Drosophila melanogaster deoxyribonucleoside kinase activates gemcitabine

Drosophila melanogaster multisubstrate deoxyribonucleoside kinase (Dm-dNK) can additionally sensitize human cancer cell lines towards the anti-cancer drug gemcitabine. We show that this property is based on the Dm-dNK ability to efficiently phosphorylate gemcitabine. The 2.2 angstrom resolution structure of DmdNK in complex with gemcitabine shows that the residues Tyr70 and Arg105 play a crucial role in the firm positioning of gemcitabine by extra interactions made by the fluoride atoms. This explains why gemcitabine is a good substrate for Dm-dNK.

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