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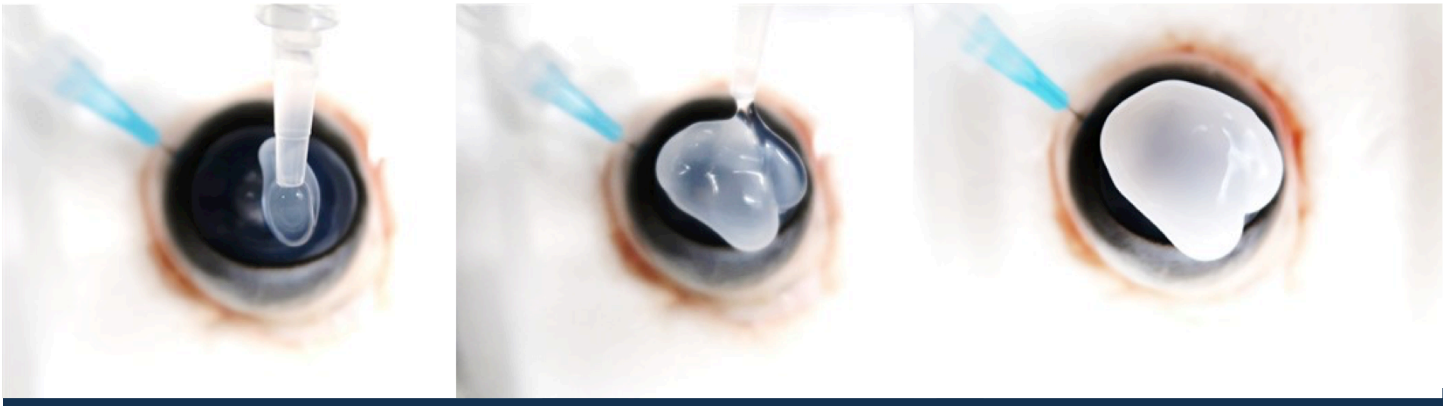

TriaGel: Comprehensive gel eye dressing to revolutionize ocular first aid ID: 4068-4336

Featured Innovators: Morgan Fedorchak, PhD, Michael Washington, PhD, Jenny Yu, MD, and Valerie Quickel

Every day in the US alone there are 2000 workplace eye injuries, these occupational injuries cost USA employers $467M per annum. If the long-term severity of these injuries could be reduced, the employees would return to work quicker and be more productive. Point-of injury application of TriaGel not only manages wound hydration and provides tissue support but also controls inflammation unlike current products which simply consist of water and gauze. Generally, patients with workplace eye wounds do not receive specialist attention for four to six hours post injury. However, inflammation that occurs in the time from injury to this specialist treatment can cause irreversible tissue damage that often leads to permanent vision loss or disfigurement for the patient, so early control is critical. TriaGel, a first-in-kind topical gel eye dressing, is designed to provide active and immediate management of ocular wounds at the point of injury. By minimizing inflammation, hydrating damaged tissue, and protecting the injured area, it offers safety product distribution companies an innovative differentiated eye care solution where there currently is none.

Technology Description

TriaGel can be applied in any pre-hospital setting. In a matter of seconds, the viscous gel is applied topically and conforms to the unique shape and volume of the wound. It quickly transforms to a solid with properties tailored to mimic orbital fat, which can be easily removed without disrupting the injury site. TriaGel allows nutrients and oxygen to permeate, preserves the tissue in a water-rich environment, and can also be enhanced to autonomously reduce inflammation by slowly releasing FDA-approved drugs in an affordable, efficient, and easy-to-use manor. Reduced swelling and faster stabilization can facilitate shorter times to initial physician evaluation, leading to dramatically better quality of care and outcomes for the patient. TriaGel can revolutionize ocular first aid.

Advantages

- Only comprehensive ocular trauma management device
- Quick and convenient topical administration; one step under 15 seconds
- Facilitates normal wound healing
- Sustained delivery of anti-inflammatory drugs for six hours

Applications

- Actively and immediately manage acute ocular and periorbital injuries
- Minimize risk of infection, inflammation, and scarring through the continual release of therapeutic drugs

TriaGel

Stage of Development

The fully characterized TriaGel formulation is currently being tested in preclinical models for wound healing, ocular and dermal drug delivery, and irritation assays relevant to complex ocular trauma.

IP Status

Provisional/utility patent filed 11/16/2017.

Notable Mentions

Completed Pitt's First and Second Gear Programs and Blast Furnace

2017 Chancellor's Innovation Fund - $35,000

2018 Center for Medical Innovation Award - $25,000

2018 Randall Family Big Idea 2nd place - $15,000

Future

Entrepreneurial Lead, Valerie Quickel, is currently evaluating the regulatory and commercial pathways with the intention of spinning out of the university and applying for SBIR funding in 2019.

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Innovators

Morgan Fedorchak, PhD

Assistant Professor of Ophthalmology
Chemical Engineering and Clinical & Translational Sciences
University of Pittsburgh

Dr. Fedorchak is the director of the Ophthalmic Biomaterials Laboratory and one of the founders of Selkie Therapeutics, LLC, an ocular drug delivery company developing the SoliDrop technology. Her lab's focus is in the specific application of biomaterials and drug delivery systems in ophthalmology. The highly translational work done in the Fedorchak Lab regularly intersects with the innovation ecosystem at Pitt and beyond, including the Benchtop to Bedside course, the Coulter TPII program, the Idea Foundry Life Sciences Accelerator, and the recently awarded Chancellor's Innovation Fund. Her academic research is funded by the National Eye Institute and the Cystinosis Research Foundation.

Education

PhD Bioengineering
University of Pittsburgh

BS Chemical and Biomedical Engineering
Carnegie Mellon University

Publications

- Fedorchak MV, et al. Long term glaucoma drug delivery using a topically retained gel/microsphere eye drop. Scientific Reports, 2017. *In press*.
- Mammen A, et al. Endophthalmitis Prophylaxis Using a Single Drop of Thermo-Responsive Controlled-Release Microspheres Loaded with Moxifloxacin in a Rabbit Model. Transl Vis Sci Tech 5(6):12, 2016.
- Fedorchak MV, et al. 28-day ocular delivery of brimonidine tartrate from rationally designed degradable microparticles in a rabbit model. Exp Eye Res, 125:210-6, 2014.
- Mealy J, et al. Development of a one-month controlled release ocular insert to treat glaucoma. Acta Biomaterialia 10(1):87-93, 2014.

Michael Washington, PhD

Ophthalmology Postdoctoral Scholar
Polymer Chemistry and Materials Science

Dr. Washington is a postdoctoral scholar with experience in developing novel ophthalmic biomaterials and treatment methods for a variety of ocular ailments, specifically ocular trauma. His graduate research expanded the field of sequenced copolymers by providing the first comprehensive report that compared the bulk properties of a set of novel sequence-defined copolymers to random analogues in a highly translational manner. He is the lead researcher for TriaGel and is supported by the NIH T32 grant.

Education

PhD Chemistry
University of Pittsburgh

BS Chemistry
Seton Hill University

Publications

- Li J, et al. Sequence-Controlled Polymers: Synthesis, Self-Assembly, and Properties. American Chemical Society, Vol. 1170, 271-86, 2014. Washington, MA, et al. The impact of monomer sequence and stereochemistry on the swelling and erosion of biodegradable poly(lactic-co-glycolic acid) matrices. Biomaterials 117, 66-76, 2017.
- Swisher, JH, et al. Properties and Applications of Sequence-Controlled Polymers. Wiley-VCH 436-466, 2017. Washington, MA, et al. Monomer Sequence in PLGA Microparticles: Effects of Acidic Microclimates and in vivo Inflammatory Response. Acta Biomaterialia 65, 259-271, 2018.

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Featured Innovators

Jenny Yu, MD

Assistant Professor of Ophthalmology
Orbital, Ocuplastics and Aesthetic Surgery Services
University of Pittsburgh

Dr. Yu serves on the Orbital, Oculoplastic, and Aesthetic Surgery Service, is an Assistant Professor of Ophthalmology and Otolaryngology, University of Pittsburgh, and is the Team Ophthalmologist for the Pittsburgh Penguins. Dr. Yu has had both clinical and basic science experience since college. She has worked on spinal cord injury research where she developed animal model protocols focusing on the healing immunology of the central nervous system. Her experience in ophthalmology has allowed her to become involved in various basic and clinical research projects including evaluating ocular structural changes after laser treatments, diagnosis of ocular diseases via imaging, and studying the effects of pharmaceuticals on the ocular surface.

Education

MD. Medicine
Ohio State University

BS Biochemistry
Ohio State University

Publications

- Duncan, KE, et al. The Utility of Image Guidance in Developing Minimally Invasive Periorbital Approaches of the Skull Base. J Neurol Surg B, 78(S 01), S1-S156, 2017.
- Ares WJ, et al. Gamma Knife Radiosurgery for Uveal Metastases: Report of three cases and a review of the literature. Am J Ophthalmol, 2017.
- Davidson EH, et al. Clinical Considerations for Vascularized Composite Allotransplantation of the Eye. J Craniofac Surg, 2016

Valerie Quickel

Entrepreneurial Lead

Valerie Quickel is a graduate from the University of Pittsburgh's College of Business Administration where she studied Global Management, Marketing, and French. She joined the team to utilize her business acumen by further evaluating the technology's market potential. Her entrepreneurial spirit is demonstrated by her participation in Innovation Institute programs, as well as her heavy involvement on the team in her post-graduate career. Valerie looks forward to becoming more involved in the Pittsburgh start-up community, as well as refining her knowledge on the medical device industry.

Education

BS Business Administration
University of Pittsburgh

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