# PHOTOCHEMISTRY OF PSORALENS AND PUVA THERAPY

Sang Chul Shim

Department of Chemistry, Korea Advanced Institute of Science and Technology
373-1 Kusong-Dong, Yusung-Gu, Taejon 305-701, Korea

Psoralens have shown skin photosensitizing effects [1] with UVA (320-400 nm) light absorption and have been used in PUVA photochemotherapy for the treatment of skin diseases such as psoriasis and vitiligo, mycosis fungoides, and chronic leukemia [2]. They are, however, phototoxic to insects, fungi, viruses, and bacteria leading to mutation, cancer, and killing of cells [3]. Therefore, many efforts have been made to synthesize new derivatives of furocoumarins along with the investigation about the photosensitization mechanism and metabolism of psoralens.

Many important studies showed that photosensitization by psoralens has been mainly ascribed to the photoreaction with DNA which occurs by three successive steps [4]; intercalation into DNA base pairs, monoadduct formation, and cross-linking of DNA. Two photoreactive sites of psoralens, namely 3,4- and 4',5'-double bond, can form cyclobutane monoadducts with a 5,6-double bond of pyrimidine bases and only 4',5'-monoadduct has been known to form a cross-link with the other DNA strands.

Although the involvement of two reactive sites is important for skin-photosensitization, the biological activities of some psoralen derivatives are known to be related to their monoadduct [5] and more efforts have been made to synthesize new monofunctional psoralens, largely because they induce less photogenotoxicity compared to bifunctional psoralens [6]. Little photogenotoxicity is known to be due to the relatively easy repair process of gene modification caused by photocycloaddition of monofunctional psoralens.

Pyrazinopsoralen (PzPs) and pyridopsoralen having fused aromatic rings on the 3,4 site are expected to have little genotoxic effect due to monofunctionality and great proximity effect [7,8]. Photophysical and photochemical properties of these monofunctional psoralens will be discussed in comparison with bifunctional psoralens.

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## References

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