Doxorubicin

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Brand name: Adriamycin®
Brand name: Rubex®
Brand name: Doxil®
IUPAC: (7S,9S)-7-[(2R,4S,5S,6S)-4-amino-5-hydroxy-6-methyloxan-2-yl]oxy-6,9,11-trihydroxy-9-(2-hydroxyacetyl)-4-methoxy-8,10-dihydro-7H-tetracene-5,12-dione
FDA approval: Yes
Manufacturer Link

Usage:

Doxorubicin is useful in a wide range of cancers, including: breast cancer, lymphoma, soft tissue sarcoma, ovarian cancer and many more. There are only a few cancer types are unresponsive to the drug, which include: colon cancer, melanoma, chronic leukemias and renal cancer. Doxorubicin is administered intravenously. In a newer formulation, Doxil, the drug is surrounded by a lipid ‘bubble’ (membrane). This formulation is an attempt to reduce the toxicity of the drug by blocking its effects on normal tissues.  

Mechanism:

Doxorubicin is an anthracycline antibiotic that exerts its effects on cancer cells via two different mechanisms. It acts as an intercalating agent and wedges between the DNA bases thus blocking DNA synthesis and transcription. The drug also inhibits the activity of an enzyme, topoisomerase type II. This leads to breaks in the genomic DNA. Both of these mechanisms result in DNA disruption that ultimately can lead to the death of the cell. Interestingly, several studies have reported that green tea enhances the antitumor activity of doxorubicin.  

Below is the structure of a 3D Doxorubicin conformer.
