Communications to the editor

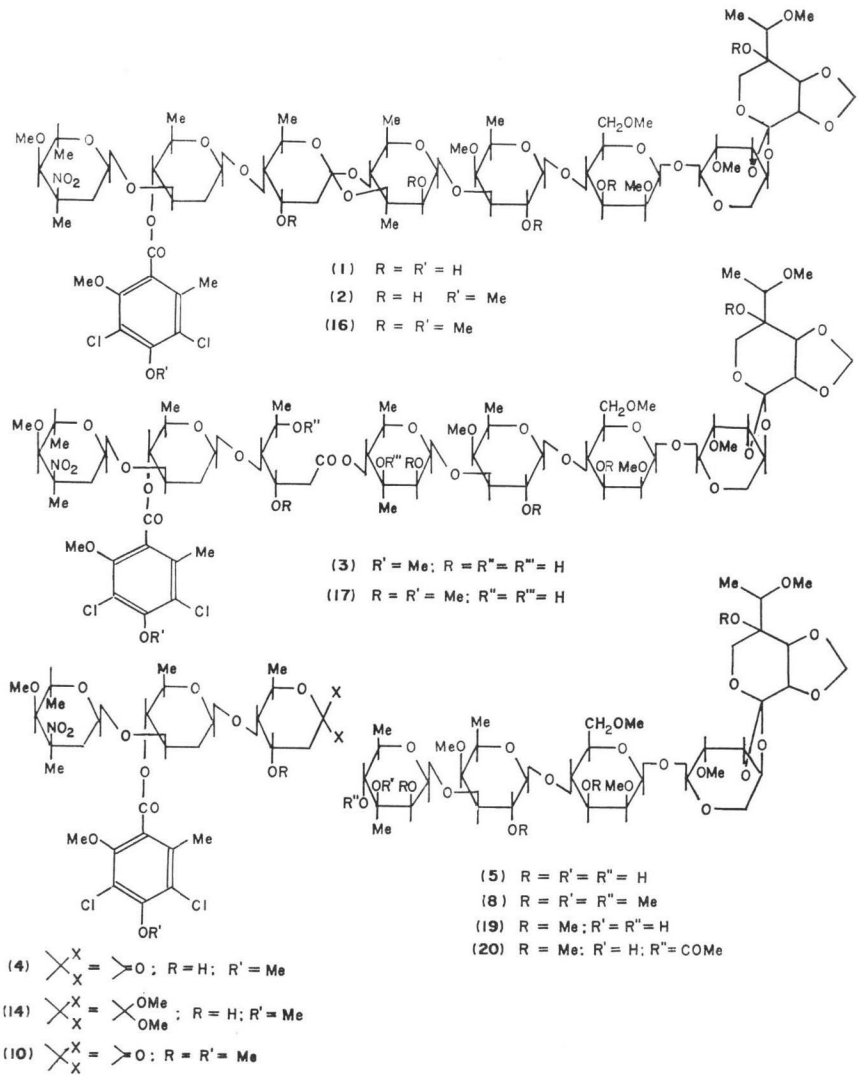
STRUCTURE OF EVERNINOMICIN B

Sir:

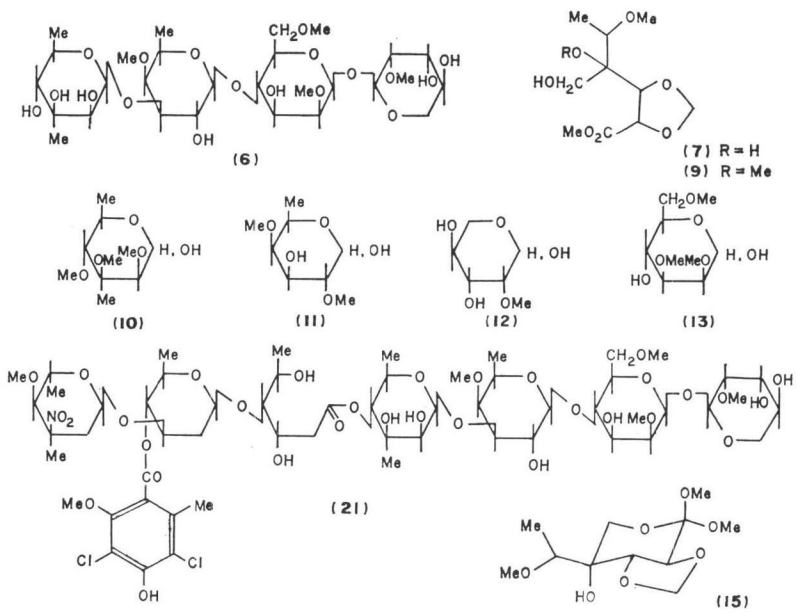
In a previous communication the structure of everheptose B[1], a hydrolysis product of everninomicin B[2], has been disclosed. We report here the structure of everninomicin B.

Everninomicin B (**1**) is a colourless crystaline solid, $C_{66}H_{99}NO_{36}Cl_2$,* m.p. 184~185°C, $[\alpha]_D$ −33.1°, ν max 1732 (ester), 1540 (nitro) cm^{-1}. On treatment with diazomethane everninomicin B formed a monomethyl ether (**2**), $C_{67}H_{101}NO_{36}Cl_2$, m.p. 187~190°C, $[\alpha]_D$ −34.5°. The molecular weight of **2** was found to be 1587 (calc. for $C_{67}H_{101}O_{36}NCl_2$ 1567) by the application of radioactive method[3].

Everninomicin B (**1**) on mild hydrolysis yielded everninomicin B_1 (**3**), $C_{66}H_{101}NO_{37}Cl_2$, $[\alpha]_D$ −49.1°, ν max 1730 (ester), 1540 (nitro) cm^{-1}; the nitro absorption is stronger than the carbonyl absorption. As in everheptose[4] and everninomicin[5] D_1, everninomicin B_1 on treatment with diazomethane underwent cleavage to **4**[4] and olgose B (**5**).



* Satisfactory elemental analyses were obtained for all new compounds.



Olgose B (**5**) is an amorphous solid, $C_{37}H_{62}O_{23}$, $[\alpha]_D$ −23.3°, no carbonyl absorption in the ir. Solvolysis* of **5** with methanolic *p*-toluene sulphonic acid at room temperature yielded evertetrose[1] B (**6**) and an ester[5] (**7**). The linkage of **6** and **7** in the structure of olgose B (**5**) was shown in the following way. Permethylated olgose B (**8**) is a crystalline solid $C_{43}H_{74}O_{23}$, m.p. 182~183°C, $[\alpha]_D$ −26.1°. Solvolysis of **8** yielded **9**[5]. On prolonged aqueous acid hydrolysis permethylated olgose B (**8**) yielded **10**, **11**, **12** and **13**. It is evident from the above observations that the two free hydroxyl groups of 2-O-methyl lyxose moiety must be linked with the primary hydroxyl group and the ester function of **9** in the structure of permethylated olgose B (**8**). The formation of the hydrolysis products of **5** and **8** is then explained by the acid catalyzed opening of the ortho ester function.

Monomethyl ether of everninomicin B (**2**) on solvolysis at 10°C yielded evertetrose B (**6**) and two ortho esters **14** and **15**. Nmr and ms of compound **14**, $C_{32}H_{47}O_{15}NCl_2$, $[\alpha]_D$ −39.5°, were consistent with the assigned structure. Although compound **15** was rather unstable, its nmr spectrum (in benzene) besides showing the expected features of the molecule showed a pair of mutually coupled doublets (J 10 Hz) at δ 3.98 and 4.15 indicating axial relationship of H_2 and H_3 proton in **15** and therefore in olgose B (**5**) and its derivatives.

Permethylated everninomicin B (**16**) is an amorphous solid, $C_{72}H_{111}NO_{36}Cl_2$, $[\alpha]_D$ −29.5°. On mild hydrolysis compound **16** yielded compound **17**, $C_{72}H_{113}NO_{36}Cl_2$, $[\alpha]_D$ −56.4°. Treatment of **17** with diazomethane yielded **18**[5] and partially methylated olgose B (**19**), a crystalline solid, $C_{41}H_{70}O_{23}$, m.p. 167~170°C, $[\alpha]_D$ −35.1°. Compound **19** formed a mono O-acetyl derivative (**20**), $C_{43}H_{72}O_{24}$, ν, max 3510, 1740 cm^{-1}. In the nmr spectrum besides other expected features of the molecules compound **20** showed a signal at δ 4.86 (d, J 10 Hz) for H_4'''' proton. The position of the free hydroxyl groups in **19** was also confirmed by measuring CD of the cuprammonium complex of **19**, $[\theta]_{288}$ +132 (suggesting k^1 chelate). It follows therefore that the two free hydroxyl groups in **19** must be involved in the linkage with the lactone function of **18** in the structure of permethylated everninomicin B (**16**). The conversion of **16** to **17** then involves the opening of one of the ortho ester linkages.

Based on the aforementioned observations, we propose structure **1** for everninomicin B and structure **3** for everninomicin B_1. On

* Solvolysis in this Communication refers to treatment of the compound with methanolic *p*-toluene sulphonic acid.

further hydrolysis everninomicin B_1 (**3**) is converted to everheptose B (**21**). The conversion of **1** to **3** involves opening of one of the ortho ester linkages and opening of both the ortho ester linkages in **1** leads to the formation of **21**.

ASHIT K. GANGULY
ANIL K. SAKSENA

Chemical Research Department
Schering Corporation, Bloomfield,
New Jersey 07003
U.S.A.

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