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:
  - Cycocrylates: 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
  o Steroid injections
  o Surgical excision
  o Cryosurgery
  o Local chemotherapy
  o Radiation
  o 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:
  o Early studies of PDT for tumors didn’t work to cure the malignancies but resulted in reduced scar formation
  o PDT already used to treat benign disorder
• Advantages
  o Photosensitizers localize
  o Drug activation specific
  o Leave scaffolding for wound healing
• Research
  o No animal models exist
  o Use tissue engineered “keloids”—have been developing
  o Keloid derived fibroblasts in culture behave differently than normal
  o Keloid is a collagen tumor
  o Estimating collagen density
  o Collagen density increases more than normal in keloids after wounding
• What can PDT do?
  o ALA
  o Diode laser, 635 nm, 5, 10, 20 Jcm2
• Conclusions:
  o Allows study of fibroblasts
  o Allow serial measurement of same specimen over time
  o PDT can be used to reduce contraction and collagen production without overt reduction in tissue viability