Sir:

In the course of our studies on alkaloids from microorganisms, alkaloid AM-6201 was isolated from culture broth of *Streptomyces xanthochromogenes* strain No. AM-6201, and was found to have antitumor activity against Ehrlich ascites carcinoma in mice. In this paper we report the structure of the alkaloid AM-6201.

Characterization of Alkaloid AM-6201

Pale yellow needles of mp. 232–233°C (from benzene). IR νmax (chloroform) cm⁻¹: 3380, 3270, 1762, 1750, 1630. [α]D +306° (c 0.26, acetone). UV λmax (methanol): 282 nm (ε = 26300); 290 nm (ε = 25995). 1H NMR (100 MHz) δ: 13.71 (1H, s, 3-OH)***, 7.84 (1H, s, NH)***, 7.48 (1H, d, J = 15 Hz, 3’-H), 6.84 (1H, t, J = 3 Hz, 5’-H), 6.71 (1H, dd, J = 8 and 3 Hz, 2’-H), 5.86 (1H, d, J = 15 Hz, 2’’-H), 3.06 (1H, ddd, J = 15, 8 and 3 Hz, 3’-H), 2.68 (1H, dt, J = 15 and 3 Hz, 3’’-H), 2.68–2.45 (4H, m, 4- and 5-H2), 2.10 (3H, s, 2’-OCH3). 13C NMR (25.1 MHz) δ: 197.2 (s, C-1), 173.9 (s, 2’-OCH3), 169.4 (s, C-1’’), 165.9 (s, C-3), 150.6 (d, C-5’), 135.6 (d, C-3’’), 115.5 (d, C-2’), 115.2 (s, C-4’’***), 114.8 (s, C-2’’***), 98.6 (d, C-2’), 34.4 (t, C-3’’), 32.3 (t, C-5), 25.7 (t, C-4), 20.9 (q, 2’-OCH3). *Anal. Calcd. for C14H19NO6: C, 57.33; H, 5.16; N, 4.78. Found: C, 57.12; H, 4.99; N, 4.60. Mass m/z: M+, 293.090 (M, 293.089).

Structure Elucidation

On ozonization and reductive degradation, AM-6201 (1) afforded the cyclopentenone (2), C5H8NO4, and the triol (3), C11H16O5. The 1H NMR spectrum (90 MHz, acetone-d6) of 2

![Chart 1](https://example.com/chart1.png)

* The 1H and 13C NMR spectra were taken in deuteriochloroform unless otherwise noted.
** On addition of deuterium oxide, this signal disappeared.
*** These assignments may be reversed.
showed two two-proton triplets for an ethylene group at $\delta$ 2.58 ($J=6$ Hz) and 2.53 ($J=6$ Hz), and a two-proton triplet for a methylene group coupled with a hydroxyl group at $\delta$ 4.25 ($J=5$ Hz). Treatment of 2 with diazomethane gave the enol ether (4) [$^1$H NMR (90 MHz): $\delta$ 4.02 (s) for OMe]. Its $^{13}$C NMR spectrum (25.1 MHz) showed signals for four quaternary, three methylene and one methyl carbons. Thus, the structure of 4 is deduced to be 2-glycolamido-3-methoxy-2-cyclopenten-1-one on the basis of the $^1$H and $^{13}$C NMR data. As expected, hydrolysis of 2 with hydrochloric acid yielded 2-amino-3-hydroxy-2-cyclopenten-1-one (5) and glycolic acid (6) which were identified with authentic samples, respectively. The triol (3) was identified with an authentic sample of 1,2,4-trihydroxybutane. Treatment of 1 with diazomethane gave the enol ether (7) [$^1$H NMR (100 MHz): $\delta$ 4.06 (s) for OMe], suggesting the presence of an enol function. It is clear, at this stage, that the 2-acrylamido-3-hydroxy-2-cyclopenten-1-one moiety is present in the framework of 1.

The $^1$H NMR spectrum (100 MHz) of 1 provided two one-proton doublets for an (E)-acrylamide group at $\delta$ 7.48 ($J=15$ Hz) and 5.86 ($J=15$ Hz), and a three-proton singlet for an acetoxy group at $\delta$ 2.10. Decoupling experiments showed the presence of a system (8) consisted of a methylene group coupled with a proton vicinally and a proton in the long range mode.

Taking into account that ozonolysis of 1 was accompanied by loss of three carbon atoms, the rest of the framework of 1 can be determined to be 2-acetoxy-2,3-dihydrofuran-4-yl moiety. The structure of 1 shown in Chart I is in accord with the $^1$H and $^{13}$C NMR data observed (vide supra), and ozonolysis pathway can be reasonably explained. Recently, Shimizu et al. reported the structure of reductioycin (9) isolated from Streptomyces griseorubiginosus nov. sp., in which the positions of the nitrogen and oxygen atoms are reversed to those in 1$^{1,2)}$. Since the physicochemical, spectral properties and mass fragmentation of 1 are quite similar to those of 9$^{3)}$, both compounds are thought to be the same.

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(Received June 25, 1981)

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