Electrostatic medium effects and formal quantum structure-activity relationships in apomorphines interacting with D1 and D2 dopamine receptors

Gómez-Jeria, Juan Sebastián

Ojeda-Vergara, Mario

The binding of apomorphines (AM) to D1 and D2 dopamine receptors is analyzed through a formal quantum structure-activity relationship method. The calculations were carried out at the CNDO/2 level of the molecular orbital theory with a continuum representation of environmental effects. The results show that the D1 receptor affinity variation is related to the variation of the electron-donating capacity of a C atom of the hydroxylic region of apomorphines in a low-polarity medium. The N-chain probably interacts with a hydrophobic region of the receptor. It is also concluded that the poor results for the D2 binding affinity are explained by errors in the experimental measurements. Finally, it is proposed that future structure-activity relationship studies must be carried out for media of different polarities.