T_1 for GpC was twice as large as that of RNase T_1,[3] and similarly, *Ki* value of DHT-RNase T_1 for 2′,(3′)-GMP was about four times as large as that of the native RNase T_1.

In the case of RNase T_1, *Ki* value for $(Cp)_3Gp$ was slightly higher than that for 2′,(3′)-GMP. Although we were unable to measure the exact *Ki* value for $(Cp)_3Gp$ of DHT-RNase T_1, the value was more than 60 times higher than the *Ki* value for $(Cp)_3Gp$ of the native RNase T_1. The experiments shown above seem to indicate that modification of RNase T_1 by DHT-group is quite unfavorable for the binding of guanylic acid residue having large nucleotides chain at 5′-OH side. Whether this phenomenon is due to the steric interference of DHT-group or the change in conformation of RNase T_1 is not clear at present. According to Kasai, optical rotatory dispersion or circular dichroism curves for RNase T_1 and DHT-RNase T_1 around 220 nm were very similar, but some differences were observed around at 270 nm. Of the three groups modified by DHT, the modification of tyrosine residue might be responsible for this phenomenon, because the introduction of trinitrophenyl group at lysine and NH_2-terminal alanine residues of RNase T_1 did not give such character to RNase T_1.[11] From the evidence described above, it was concluded that a peculiar nature of DHT-RNase T_1 towards RNA was probably due to the unfavorable effect of the modification on the binding of guanylic acid residue having polynucleotides at 5′-OH side.

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Synthesis of Pyrrolo[2,1,5-*cd*]indolizine, Cycl[3,2,2]azine[1]

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Cycl[3,2,2]azine (III) was synthesized from II by Pd-C dehydrogenation.

Previous approaches to the synthesis of cyclazines have been largely based on annelation procedures employing quinolizines,[3] indolizines[4] or pyrrolizines.[5]

The dehydrogenation by Pd-C of readily accessible octahydropyrrolo[2,1,5-*cd*]indolizine(II) now reported is a new approach to the synthesis of pyrrolo[2,1,5-*cd*]indolizine(III), otherwise known as cycl[3,2,2]azine (Fig. 1).

II was readily obtained in yield of 48% as the free base by dry-distilling ethyl 3-oxoindolizidine-5-propionate(I) with the same, or half the amount of soda lime as described in the previous paper.[1a]

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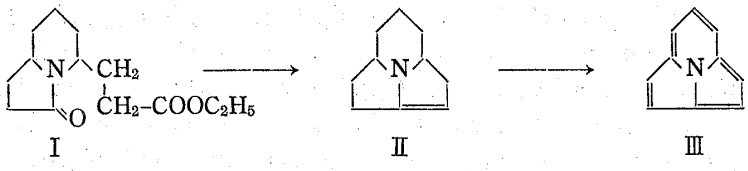

I II III

Fig. 1

The dehydrogenation of II was heated with 5% Pd-C directly, or under reflux in dioxane afforded easily a cycl[3,2,2]azine(III) in 24% and 11% yield, respectively.

The identity of the reaction product as III was confirmed by mp and ultraviolet (UV), infrared (IR) and nuclear magnetic resonance (NMR) spectroscopic comparison with those reported previously.[4a,6]

Experimental

1,2,4,4a,5,6,7,7a-Octahydropyrrolo[2,1,5-*cd*]indolizine (II)——II was prepared as described in the previous paper[1a] from ethyl 3-oxo-indolizidine-5-propionate (I). mp 93° (from ether). Perchlorate, mp 172° (decomp).

Pyrrolo[2,1,5-*cd*]indolizine (III: Cycl[3,2,2]azine)——1) II (200 mg) was refluxed for 8 hr with 5% Pd-C (2 g) in dioxane (10 ml). After removal of the Pd-C and the dioxane solvent *in vacuo*, a yellowish viscous residue was taken up in *n*-pentane or *n*-hexane and chromatographed over Silica gel column (1.5×20 cm, Wakogel C-200). The *n*-pentane or *n*-hexane eluates on evaporation afforded a yellow solid on trituration with a drop of MeOH which yielded 20 mg (11%) of III.

2) II (200 mg) was heated directly with 5% Pd-C (500 mg) on oil bath (200±5°) for 5 hr, and extracted with *n*-pentane. The product was purified as described above, which gave 45 mg (24%) of III. Recrystallization of the product (III) from MeOH gave yellow needles, mp 63—64°. III was found to be completely identical with those of the authentic sample in their IR, UV, NMR, and mp.

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