A STEPWEISE RING ENLARGEMENT REACTION OF LACTAMS

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The conversion of caprolactam to eight-membered unsaturated lactams has been described. The reaction of the seven-membered N-acetylketene-O,N-acetal with $PhHgCCl_3$ afforded the dichlorocarbene addition product I, whose structure was confirmed mainly by its characteristic mass spectral fragmentation pattern. The ring opening of the resulting dichlorocyclopentane moiety of I was effected by 1) $LiAlH_4$ reduction of the N-acetyl group followed by base treatment and 2) O-ethylation of the N-acetyl group by $Et_3O^+BF_4^-$ followed by mild hydrolysis, affording 1-ethyl-1,2,5,6,7,8-hexahydro-2-oxoazocine and 1,2,5,6,7,8-hexahydro-3-chloro-2-oxoazocine, respectively.