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Different Types of Channel Activity of Gramicidin A and Its Analogues

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Gramicidin A is a channel-forming pentadecapeptide selective for monovalent cations. A method of sensitized photoinactivation elaborated in our laboratory enables a study of kinetic properties of gramicidin channels at the level of macroscopic electrical current. The method is based on the selective damage of tryptophane residues in gramicidin by singlet oxygen generated upon a light flash in the presence of a photosensitizer. The method as well as single-channel measurements were applied for the study of the interaction of avidin with gramicidin derivatives carrying biotin at the C-terminus. It was shown that avidin binding leads to a

formation of tandem gramicidin channels, which has increased lifetime as compared to control channels. Other analogues carrying polycationic sequence terminating with cysteine residue at the C-terminus of gramicidin were studied. It was shown that the properties of the channels formed by these analogues depended substantially on the factors affecting the degree of the cysteine reduction and oxidation.

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