

Photodynamic killing of *Blepharisma* (albino), *Climacostomum* and *Dileptus* by treatment with photosensitizer pigments

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Blepharisma japonicum produces a red pigment, blepharismine. Blepharismine is highly toxic to various ciliates in the dark. It is known that blepharismine has a defense function against predatory protists. Blepharismine is a photodynamic pigment. Even a dilute solution of blepharismine photosensitizes colorless cells. *Blepharisma* and *Climacostomum* are highly resistant to the toxicity of blepharismine in the dark. Are they also resistant to the toxicity of blepharismine in the light? We examined the photodynamic killing of *Blepharisma* (albino), *Climacostomum* and *Dileptus* by treatment with the photosensitizer pigments blepharismine, eosin, erythrosin, rose bengal and methylene blue. *Blepharisma* (albino) and *Climacostomum* were killed by the phototoxicity of blepharismine. *Climacostomum* was most resistant among the three ciliates to the phototoxicity of the acidic photosensitizer pigments and most sensitive to the phototoxicity of the basic photosensitizer pigment. *Blepharisma* (albino) was not resistant to the phototoxicity of any photosensitizer pigments tested in this work. These findings suggest that the mechanism of toxicity of blepharismine in the dark is different from that of its phototoxicity. The fact that *Blepharisma* is resistant to the toxicity of blepharismine in the dark but is sensitive to the phototoxicity of blepharismine suggests that *Blepharisma* developed the photophobic response to escape from harmful light.