

Deoxyxyboquinone: A Personalized Anticancer Compound

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Deoxyxyboquinone (DNQ) is a potent antineoplastic agent with an unknown mechanism of action. Here we describe a facile synthetic route to this anthraquinone, and we use this material to determine the mechanism by which DNQ induces cancer cell death. DNQ was synthesized in seven linear steps through a route employing three palladium-mediated coupling reactions. Experiments performed on cancer cells grown in hypoxia and normoxia strongly suggest that DNQ induces cell death uniquely by generating reactive oxygen species (ROS). Unlike most other ROS-generating agents, DNQ potently induces death of cancer cells in culture, with IC_{50} values between 16 and 210 nM. ROS-generating quinones are bioreductively activated by specific enzymes which are frequently upregulated in tumors. Thus, DNQ is a potential candidate for the personalized treatment of cancer.

