

Notes by Joan B. Martin MD

Please contact me with any corrections

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PHOTODYNAMIC TISSUE REPAIR AND HEALING

Michael Hamblin, Harvard

- Problems with conventional suturing/staples: labor intensive, gap too big, sensitive tissues such as the eyes
- Tissue glues:
 - Cyanoacrylates: relatively toxic
 - Fibrin sealants: \$, from blood, not that strong
 - Gelatin-resorcinol-formol glues: toxic
 - Light activated adhesives and bonding technologies
 - Hydrogels: polymerize into solid in the presence of light
 - Dye activated protein solders: non-covalent bonds in the tissue
 - Photochemical tissue bonding: dye rose Bengal without exogenous proteins forms direct covalent bonds but must get edges together
 - PLATG
 - Very soluble to allow viscous formulation
 - Glue remain in place
 - Protein molecules very close
 - Need light
 - Need oxygen
- Prior work:
 - Riboflavin 6 P fibrinogen + argon laser: not so good
 - Chlorin (e6) BSA + argon laser: strong bonds
- Research Chlorin (36) + albumin and Janus green
 - Is possible to get as strong as native tissue
- Glues are biodegradable and temporary
- Low radiance and low heat
- Good for filling in gaps
- Fairly strong
- Fibrin glue not easily obtained, can pass viral infection
- Gives you more control if you have photoactivation

PDT MODULATES WOUND HEALING IN KELOID TUMORS

Brian Wong, Beckman Laser Institute, USA

- Irvine, CA
- Associate Professor, Facial Plastic Surgery, ENT, UC Irvine
- PDT was developed as magic bullet for tumors
- His emphasis is on the nose
- Many off label uses for photodynamic TX of sun damaged skin
- Clinical problem: aberrant wound healing

- Keloids: excessive collagen deposition extending beyond the borders of the injury
- Hypertrophic scars stay within the boundaries of the injury
- Current keloid TX options
 - Steroid injections
 - Surgical excision
 - Cryosurgery
 - Local chemotherapy
 - Radiation
 - Regrowth/recurrence 50%
- Don't know why keloids form
- Steroid injections are hit and miss (perhaps due to penetration)
- Can photodynamic therapy (PDT) be used in combination with surgery?
- Motivation:
 - Early studies of PDT for tumors didn't work to cure the malignancies but resulted in reduced scar formation
 - PDT already used to treat benign disorder
- Advantages
 - Photosensitizers localize
 - Drug activation specific
 - Leave scaffolding for wound healing
- Research
 - No animal models exist
 - Use tissue engineered "keloids"—have been developing
 - Keloid derived fibroblasts in culture behave differently than normal
 - Keloid is a collagen tumor
 - Estimating collagen density
 - Collagen density increases more than normal in keloids after wounding
- What can PDT do?
 - ALA
 - Diode laser, 635 nm, 5, 10, 20 Jcm²
- Conclusions:
 - Allows study of fibroblasts
 - Allow serial measurement of same specimen over time
 - PDT can be used to reduce contraction and collagen production without overt reduction in tissue viability