Synthesis, Characterization, and Stability of Gold (III) complex ions Possessing henanthroline-based ligands

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A five coordinate neutral gold (III) complex possessing a 2,9-di-secbutyl-phenanthroline ligand {[^{secbutyl}phen]$AuCl_3$} has been previously reported in our laboratory. This complex has been shown to have enhanced reduced glutathione (GSH) stability compared to four coordinate square planar complex ions, and has also demonstrated *in vitro* anti-tumor activity. However, the [^{secbutyl}phen]$AuCl_3$ complex has limited *in vivo* activity. We hypothesize that serum albumin limits *in vivo* activity, and recent results indicate that [^{secbutyl}phen]$AuCl_3$ exhibits binding to a bovine serum albumin (BSA) model. Our goal is to make analogous complexes that have varying hydrophobic character and test if this impacts GSH stability and/or serum albumin binding. We have successfully synthesized and characterized two new ligands{[2-secbutyl-phenanthroline ($^{mono\text{-}secbutyl}$phen), and 2,9-di-secbutyl-4-methyl-phenanthroline ($^{methyl\text{-}secbutyl}$phen)] and subsequently made new gold (III) complexes with the ligands{[$^{mono\text{-}secbutyl}$phen][$AuCl_3$], and [$^{methyl\text{-}secbutyl}$phen][$AuCl_3$]}. ^{1}H NMR and single crystal x-ray diffraction experiments confirm that we have made the analogous five coordinate neutral gold (III) complexes. Initial GSH stability experiments indicate that both gold complexes possess similar GSH stability to the previously reported [(secbutylphen)AuCl3] complex. These two new gold complexes will soon be tested for their ability to inhibit *in vivo* tumor cells, with and without the presence of BSA to determine if they have different properties than the original complex.