Novel Synthetic & Biodegradable Surgical Adhesive & Tissue Sealant

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Potential Indications

Seroma
- Seroma, an abnormal collection of serous fluid within the tissues of the body
- A common postoperative complication particularly following ablative and reconstructive surgeries
- Can lead to significant patient morbidity (infection and reoperation)
- Treated most effectively with Jackson-Pratt drains but high risk of infection

Hemorrhage
- After a traumatic injury, hemorrhage is responsible for over 35% of pre-hospital deaths in the U.S.
- Hemorrhage is also the most common cause of death both in hospitals and on the battlefield
- $1.4\ Million surgeries have taken place in the U.S. in 2014
- Intraoperative & postoperative bleeding can lead to critical surgical complications (transfusions, re-operations, death)
- Need for highly efficacious hemostats.

Hemostasis
- Global hemostats market expected to reach $2.76 billion by 2020 (CAGR of 6.2% from 2015)

Existing Hemostatic Agents commercialized:
- Fibrin Sealant, a blood-derived product
  - Risk of disease transmission
  - Very expensive to produce
- Adherus Dural Sealant (Hyperbranch), Synthetic dendritic polymers
  - Expensive to produce
  - Low volume.

Surgical Adhesive Market for Seroma Prevention
- Global surgical sealants & adhesives market estimated to reach $2.64 billion by 2020 (CAGR of 9.2% from 2015)

Existing Sealant Agents commercialized:
- TISSUGLU® Surgical Adhesive (Cohera Medical), a polyurethane-based product
  - Require 45min operating room time
  - At least weeks to be absorbed.

Proof of Concept

Hemostasis
In rat partial hepatectomy model, three treatment groups: (1) topical MPEG-pDHA, (2) Topical Instat™, a commercially available hemostatic powder, (3) topical saline as a control:
- adult male Sprague-Dawley rats
- No inflammatory response in the MPEG-pDHA group
- No residual polymer after 7 days
- MPEG-pDHA doesn’t affect the markers of coagulability (prothrombin time (PT) and partial thromboplastin time (PTT))
- Bleeding time significantly shorter when treated with MPEG-pDHA compared to Instat™ and saline control
- Blood loss significantly decreased when treated with MPEG-pDHA compared to saline control

Seroma
In an animal model of radical breast mastectomy:
- MPEG-pDHA 5000-3000 results in over 95% reduction in seroma volume
- Normal-appearing early granulation tissue and a mild inflammatory response that was equal to untreated control animals
- Reduction in seroma volume
- Utility for the prevention or treatment of postoperative seroma.

Advantages of the Technology
- Thixotropic hydrogel that is rapidly resorbable (few days)
- Easily extruded through narrow-gauge needles (injectable)
- Biocompatible
- Low immunogenicity
- Properties can be fine-tuned by adjusting the length of its constituting blocks.

MPEG-pDHA, a rapid & highly effective hemostatic agent in vivo.

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