The Anticancer Drug Cisplatin Interacts with the Human Erythrocyte Membrane

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Drugs which exert their effects by interacting with DNA cause structural and functional membrane alterations which may be essential for growth inhibition by these agents. This paper describes the interaction of cisplatin with the human erythrocyte membrane and models constituted by bilayers of dimyristoylphosphatidylethanolamine (DMPE) and diacylphosphatidylserine (DAPS), representative of phospholipid classes located in the inner monolayer of the erythrocyte membrane, and of dimyristoylphosphatidylcholine (DMPC), a class present in its outer monolayer. Cisplatin ability to perturb DMPE, DAPS and DMPC bilayer structures was determined by X-ray diffraction and fluorescence spectroscopy. Electron microscopy disclosed that human erythrocytes incubated with 35 μM cisplatin, which is its therapeutical concentration in serum, developed cup-shaped forms (stomatocytes). According to the bilayer couple hypothesis, this means that the drug is inserted into the inner monolayer of the erythrocyte membrane, a conclusion supported by the studies on model systems.