

Crosslinking of Amino Acids Photosensitized by Rose Bengal

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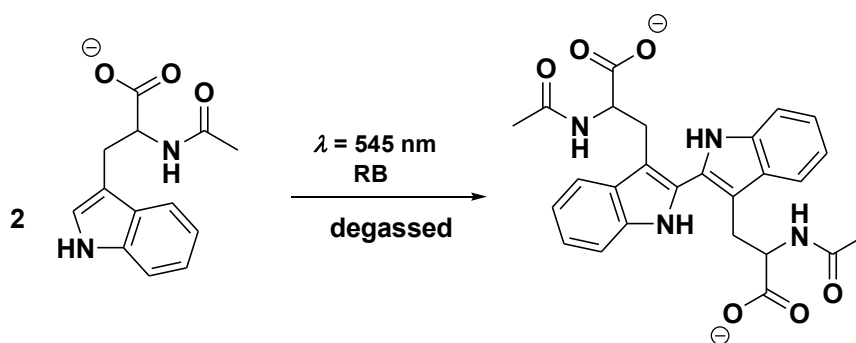
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Non-invasive approaches to stitching wounds are gaining importance. The laser welding was shown to be a successful alternative to the classical chirurgic stitching.¹ Kochevar and co-workers have introduced another methodology to seal wounds. Rose bengal (RB), a well-known xanthene dye and oxygen sensitizer,² can induce tissue bonding upon irradiation with a green-light laser. Pork and human tissues were shown to be successfully sealed both in vitro and in vivo.³⁻⁴ However, the mechanism of this process is not understood well.

We performed a detailed spectroscopic study of photosensitized coupling reactions of selected amino acids (e.g., Figure 1). Crosslink products of were analyzed by UV-Vis absorption and fluorescent spectroscopies and LC/MS. The initial step - an electron transfer - was also studied by nanosecond laser flash photolysis using a 532 nm laser as a source of excitation. We show that these photoinduced electron transfer processes can play an important role in a complex mechanism of photochemical tissue bonding.

Fig.1



1 Simhon, D., et al., *Lasers Surg Med* **2001**, 29, 265-273.

2 Neckers, D. C., *J. Photochem. and Photobiol. A-Chem.* **1989**, 47, 1-29.

3 Mulroy, L., et al., *Invest Ophthalmol Vis Sci* **2000**, 41, 3335-3340.

4 Chan, B. P., Kochevar, I. E., and Redmond, R. W. *J Surg Res* **2002**, 108, 77-84.