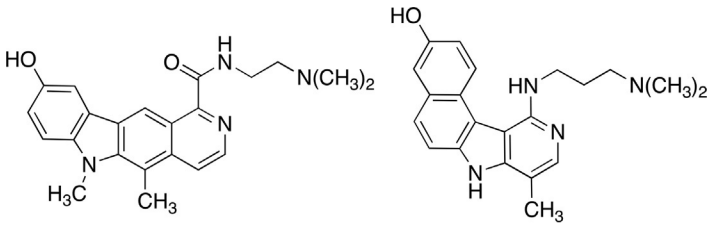

In recent years, patent applications for ellipticine-based cancer treatments have continued to be submitted. Additional mechanisms of action established more recently,[21] such as kinase inhibition, interaction with the p53 transcription factor, bio-oxidation, and adduct formation, showed that compounds of the ellipticine family are multitarget anticancer agents.

2.2 ACTINOMYCINS

Actinomycin D (dactinomycin, Cosmegen®) is a member of the actinomycin family of compounds that was isolated from several *Streptomyces* strains. It contains a phenoxazine chromophore attached to two cyclic depsipeptides containing five amino acid residues, and it can be considered as a hybrid compound that behaves both as a DNA intercalator and as a minor groove binding agent. Although it differs from most intercalating drugs in that it lacks a positive charge, it has been suggested that this is compensated by its high dipole moment, arising from a nonsymmetrical distribution of polar substituents.[22] Dactinomycin is used alone or in combination to treat sarcomas, pediatric solid tumors (e.g., Wilm's tumor, a type of renal tumor), germ cell cancers (testicular cancer), and choriocarcinoma. Its ability to generate superoxide radicals was discussed in Section 5 of Chapter 4.