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James D. White, Peter Hrnciar, and (+)-morphine Frank Stappenbeck Department of Chemistry, Treatment of severe pain Oregon State University (+)-morphine, unnatural isomer Corvallis, OR 97331 J. Org. Chem. 1997, 62, 5250. NMe Horacio F. Olivo Abstracted by: HO Ħ SYNTHETIC PATHWAYS ŌН **UNIVERSITY OF IOWA** CO₂Me ,,\CO₂Me H₂, [Rh(COD)Cl]₂ (4R,5R)-(-)-MOD-DIOP Br₂, HOAc 93% MeO CO₂H CO₂H MeO 100%, 94%ee isovanillin + dimethyl succinate OH Stobbe condensation Org. react. 1951, 6, 1 Br Br Friedel-Crafts ,,\CO₂Me ,√CO₂Me H₂, Pd/C, NaHCO₃ Ms-OH, P₂O₅ DME, 0 °C 75% MeO CO₂H MeO 85% 0 ÒН ÓН ∖CO2Me ,\CO₂Η KH, HCO₂Me ,\CO₂Η LiOH DME, 0 °C THF-H₂O MeO 100 % 85% MeO MeO ÔН 0 0 Ö ÒН OH 0 92Perkin1, 1415 5 MVK, Et₃N CH₂Cl₂, 95% NaOH, CH_2N_2 H₂O-THF Ю Et₂O-CH₂Cl₂ 7a 95% MeO MeO

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OH

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Robinson

annulation

95%

synthetic pathways, page 3, synthesis of (+)-morphine