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Isolation and Novel X-ray Structure of Naturally Occurring Antibiotic Dianemycin

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Microorganisms such as bacteria, fungi, and algae produce a plethora of polyketide natural products. Most of these secondary metabolites are biosynthesized in order to protect the producing organism from other species present in the environment. As a consequence, many polyketide natural products possess a broad spectrum of biological activities directed against other bacteria, fungi, nematodes, etc. Thus, a strain of *Streptomyces milbemycinus* NRRL 5739, that are microscopic fungi, is known for production of several antibacterial and antiparasitic substances or their precursors.

During the project directed towards biosynthesis and chemical transformations of milbemycins we have unexpectedly isolated and re-characterized a natural product Dianemycin (Fig 1.). The latter has been known since 1970-ties; however, its X-ray studies were not based on crystals with excellent quality.¹ We succeeded to crystallize the aforementioned natural product in a form of its methanol solvate.

Dianemycin belongs to the class of carboxyl ionophores that complex the first row metal cations and therefore affect the transport of these latter in mitochondria.² This property results in outstanding activity against chloroquine-resistant forms of malaria. Other applications include treatment of colchicine resistant carcinomas. On the other hand, its excellent anti-inflammatory activity comparable with that of prednisolone has been documented.³

The isolation and full details of X-ray structure of Dianemycin will be discussed.

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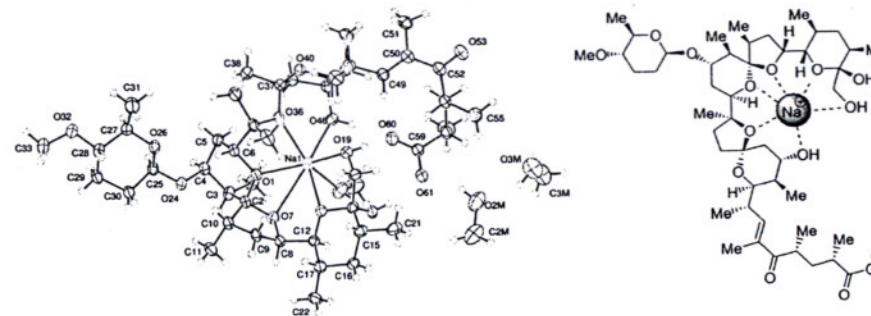


Fig.1 Structural formula and X-ray representation of Dianemycin.