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Bilayer lipid membrane as a model of photodynamic therapy processes in cancer cells

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The photodynamic therapy of cancer is based on using of photosensitizers (PS) which bind to cells and kill them by singlet oxygen (SO) generated under illumination. These processes were studied *in vitro* on a model system-bilayer lipid membrane (BLM). We have studied adsorption and photodynamic efficiency of various derivates of porphyrins. The binding of PS to BLM as well as damage of incorporated into it special molecules-SO targets-were monitored by measuring of boundary potential (BP) by a method developed by us earlier. The BP was negative in the case of anions of sulfonated tetraphenylporphyrin (TPPS4) and a positive one with cations of β-imidazolyl substituted tetraphenylporphyrine (β-ImTPP) and corresponding Zn(II) complex (β-ImTPPZn). The photodynamic activity of these PS was evaluated as rate R of damage of the SO targets (T)-molecules of di-4-ANEPPS adsorbed on the surface of BLM, under illumination. The rate of oxidation of T molecules adsorbed on (cis) side of the membrane containing PS molecules was compared with that when T was adsorbed on opposite (trans) side. The value of R at *cis*-side was higher than that at *trans*-side in contrast to our earlier study when SO was generated by sulfonated aluminum(III) phthalocyanines. The difference between porphyrins and phthalocyanines was explained by the different position of these PS on the boundary of the membrane.

Biography

Jiménez-Munguía I After concluding degree in Biopharmaceutical Chemistry in Mexico, Irene was awarded a grant from Fundación Carolina for studying the Master in Genetic, Molecular and Cellular Biotechnology. She obtained PhD. in Biomedicine at The Department of Biochemistry and Molecular Biology of The University of Cordoba in Spain. Mainly, she has been working in proteomics-based techniques to obtain vaccine candidates against pathogenic bacteria. In LBMI, Irene is focused on deciphering ligand-receptor interactions during meningitis caused by S. pneumoniae.

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