



### Key Investigator

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### Field

- Non-invasive medical diagnostics
- Continuous health monitoring
- Diabetes management
- Wearable health technology

### Technology

- Silicone hydrogel
- Fluorescent assay
- Glucose monitoring
- Analyte detection

### Advantages

- Non-invasive
- Continuous monitoring
- High specificity and sensitivity

### Status

Available for licensing

### Patent Status

US Patent 11,369,295 (issued)

### UMB Docket Reference

JL-2016-128

### External Reference

"Contact Lenses Market Size, Share & Trends Analysis Report By Material (Hybrid Lens, Silicone Hydrogel), By Design (Spherical Lens, Toric Lens), By Application, By Distribution Channel, By Usage, And Segment Forecasts, 2023 - 2030," Grand View Research, 2023. [Link](#).

"Diabetes Devices Market Size, Share & Trends Analysis Report By Type (BGM Devices, Insulin Delivery Devices), By Distribution Channel, By End-use (Hospitals, Homecare), By Region, And Segment Forecasts, 2023 - 2030," Grand View Research, 2023. [Link](#).

## Silicone Hydrogel Based Fluorescent Assay and Contact Lens

### Summary

The "Silicone Hydrogel Based Fluorescent Assay and Contact Lens" patent introduces a novel technology for non-invasive medical diagnostics. It integrates a fluorescent assay into a silicone hydrogel contact lens, enabling real-time glucose monitoring in tear fluid. This lens may also detect other medically significant analytes. Beneficial for diabetes management, the innovation has broader health monitoring applications. The diabetes devices market was valued at USD 28.1 billion in 2022, with an expected CAGR of 7.5% from 2023 to 2030. The contact lens market, valued at USD 17.14 billion, is projected to grow at a CAGR of 8.9% during the same period. The patented technology presents an opportunity to offer multifunctional, health-monitoring contact lenses to a wide user base.

### Market

The patented technology of a Silicone Hydrogel Based Fluorescent Assay and Contact Lens has substantial commercial applications in the healthcare and vision market. This innovation harnesses the unique properties of silicone hydrogel, a material already popular in contact lens production due to its high oxygen permeability and comfort and integrates a fluorescent assay capable of detecting analytes such as glucose in tear fluid. The commercialization of this technology could change the way individuals monitor chronic conditions like diabetes, offering a non-invasive, real-time solution for tracking glucose levels and other medically important analytes.

The global diabetes devices market size was valued at USD 28.1 billion in 2022 and is expected to grow at a compound annual growth rate (CAGR) of 7.5% from 2023 to 2030. This market encompasses devices that are used for the monitoring and treatment of diabetes, such as blood glucose meters, insulin delivery devices, and continuous glucose monitoring systems. The growth of this market is attributed to several factors, including technological advancements, the rising incidence of obesity, and the increasing prevalence of diabetes globally.

The market for contact lenses is also substantial, with a valuation of USD 17.14 billion in 2022, and is projected to expand at a CAGR of 8.9% from 2023 to 2030. This growth is primarily fueled by the increasing prevalence of refractive errors among the global population and the rising number of the elderly, who are more susceptible to eye-related diseases. The integration of health monitoring into contact lenses could tap into this growth, addressing a currently unmet need for continuous, non-invasive health monitoring.

Market trends indicate a strong consumer preference for advanced contact lens materials like silicone hydrogel, which offer enhanced comfort for prolonged wear. This preference aligns with the patented technology's use of silicone hydrogel as its base material. Additionally, there is a growing trend towards incorporating technology into contact lenses for augmented reality applications and health monitoring, suggesting a receptive market for the patented technology.

### Technology

The patent titled "Silicone Hydrogel Based Fluorescent Assay and Contact Lens" describes a bioassay technology and non-invasive medical diagnostics. At the heart of this invention is a probe composition that is integrated into a silicone hydrogel substrate. The probe is composed of four distinct parts: a hydrophobic portion, a hydrophilic portion, an analyte-binding portion, and a fluorophore portion. The analyte-binding portion is specifically

designed to bind to an analyte present in an aqueous solution, such as tear fluid. The fluorophore portion is the component that reacts to this binding event by altering its optical properties, particularly the way it emits fluorescent light upon excitation. This change in fluorescence is indicative of the presence and concentration of the analyte, which, in the case of this patent, is primarily glucose.

The silicone hydrogel substrate's dual-network system—comprising a hydrogel network for aqueous solution flow and a silicone network—ensures controlled exposure to tear fluid, enabling accurate glucose level detection.

This system's advantages include continuous, real-time glucose monitoring without blood samples, reducing discomfort and complications from frequent testing, especially for diabetes patients. While primarily for glucose monitoring in diabetics, the technology's principle could extend to other medical conditions, offering a versatile platform for non-invasive diagnostics.

The primary application of this technology is, undoubtedly, the monitoring of glucose levels in diabetic patients. However, the underlying principle of the technology – the detection of analytes in bodily fluids through a contact lens – has broader implications. It could potentially be adapted to monitor other biomarkers relevant to different medical conditions, making it a versatile platform for non-invasive diagnostics.

Materials and components used in this technology are at the forefront of medical device innovation. Silicone hydrogel is a material commonly used in contact lenses due to its biocompatibility and oxygen permeability, which are crucial for maintaining corneal health. The probe composition's design represents an advancement in fluorescent probe technology, where specificity and sensitivity to the target analyte are key.

## References

- "Contact Lenses Market Size, Share & Trends Analysis Report By Material (Hybrid Lens, Silicone Hydrogel), By Design (Spherical Lens, Toric Lens), By Application, By Distribution Channel, By Usage, And Segment Forecasts, 2023 - 2030," Grand View Research, 2023. [Online]. Available: <https://www.grandviewresearch.com/industry-analysis/contact-lenses-market>.
- "Diabetes Devices Market Size, Share & Trends Analysis Report By Type (BGM Devices, Insulin Delivery Devices), By Distribution Channel, By End-use (Hospitals, Homecare), By Region, And Segment Forecasts, 2023 - 2030," Grand View Research, 2023. [Online]. Available: <https://www.grandviewresearch.com/industry-analysis/diabetes-devices-market>.

## Additional Information

- **Potential Fields of Application:** Non-invasive medical diagnostics, continuous health monitoring, diabetes management, wearable health technology.
- **Keywords:** Silicone hydrogel, fluorescent assay, contact lens, non-invasive glucose monitoring, analyte detection, biomarker monitoring, diabetes care, medical device.
- **Advantages:** Non-invasive, continuous monitoring, real-time data, reduced discomfort, potential for monitoring multiple biomarkers, high specificity and sensitivity.

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## Patent Number:

- US Patent 11,369,295