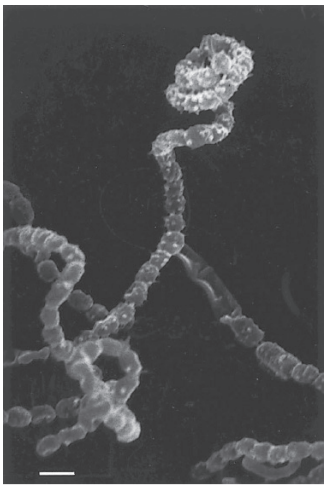
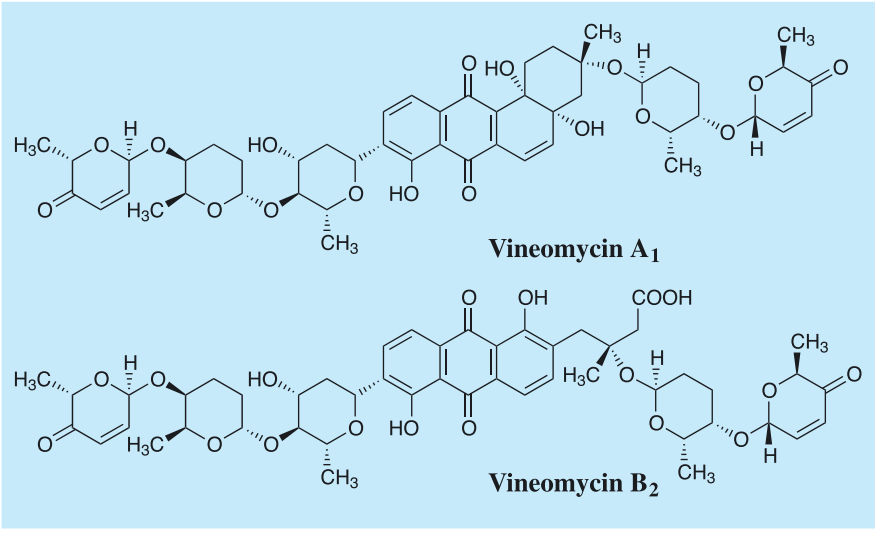
Vineomycin©

1. Discovery, producing organism and structures[1-3)]

While screening for new antibiotics in actinomycetes, vineomycins A_1, A_2, B_1 and B_2 were isolated from the culture broth of *Streptomyces matensis* strain OS-4742^T. These compounds are active against Gram-positive bacteria and the Sarcoma 180 solid tumor in mice. Vineomycin A_1 (P-1894B) also possesses potent inhibitory activity against collagen prolyl hydroxylase. The synthesis of vineomycin B_2 analog has been reported by several groups. The first total synthesis of vineomycin B_2 was reported by Toshima *et al*.[4)] (See Appendix-I).



Streptomyces matensis subsp. *vineus* OS-4742^T



2. Physical data (Vineomycin B_2)[1-3)]

Yellow powder. $C_{49}H_{58}O_{18}$; mol wt 934.36. Sol. in MeOH.

3. Biological activity[1)]

1) Antimicrobial activity

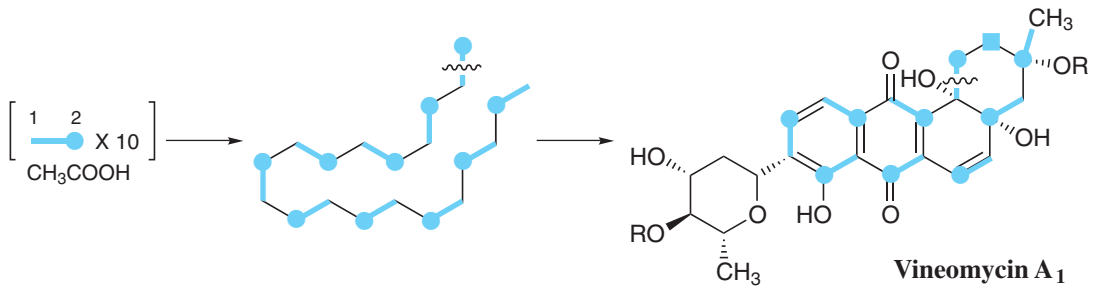
Test organism	MIC (μg/ml)*			
	A1	A2	B1	B2
Staphylococcus aureus FDA209P	0.8	12.5	1.6	1.6
Bacillus subtilis PCI219	3.1	12.5	6.3	12.5
B. cereus T	12.5	50	6.3	25
Micrococcus luteus PCI1001	0.8	12.5	12.5	50
Escherichia coli NIHJ	>100	>100	>100	>100
Pseudomonas aeruginosa P-3	>100	>100	>100	>100
Candida albicans	>100		>100	>100
Aspergillus niger	>100		>100	>100

*Nutrient agar for bacteria (37˚C, 1 day) and potato-glucose agar for fungi (27 °C, 2 days).

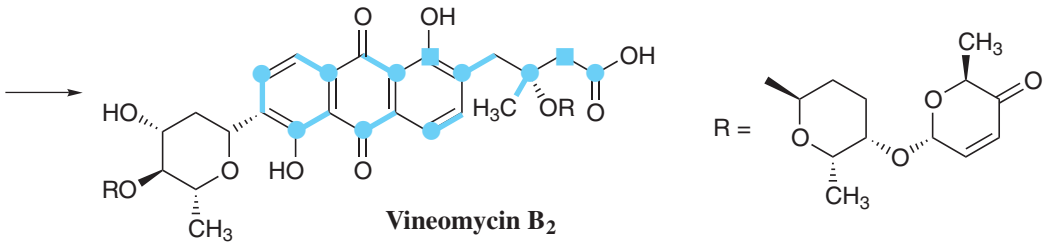
2) Antitumor activity
When vineomycin A_1 (50 mg/kg) was administered *i.p.* once a day after transplantation of sarcoma 180 cells, the tumor size (T/C) on 7th day was 0.13.

4. Biosynthesis[5)]

The labeling experiments with both [1-^{13}C]- and [1,2-$^{13}C_2$] sodium acetate followed by ^{13}C-NMR spectroscopy revealed that the benz[a]anthraquinone chromophore of A_1 originated from a decaketide metabolite by decarboxylation of the carboxyl end and that of B_2 was formed *via* C-C bond cleavage of A_1.



Vineomycin A_1



Vineomycin B_2

5. Vineomycin A_1 is commercially available as a biochemical reagent.

6. References

1. [138] S. Ōmura *et al.*, *J. Antibiot.* **30**, 908-916 (1977)
2. [210] N. Imamura *et al.*, *Chem. Pharm. Bull.* **29**, 1788-1790 (1981)
3. [220] N. Imamura *et al.*, *J. Antibiot.* **34**, 1517-1518 (1981)
4. S. Kusumi *et al.*, *J. Am. Chem. Soc.* **135**, 15909-15912 (2013)
5. [239] N. Imamura *et al.*, *J. Antibiot.* **35**, 602-608 (1982)