In this work, a curcumin-diglutaric acid (CurDG) prodrug was synthesized by conjugation of curcumin with glutaric acid via an ester linkage. The water solubility, partition coefficient, release characteristics, and antinociceptive activity of CurDG were compared to those of curcumin. The aqueous solubility of CurDG (7.48 μg/mL) is significantly greater than that of curcumin (0.068 μg/mL). A study in human plasma showed that the CurDG completely releases curcumin within 2 h, suggesting the ability of CurDG to serve as a prodrug of curcumin. A hot plate test in mice showed the highest antinociceptive effect dose of curcumin at 200 mg/kg p.o., whereas CurDG showed the same effect at an effective dose of 100 mg/kg p.o., indicating that CurDG significantly enhanced the antinociceptive effect compared to curcumin. The enhanced antinociceptive effect of CurDG may be due to improved water solubility and increased oral bioavailability compared to curcumin.