

PHOTOTOXIC REACTION

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Phototoxic reaction is defined by the combined action of a chemical agent and a physical agent (light). Photosensitizers, drugs or chemicals that can cause phototoxic reaction, may reach the skin either directly following external exposure or indirectly following systemic administration. A lot of drugs, traditional medicinal herbs, food additives, cosmetic ingredients, agricultural or industrial chemicals may work as photosensitizers. Phototoxic reaction usually augments biologic action of ultraviolet-A (UVA) that is more abundant in natural sunlight but has less biologic actions than ultraviolet-B (UVB). To evaluate the potentials of drugs or chemicals to induce phototoxic reaction, we can use several *in vitro* or *in vivo* experiments. Those chemicals usually have absorption peak at ultraviolet region and show fluorescence. In addition, they induce phototoxic killing of microorganisms like *Candida albicans* or *Salmonella typhimurium*, and phototoxic lysis or killing of various cells. We can also evaluate the phototoxic reaction by *in vivo* experiment. Phototoxic reaction usually increases edema that can be measured by swellings of back skin or ears, and induces formation of apoptotic killing of skin keratinocytes (sunburn cells). They also suppresses immune response locally. Although the phototoxic reactions usually shows harmful effects, they also have beneficial effects. The fluorescence helps simple and quick diagnosis in clinical dermatology. Photochemotherapy using psoralen and UVA (PUVA) is one of the best treatments in many skin diseases. Extracorporeal photochemotherapy is a modification of PUVA to treat cells in circulating blood. Photodynamic therapy also utilizes the phototoxicity but they usually use different light and chemicals. When we put laser light on various endoscopic devices, phototoxic reaction will also be used in various internal diseases like lung or urinary bladders. Comprehensive experimental works on the phototoxic reaction will help us to find out better chemicals for the photochemotherapy, photodynamic therapy, or some laser therapy, and will give informations for pharmaceutical manufacturing of drugs with less phototoxic reaction.