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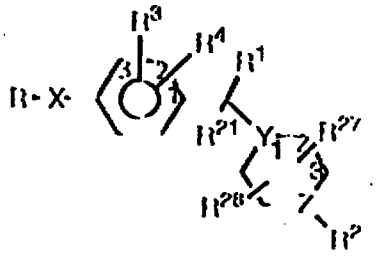
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(54) Title: MUSCARINIC ANTAGONISTS



(I)

(57) Abstract

Di-N-substituted piperazine or 1,4 di-substituted piperidine compounds in accordance with formula I (including all isomers, salts, esters, and solvates) wherein R, $R^1$, $R^2$, $R^3$, $R^4$, $R^{21}$, $R^{27}$, $R^{28}$, X, Y and Z as defined herein are muscarinic antagonists useful for treating cognitive disorders such as Alzheimer's disease. Pharmaceutical compositions and methods of preparation are also disclosed. Also disclosed are synergistic combinations of compounds of the above formula with acetylcholinesterase inhibitors.