

Investigation of BHBM-Grafted Gold Nanoparticles as Drug Delivery Agents for Treatment of Cryptococcosis

Cryptococcosis, caused by the fungal pathogen *Cryptococcus neoformans* (*Cn*), is a fatal disease afflicting over 10% of HIV patients. Current antifungal therapies are not effective, with Sub-Saharan mortality rates exceeding 50%. Recently, a novel drug, BHBM (N'-(3-bromo-4-hydroxybenzylidene)-2-methylbenzohydrazide) has been found to be effective in Cryptococcosis treatment. This study aimed to create BHBM drug delivery agents for treatment of Cryptococcosis. Samples treated with BHBM alone did not noticeably reduce infectivity as compared to the control, demonstrating that the drug alone is unable to penetrate the plasma membrane as effectively as when bound to AuNP vehicles. Future work includes in vivo trials and optimization of drug release. Results indicated AuNP treated cells had lower *Cn* infectivity than controls, suggesting an AuNP role in the reduction of *Cn* internalization. This data suggested that AuNPs, without attachment to BHBM, may have applications in cryptococcosis treatment. However, BHBM-grafted nanoparticles produced the lowest infectivity rates overall, a 30% decrease from those of the control group. BHBM's interaction with the cellular membrane led to nanoparticulate ring formation in BHBM grafted AuNP treated samples, presumably amplifying AuNP ability to reduce *Cn* internalization and resulting in lower BHBM-grafted AuNP *Cn* infectivity rates than those of AuNPs.