanomedical have been working on. In collaboration with Spago Nanomedical, we detail our successful loading of these so-called nanoparticles with metals, theoretically enhancing their contrast for imaging techniques like Computed Tomography scans.

With approximately 10 million people succumbing to cancer annually worldwide, the need for more accurate diagnostic tools and effective treatment strategies has never been more urgent. Spago Nanomedical, an innovative research company, has developed a nanoparticle-based product to combat cancer cells. When injected, the product functions by selectively binding to cancer tissue, leading to an accumulation of nanoparticles in the tumors. While these nanoparticles are designed to selectively accumulate in cancer tissue, the precise mechanism of how and where the particles end up in the body is yet to be completely understood. To address this knowledge gap, this thesis aimed to improve the contrast in distribution studies by loading the nanoparticles with new metals.

The project involved loading nanoparticles with the metals bismuth, gadolinium, hafnium and lutetium. These loaded particles were then characterized using several analytical techniques to ensure that the size, shape and chemical composition was suitable. Yet, safety remains paramount, motivating the assessment of toxicity. This was done by subjecting cell cultures to increasing concentrations of our nanoparticles and recording their potential harm.

Through the procedures described above, our research confirmed that these metal-loaded nanoparticles are successfully loaded with the metals, theoretically leading to greater contrast in computed tomography. Our results also show that the particles pose minimal risk to cells, making them promising candidates for further studies and potential use in medical applications. Our findings open doors for more accurate visualization of where the nanoparticles end up within the body of a patient, paving the way for improved diagnostics and targeted therapies.