

In vitro antibacterial and time kill evaluation of mononuclear phosphane-gold (I) dithiocarbamates

ABSTRACT

Four compounds, $R_3PAu[S_2CN(CH_2CH_2OH)_2]$, $R = Ph$ (**1**) and cyclohexyl (**2**), and $Et_3PAuS_2CNR'_2$, $R' = R' = Et$ (**3**) and $R'_2 = (CH_2)_4$ (**4**), have been evaluated for antibacterial activity against a panel of 24 Gram positive (8) and Gram negative (16) bacteria. Based on minimum inhibitory concentration (MIC) scores, compounds **1** and **2** were shown to be specifically potent against Gram positive bacteria whereas compounds **3** and, to a lesser extent, **4** exhibited broad range activity. All four compounds were active against methicillin resistant *Staphylococcus aureus* (MRSA). Time kill assays revealed the compounds to exhibit both time- and concentration-dependent pharmacokinetics against susceptible bacteria. Each compound was bactericidal against one or more bacteria with **3** being especially potent after 8 h exposure; compounds **1** and **3** were bactericidal against MRSA. Compound **3** was the most effective bactericide across the series especially toward *B. subtilis*, *S. saprophyticus*, *A. hydrophila*, *P. vulgaris*, and *V. parahaemolyticus*. This study demonstrates the potential of this class of compounds as antibacterial agents, either broad range or against specific bacteria.

Keyword: Phosphanegold(I) compounds; Dithiocarbamate; Thiolate; Antimicrobial; Time kill assay